Kemenkes
RS Kariadi

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) AND MANAGEMENT PLAN (ESMP)

Development of Rumah Sakit Umum Pusat Dr. Kariadi Semarang



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GLOSSARY AND ABBREVIATIONS

ACM	Asbestos Containing Materials
AIIB	Asian Infrastructure Investment Bank
AMDAL	Analisis Mengenai Dampak Lingkungan (Environmental Impact Assessment)
ANDAL	Analisis Dampak Lingkungan — main impact assessment document within AMDAL
AoI	Area of Influence
APHA	American Public Health Association
B3 / LB3	Bahan Berbahaya dan Beracun / Limbah B3 (Hazardous and Toxic Materials / Wastes)
BLU	Badan Layanan Umum (Public Service Agency)
BMAL	Baku Mutu Air Limbah (Wastewater Effluent Quality Standard)
BMUE/BMEU	Baku Mutu Emisi Udara (Stack Emission Quality Standard)
BMN	Barang Milik Negara (State-Owned Asset)
BOR	Bed Occupancy Rate
BPK	Balai Pelestarian Kebudayaan (Cultural Heritage Preservation Office)
BPJS	Badan Penyelenggara Jaminan Sosial (Social Security Agency)
BPS	Badan Pusat Statistik (Central Statistics Agency)
BWK	Bagian Wilayah Kota (City Planning Area)
CBZ	Centrale Burgerlijke Ziekeninrichting (colonial-era designation of RSDK)
CESMP	Contractor's Environmental and Social Management Plan
CFP	Chance Find Procedure
CHMP	Cultural Heritage Management Plan
CHMPF	Cultural Heritage Management Plan Framework
CHSMP	Community Health, Safety, and Security Management Plan
CRA	Climate Risk Assessment
CSC	Construction Supervision Consultant
DED	Detailed Engineering Design
DJKN	Direktorat Jenderal Kekayaan Negara (Directorate General of State Assets)
DLH	Dinas Lingkungan Hidup (Provincial/Municipal Environment Agency)
EGI	PT Equator Global Internasional (Safeguards Consultant)
ESEL	Environmental and Social Exclusion List
ESF	Environmental and Social Framework

ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESP	Environmental and Social Policy
ESS	Environmental and Social Standard(s)
FS	Feasibility Study (PT Pandu Persada, December 2025)
GBV	Gender-Based Violence
GHG	Greenhouse Gas
GMS-DC	Gedung Medik Sentral and Diagnostic Centre (proposed new building)
GRM	Grievance Redress Mechanism
HAI	Hospital-Acquired Infection
HEPA	High-Efficiency Particulate Air (filtration)
HIA	Heritage Impact Assessment
HIAF	Heritage Impact Assessment Framework
HMP	Heritage Management Plan / Programme
HOCP	Hospital Operational Continuity Plan
HVAC	Heating, Ventilation, and Air Conditioning
ICCA	Instalasi Catheterisasi Jantung (Cardiac Catheterisation Lab)
ICCU	Intensive Cardiac Care Unit
ICB	International Competitive Bidding
ICRA	Infection Control Risk Assessment
ICU	Intensive Care Unit
IGD	Instalasi Gawat Darurat (Emergency Department)
IPAL	Instalasi Pengolahan Air Limbah (Wastewater Treatment Plant)
IPC	Infection Prevention and Control
IRM	Instalasi Rehabilitasi Medik (Medical Rehabilitation Unit)
K3	Keselamatan dan Kesehatan Kerja (Occupational Health and Safety)
KA-ANDAL	Kerangka Acuan ANDAL (Terms of Reference for the Impact Assessment)
Kemenkes	Kementerian Kesehatan Republik Indonesia (Ministry of Health)
KGJ	Keputusan Gubernur Jawa Tengah (Central Java Governor Decree)
KKOP	Kawasan Keselamatan Operasi Penerbangan (Aviation Safety Zone)
KKPR/PKKPR	Konfirmasi / Persetujuan Kesesuaian Kegiatan Pemanfaatan Ruang (Spatial Suitability Confirmation)
KPA	Komisi Penilai AMDAL (AMDAL Assessment Commission)

KPKNL	Kantor Pelayanan Kekayaan Negara dan Lelang (State Assets and Auction Service Office)
KRK	Keterangan Rencana Kota (City Plan Information)
LBH	Lembaga Bantuan Hukum (Legal Aid Institute)
LMP	Labour Management Plan
LPSE	Layanan Pengadaan Secara Elektronik (Electronic Procurement Service)
MK	Manajemen Konstruksi (Construction Management)
NCR	Non-Conformance Report
NIB	Nomor Induk Berusaha (Business Registration Number)
NICU	Neonatal Intensive Care Unit
NIDI	Nomor Induk Diklat / Inspeksi (Genset Registration Number)
NTS	Non-Technical Summary
OHS	Occupational Health and Safety
OSS-RBA	Online Single Submission — Risk-Based Approach
P3K	Pegawai Pemerintah dengan Perjanjian Kerja (Government Employee on Contract)
PDAM	Perusahaan Daerah Air Minum (Municipal Water Utility)
PDN	Produk Dalam Negeri (Domestic Products)
Perda	Peraturan Daerah (Regional / Municipal Regulation)
Permenkes	Peraturan Menteri Kesehatan (Minister of Health Regulation)
PermenLHK	Peraturan Menteri Lingkungan Hidup dan Kehutanan (Minister of Environment and Forestry Regulation)
Permen PUPR	Peraturan Menteri Pekerjaan Umum dan Perumahan Rakyat (Minister of Public Works Regulation)
Perpres	Peraturan Presiden (Presidential Regulation)
Pertek	Persetujuan Teknis (Technical Approval — BMAL / Emisi)
PHLN	Pinjaman dan Hibah Luar Negeri (Foreign Loan and Grant)
PICU	Paediatric Intensive Care Unit
PIU	Project Implementation Unit
PKH	Program Keluarga Harapan (Family Hope Programme)
PKL	Pedagang Kaki Lima (Street Vendors)
PMU	Project Management Unit
PNBP	Penerimaan Negara Bukan Pajak (Non-Tax State Revenue)
PNS	Pegawai Negeri Sipil (Civil Servant)

PP	Peraturan Pemerintah (Government Regulation)
PPE	Personal Protective Equipment
PPM	Project-affected People's Mechanism (AIIB)
PPV	Peak Particle Velocity
RAPF	Restoration Action Plan Framework
RDTR	Rencana Detail Tata Ruang (Detailed Spatial Plan)
Rintek	Rincian Teknis (Detailed Technical Document for B3 Storage)
RKL-RPL	Rencana Pengelolaan / Pemantauan Lingkungan (Environmental Management and Monitoring Plans)
RSDK	RSUP Dr. Kariadi Semarang
RSPPU	Rumah Sakit Pendidikan Penyelenggara Utama (Primary Teaching Hospital)
RSUP	Rumah Sakit Umum Pusat (Central General Hospital)
RTH	Ruang Terbuka Hijau (Green Open Space)
RTRW	Rencana Tata Ruang Wilayah (Regional Spatial Plan)
RUP	Rencana Umum Pengadaan (General Procurement Plan)
SEAH	Sexual Exploitation, Abuse, and Harassment
SEP	Stakeholder Engagement Plan
SIPA	Surat Izin Pengambilan Air (Groundwater Abstraction Permit)
SLO	Sertifikat Laik Operasi (Operational Worthiness Certificate)
SMK3	Sistem Manajemen Kesehatan dan Keselamatan Kerja (OHS Management System)
SNI	Standar Nasional Indonesia (Indonesian National Standard)
SOE	Service of Excellence
SOP / SPO	Standard Operating Procedure / Standar Prosedur Operasional
SOSBUD	Sosial Budaya (Socio-cultural)
SPU	Sarana Pelayanan Umum (Public Service Facility Zone)
TMP	Traffic Management Plan
TNI	Tentara Nasional Indonesia (Indonesian National Armed Forces)
TPA	Tempat Pemrosesan Akhir (Final Disposal Site)
TPS	Tempat Penampungan Sementara (Temporary Storage Site)
TRUST	AIIB Project Funding Programme for RSDK
TT	Tempat Tidur — Bed (Hospital Capacity Unit)
UKL-UPL	Upaya Pengelolaan Lingkungan — Upaya Pemantauan Lingkungan (Environmental Management and Monitoring Efforts)

UNDIP	Universitas Diponegoro
UPS	Uninterruptible Power Supply
UU	Undang-Undang (Law)
VGAP	Vulnerable Groups Action Plan
WBG	World Bank Group
WHO	World Health Organization

FOREWORD

RSUP Dr. Kariadi (RSDK) Semarang is the primary national-referral tertiary teaching hospital of Central Java Province and the principal academic hospital affiliated with Universitas Diponegoro Faculty of Medicine. Established 9 September 1925 during the Dutch colonial period (originally CBZ — Centrale Burgerlijke Ziekenverpleging), RSDK occupies a 188,080 m² site (per Sertifikat Tanah Hak Pakai No. 04/05 of 1996) within the Kawasan Kesehatan dengan Zona Rumah Sakit Umum of Kota Semarang as designated by Perda Kota Semarang No. 5 of 2021 (Perubahan Atas Perda No. 14 of 2011 tentang RTRW Kota Semarang Tahun 2011-2031)

Pursuant to the Feasibility Study for the Gedung Medik Sentral and Diagnostic Center and Service of Excellence (GMS-DC & SoE) prepared by PT Pandu Persada in December 2025, and the Master Plan of RSDK 2024, the Hospital will be redeveloped through the construction of an integrated GMS-DC & SoE building that modernises emergency, surgical, intensive-care, cardiac, and diagnostic-imaging service capacity while continuing day-to-day operations across the existing 18-plus building complex on the 188,080 m² site.

This Environmental and Social Impact Assessment (ESIA) and Environmental and Social Management Plan (ESMP), hereafter collectively referred to as the "ESIA", has been prepared to identify, predict, evaluate, and mitigate the environmental and social impacts arising from each phase of the GMS-DC & SoE redevelopment. The document harmonises the Indonesian regulatory regime — Law 32/2009 as amended by Law 11/2020 and Law 6/2023, Government Regulation 22/2021, the AMDAL framework, technical approval for wastewater standard (Pertek BMAL), technical approval for air quality standard (Pertek Emisi), technical detail document of hazardous wastes (Rintek Limbah B3), and traffic impact assessment (Andalalin) — with the AIIB Environmental and Social Framework (June 2024) including its Environmental and Social Policy (ESP), the Environmental and Social Standards (ESS1–ESS3), and the Environmental and Social Exclusion List (ESEL).

The ESIA is one of seven safeguards' deliverables commissioned to PT Equator Global Internasional (EGI) under contract 113-AMS-2026 — the others being the ANDAL Addendum and RKL-RPL, the renewed *Pertek* BMAL, the renewed *Pertek Emisi*, the renewed *Rintek Limbah* B3, the Andalalin refresh, and the integrated *Persetujuan Lingkungan* (Environmental Approval). The ESIA and these companion documents are being produced in parallel under a Dual-Track Compliance approach to avoid duplication of effort and to ensure that both national regulators and the AIIB safeguards team are addressed by the same evidence base.

Disclaimer — This ESIA is prepared as a Living Document. It reflects environmental and social considerations identified at the time of preparation (May 2026) based on the Feasibility Study for GMS-DC (PT Pandu Persada, December 2025), the RSDK Master Plan 2024, the ANDAL 2020, twelve semester UKL-UPL reports covering 2020-Sem 1 through 2025-Sem 2, the existing Pertek BMAL/Emisi and Rintek Limbah B3 evidence files, and the operational data corpus provided by the Hospital. The document will be updated periodically (target: monthly) in line with the progress of the Detailed Engineering Design (DED, expected July 2026), the M1 transitional-season and M2 dry-season primary baseline survey results, the harmonised delivery of the AMDAL Addendum, Pertek BMAL, Pertek Emisi, Rintek Limbah B3 and Andalalin documents, stakeholder consultation outcomes (Round 1 in M1, Round 2 in M5, Round 3 in M7),

and the AIIB safeguards review feedback. ***Items marked [PLACEHOLDER] indicate data acknowledged as required and will be incorporated in subsequent versions toward v1.0 submission to AIIB by 21 June 2026 and the final deliverable on 19 December 2026.***

On behalf of the Project Implementation Unit (PIU) of the Ministry of Health and the Board of Directors of RSDK Semarang, sincere appreciation is extended to all stakeholders who have contributed to the preparation of this document — in particular Bapak Agus Akhmadi serves as the designated person-in-charge (PIC) for environment (*Penanggung Jawab Lingkungan*), in The Directorate of Planning and Service Strategy Development, the Environmental Sanitation Unit, and the Cultural Heritage Team of RSDK (*Direktorat Perencanaan dan Pengembangan Strategi Layanan, Unit Sanitasi-Lingkungan, dan Tim Cagar Budaya*) whose data and historical knowledge underpin the baseline characterisation in Chapters 4 and 5.

This document will be subject to continuous improvement through the Living Document mechanism and will only become the formal submission to AIIB and to the AMDAL Appraissal Panel of the Ministry of Environment (*Tim Penilai* AMDAL) once the v2.0 milestone is reached on 30 June 2026.

Semarang, 30 June 2026

RS Dr. Kariadi Unit Director

[Agus Akhmadi]

EXECUTIVE SUMMARY

Background and Project Rationale

RSUP Dr. Kariadi (RSDK) Semarang is the primary national tertiary referral and teaching hospital of Central Java Province and the principal academic hospital of Diponegoro University. Established in 1925, RSDK occupies a 188,080 m² site within Semarang City's Education and Health Strategic Area (Perda No. 5/2021) and operates as a Class A Public Service Agency (BLU) hospital. Its 18-building complex provides emergency, surgical, intensive care (ICU BOR 84.58%; ICCU BOR 98.85%; NICU 35 beds), cardiology, oncology, diagnostic imaging, and inpatient services to a projected catchment of 5.30–6.01 million Central Java residents requiring healthcare by 2026–2037.

Three converging pressures - emergency unit (IGD) stagnation peaking at 51–145 daily patients against a 58-bed capacity; intensive-care occupancy rates well above the 70–80% efficiency benchmark; and the clinical need to consolidate emergency, surgical, intensive-care, and Cathlab functions into a single contiguous block - underpin the Gedung Medik Sentral dan Diagnostic Center (GMS-DC) Redevelopment. The project is financed with AIIB support under the Ministry of Health's TRUST program and formalised through the Feasibility Study of PT Pandu Persada (December 2025) and the RSDK Master Plan 2024.

Project Description

The GMS-DC & SoE redevelopment is a brownfield expansion within the existing 188,080 m² hospital complex. It involves the demolition of TPS Electrical Substation Garage Electrical Substation Generator Building Corridor Garage Building for the construction of the new Central Medical Building (*Gedung Medik Sentral - Diagnosis Centre*) (GMS-DC), and existing building will be demolish there are Laboratory Electrical Substation 3, Radiology and Laboratory Building, Old Cardiology Building (Elang Building), Cardiology and Stroke Building, IRDA and IRIN Building, Merak Building, Hydrotherapy Building, Ar-Rohman Prayer Room, Radiology Corridor, Kutilang Room – Merak Building Corridor, Hydrotherapy Corridor for new Service of Excellence (SoE), and supporting infrastructure. Spatial suitability has been confirmed through PKKPR No. 07022210213374075 (28 June 2024). The project is classified as AIIB Category B (Moderate Risk), reflecting its nature as an upgrade within an existing tertiary hospital complex rather than a greenfield development.

The GMS-DC design incorporates a Smart Hospital Building Management System, a Green Hospital building envelope targeting GBCI Greenship compliance, a zero-run-off drainage system sized to a 1-in-50-year standard, and an upgraded PLN primary supply from 5,540 kVA to 8,000 kVA. A new 500 kg/hr dual-chamber incinerator with scrubber APC is planned for Phase 8 (2027). The project does not require land acquisition or community displacement.

Scope and Approach of the Assessment

This ESIA-ESMP covers preconstruction, construction, operational, and decommissioning phases. The assessment applies a Modified Leopold Matrix to characterise 26 impact entries across three categories: Environmental Risks and Impacts (A.1–A.6), Social Risks and Impacts (B.1–B.7), and Legal

and Procedural Risks (C.1). Significance ratings are derived from the combined weight of Likelihood, Magnitude, and Receptor Sensitivity, with Spatial Scale and Duration as modifiers. Cumulative impacts are assessed per the IFC Good Practice Handbook on Cumulative Impact Assessment (2013). Where Indonesian regulatory requirements and the AIIB ESF (2024) diverge - on climate risk, GHG Scope 1–3 accounting, GBV/SEAH protocols, vulnerable group identification, and stakeholder engagement - the more stringent standard applies.

The assessment draws on twelve semester UKL-UPL monitoring reports (2020–2025), 2024–2025 Pertek BMAL effluent records for three IPAL units, Pertek Emisi stack records for five genset stacks and two Miura boilers, the Q1 2026 hazardous wastes balance (*Neraca Limbah* B3), the Feasibility Study (391 pages), ANDAL 2020, and Master Plan 2024.

Environmental and Social Baseline

Ambient air quality and noise at all four monitoring points (Residential in Barusari village, Jl. Dr. Sutomo, Jl. Dr. Kariadi, Gedung Medika Sentral) are consistently within PP 22/2021 and Decree of Central Java Governor (Kep Gub Jateng) 8/2001 standards across the full 2020–2025 UKL-UPL records. Wastewater treatment performance is strong: IPAL Garuda January 2025 outlet readings show BOD 12 mg/L, COD 42.1 mg/L, and TSS <13 mg/L against Regulation of the Ministry of Environment (PermenLH) 68/2016 thresholds of 30, 100, and 30 mg/L respectively, with 96–97% removal efficiency. All five generator stacks and two boilers are compliant with PermenLH 15/2019. B3 waste management under the PT PRIA contract is fully manifested. The baseline is therefore one of demonstrated compliance, providing a clean reference against which construction-phase changes will be measured.

The socioeconomic baseline identifies residents of Barusari RT 1/RW 5 as the primary community receptor, with 45 registered persons with disabilities in Sub-district of Semarang Selatan, a significant elderly and low-income patient population, and approximately 40 informal pavement traders (PKL) on Jl. Dr. Sutomo and Jl. Dr. Kariadi. Central Java recorded 42,938 GBV cases in 2024, establishing an elevated baseline GBV environment relevant to labor-influx risk assessment. A total of 335 cases of violence against women were recorded in Semarang City (***Table 36***), including physical and sexual violence, ***with women constituting the majority of victims***. In South Semarang Subdistrict, where Dr. Kariadi Hospital is located, 10 cases were reported

The heritage baseline documents that the nationally designated CBZ/RSDK heritage building (Nationally Designated Historic Building, Ministerial Decree No. 370/M/2017) exhibits significant structural vulnerabilities: brick masonry foundations at approximately 120 cm depth, concrete compressive strength as low as fc' 19.03 MPa, and timber roof truss deflection of 80 mm against an allowable 33 mm. Parts of the building are located at separation distances of less than one metre from Gedung Elang. A wartime bunker structure dating from approximately 1939, near the IPAL area, may indicate additional subsurface archaeological remains.

Impact Assessment Summary

The assessment identifies 26 impacts. All are reduced to a residual significance of Moderate or below through the mitigation measures in the ESMP and specialist sub-plans. Two are designated **Priority**

Management Items requiring monthly reporting to the RSDK Director and the AIIB safeguards team throughout construction.

Hospital-Acquired Infection risk (B.2.1) Critical pre-mitigation, Moderate residual. This is the highest-consequence risk in the matrix. Demolition and structural works generate Aspergillus-spore-laden dust that can breach HVAC systems and reach immunocompromised patients in ICU, ICCU, haemato-oncology, NICU, and transplant units - where the mortality rate from invasive pulmonary aspergillosis can reach 30–90%. The ICRA protocol - applied to every work package in proximity to clinical zones, requiring sealed floor-to-ceiling hoarding under negative pressure, HEPA filtration, daily IPC inspections with stop-work authority, and monthly correlation of HAI surveillance data with construction activity — reduces residual significance to Moderate.

Heritage structure physical damage (B.7.1) Major pre-mitigation, Moderate residual. The combination of demolition at less than one metre separation from documented structurally vulnerable heritage fabric, deep excavation and piling, and the irreversible nature of heritage damage justifies a Major pre-mitigation rating. Mitigation includes a qualified heritage conservation specialist, ISO 4866 PPV monitoring with a 2 mm/s trigger level, pre- and post-works structural condition surveys for each construction sub-phase, and written Board of Audit (*Badan Pemeriksa Keuangan* – BPK) Jawa Tengah approval before any work within the heritage buffer.

Additional construction-phase impacts rated **Major** pre-mitigation: dust and PM_{10} (A.1.1), construction noise (A.2.1), ACM release (A.3.1), and natural hazard exposure (A.5.1) - are managed through fenceline real-time monitoring with stop-work triggers, mandatory pre-demolition asbestos containing materials (ACM) surveys with licensed abatement, acoustic barriers, and SNI 1726:2019-compliant structural design.

Social impacts - SEA/SH risk (B.6.1, Moderate), vulnerable group marginalisation (B.6.2, Moderate), service continuity (B.1.1, Moderate), and livelihood impacts on internal vendors and external PKL (B.5.1, C.1.1) - are managed through a mandatory Code of Conduct with GBV referral pathways, a Vulnerable Groups Action Plan (VGAP), the Hospital Operational Continuity Plan (HOCP), a pre-demolition vendor livelihood census, and AIIB ESSs-compliant temporary trading relocation and re-integration.

Two impacts are assessed as **Positive**: local employment generation (B.5.3) and vendor income uplift from the concentrated construction workforce (B.5.2). Operational phase impacts - wastewater, B3 waste, stack emissions, and traffic - represent manageable incremental uplifts from a well-managed baseline, pending quantitative confirmation through the Pertek BMAL renewal, Rintek Limbah B3 update, Pertek Emisi renewal, and Andalalin refresh. GMS-DC commissioning delivers net beneficial improvements in service quality, infection-control infrastructure, and climate resilience.

Cumulative Impacts

Three cumulative interaction pathways are identified. During construction, combined noise and PM_{10} loading from GMS-DC & SoE works, parallel RSDK maintenance, and background urban construction elevates the effective pre-mitigation significance on the Kelurahan Barusari residential receptor and on ICU/ICCU patients — requiring fenceline monitoring thresholds set against ambient standards

rather than project-increment-only calculations. During operation, the Pertek BMAL renewal and Andalalin refresh are the primary quantitative tools for characterising cumulative wastewater and traffic contributions within Kota Semarang's city-level infrastructure systems. GHG emissions are addressed through the Smart Hospital BMS, low-GWP refrigerant specification, solar PV installation, and GBCI Greenship compliance, aligning the project with Indonesia's NDC trajectory.

Climate Change Assessment

The climate risk assessment identifies flooding, heat stress, vector-borne disease range expansion, and energy supply reliability as the principal climate hazards for the RSDK site across a 10–30-year horizon. Adaptation measures are embedded in the GMS-DC & SoE design: drainage sized to a 1-in-50-year standard, a heat-resilient building envelope, a Smart Hospital HVAC with continuous indoor-air-quality monitoring, and a State Electricity Company (*Perusahaan Listrik Negara* – PLN) priority-restoration partnership. The GHG inventory follows IPCC 2006/2019 and WRI/WBCSD Protocol methodology across Scope 1 (stationary combustion, refrigerants, fleet), Scope 2 (PLN grid electricity), and Scope 3 (transport, supply chain, embodied carbon). A net operational GHG reduction target of 25–30% against business-as-usual by 2035 is established, pursued through solar PV, BMS energy management, LED lighting, low-GWP refrigerants, and telemedicine expansion. Quantitative baseline values will be confirmed in Living Document v1.0 upon completion of the renewed Pertek Emisi dataset.

Stakeholder Engagement and Grievance Redress

The Stakeholder Engagement Plan (SEP) covers three consultation rounds: Round 1 (M1, May–June 2026, KA-ANDAL stage); Round 2 (M5, September 2026); and Round 3 (M7, November 2026, Sidang Pleno KPA). All events are designed to be accessible, gender-responsive, and inclusive of vulnerable groups, with Javanese language (*Bahasa Jawa*) facilitation, sign-language interpretation, and home visits for mobility-impaired participants. A What We Heard / What We Did registers on documents how consultation outcomes influence project decisions.

The project Grievance Redress Mechanism (GRM) is built on RSDK's existing SIPETIK platform and expanded with a telephone hotline, online complaint form, physical comment boxes at accessible locations, and a confidential GBV/SEAH channel with a female focal person. The GRM covers workers, patients, vendors, and surrounding communities, with a 5-day acknowledgement and 30-day resolution KPI. All GRM data is disaggregated by gender and vulnerability status and reported quarterly to the AIIB safeguards team.

Grievance Redress Mechanism

In managing complaints related to project impacts and risks, RSDK should establish and implement a Grievance Redress Mechanism that provides a formal, accessible, confidential, and time bound channel for receiving, recording, reviewing, and resolving grievances from patients, caregivers, staff, students, contractors, suppliers, visitors, and surrounding communities during construction, commissioning, and operational phases. The GRM should be guided by accessibility, transparency, impartiality, confidentiality, gender responsiveness, non retaliation, personal data protection, and respect for persons with disabilities and other vulnerable groups. RSDK should consolidate and

strengthen its available complaint channels, such as in person reporting, telephone services, WhatsApp, email, digital complaint forms, suggestion boxes, patient relations services, and internal staff reporting mechanisms, into a structured project specific procedure with clear responsibilities, response timeframes, escalation procedures, and documentation requirements. The mechanism should cover complaint receipt, registration, classification, assessment, investigation where appropriate, resolution, feedback, monitoring, and reporting, with separate procedures for general patient and community complaints, labour and workplace complaints, and complaints involving GBV, SEA, or SH. GBV, SEA, and SH complaints should be handled through dedicated confidential channels by trained focal points using a survivor centred and trauma informed approach that prioritizes immediate safety, informed consent, referral to medical, psychosocial, legal, and protection services, and prevention of retaliation. If a complaint cannot be resolved at the hospital level, complainants should be able to escalate it to the Project Implementation Unit, the Ministry of Health, relevant government authorities, or the AIIB Project Affected People's Mechanism. The GRM should be communicated to all stakeholders and incorporated into the Environmental and Social Management Plan, contractor codes of conduct, bidding documents, work contracts, staff orientation, and public information materials so that it can effectively manage environmental, social, labour, gender, and community safety risks.

Independent Accountability Mechanism: The Project-affected People's Mechanism (PPM) has been established by the Asian Infrastructure Investment Bank (AIIB) to provide an opportunity for an independent and impartial review of submissions from Project-affected people who believe they have been or are likely to be adversely affected by AIIB's failure to implement its Environmental and Social Policy in situations when their concerns cannot be addressed satisfactorily through Project-level Grievance Redress Mechanisms or AIIB Management's processes. For information on how to make submissions to the PPM https://www.aiib.org/en/policies-strategies/operational-policies/policy-on-the-project-affected-mechanism.html.

Priority Actions for Living Document v3.0

The following actions are required before ESIA advances to v3.0 (target: 12 August 2026):

Complete the M1 transitional-season primary baseline survey - ambient air, noise, surface water, groundwater, biodiversity walkover, traffic counts, and socioeconomic perception - and integrate results into Chapters 4–6 and Annex F.

Complete harmonised drafting of the AMDAL Addendum (KA-ANDAL → ANDAL → RKL-RPL), Pertek BMAL renewal, Pertek Emisi renewal, Rintek Limbah B3 update, and Andalalin refresh under contract 113-AMS-2026, in time for parallel Komisi Penilai AMDAL review.

Establish the project GRM - including SI PETIK integration, all public-facing channels, and the confidential GBV/SEAH focal person - before site mobilization.

RINGKASAN EKSEKUTIF

Latar Belakang dan Dasar Proyek

RSUP Dr. Kariadi (RSDK) Semarang merupakan rumah sakit rujukan tersier dan pendidikan utama tingkat nasional di Provinsi Jawa Tengah serta rumah sakit akademik utama Universitas Diponegoro. Didirikan pada tahun 1925, RSDK menempati lahan seluas 188.080 m² di dalam Kawasan Strategis Pendidikan dan Kesehatan Kota Semarang (Perda No. 5/2021) dan beroperasi sebagai rumah sakit Badan Layanan Umum (BLU) Kelas A. Kompleks yang terdiri dari 18 bangunan ini menyediakan layanan gawat darurat, bedah, perawatan intensif (Tingkat Okupansi ICU 84,58%; Tingkat Okupansi ICCU 98,85%; NICU 35 tempat tidur), kardiologi, onkologi, pencitraan diagnostik, dan rawat inap bagi wilayah layanan yang diproyeksikan mencakup 5,30–6,01 juta penduduk Jawa Tengah yang membutuhkan layanan kesehatan pada periode 2026–2037.

Tiga tekanan yang saling beririsan,- stagnasi unit gawat darurat (IGD) yang mencapai puncaknya pada 51–145 pasien per hari dibandingkan kapasitas 58 tempat tidur; tingkat hunian unit perawatan intensif yang jauh di atas tolok ukur efisiensi 70–80%; serta kebutuhan klinis untuk menggabungkan fungsi gawat darurat, bedah, perawatan intensif, dan Cathlab ke dalam satu blok yang bersebelahan - menjadi landasan utama Pembangunan Kembali Gedung Medik Sentral dan Diagnostic Center (GMS-DC).menjadi landasan utama Pembangunan Kembali Gedung Medik Sentral dan Diagnostic Center (GMS-DC). Proyek ini didanai dengan dukungan AIIB di bawah program TRUST Kementerian Kesehatan dan diformalkan melalui Studi Kelayakan PT Pandu Persada (Desember 2025) serta Rencana Induk RSDK 2024.

Deskripsi Proyek

Proyek pembangunan kembali GMS-DC & SoE merupakan perluasan lahan bekas (brownfield) di dalam kompleks rumah sakit yang sudah ada seluas 188.080 m². Proyek ini mencakup pembongkaran Gedung Elang, serta pembangunan Gedung Medik Sentral (GMS), serta pembongkaran pada gedung eksisting yakni Gardu Listrik 3 Laborat, Gedung Radiologi dan Laboratorium, Gedung Jantung Lama (Elang), Gedung Jantung dan Stroke, Gedung IRDA dan IRIN, Gedung Merak, Gedung Hidroterapy, Musholla Ar-Rohman, Selasar Radiologi, Selasar R Kutilang-G Merak, Selasar Hidroterapi untuk pembangunan Service of Excellence (SoE), dan infrastruktur pendukung. Kesesuaian ruang telah dikonfirmasi melalui PKKPR No. 07022210213374075 (28 Juni 2024). Proyek ini diklasifikasikan sebagai Kategori B AIIB (Risiko Sedang), yang mencerminkan sifatnya sebagai peningkatan di dalam kompleks rumah sakit tersier yang sudah ada, bukan pengembangan lahan kosong (greenfield).

Desain GMS-DC mengintegrasikan Sistem Manajemen Gedung Rumah Sakit Cerdas, selubung bangunan Rumah Sakit Hijau yang menargetkan kepatuhan terhadap standar GBCI Greenship, sistem drainase tanpa limpasan yang dirancang sesuai standar 1-in-50-year, serta peningkatan pasokan listrik primer PLN dari 5.540 kVA menjadi 8.000 kVA. Sebuah insinerator ruang ganda baru berkapasitas 500 kg/jam dengan APC scrubber direncanakan untuk Fase 8 (2027). Proyek ini tidak memerlukan pembebasan lahan atau relokasi masyarakat.

Ruang Lingkup dan Pendekatan Penilaian

ESIA-ESMP ini mencakup fase prakonstruksi, konstruksi, operasional, dan dekomisioning. Penilaian ini menerapkan Matriks Leopold yang Dimodifikasi untuk mengkarakterisasi 26 entri dampak di tiga kategori: Risiko dan Dampak Lingkungan (A.1–A.6), Risiko dan Dampak Sosial (B.1–B.7), serta Risiko Hukum dan Prosedural (C.1). Peringkat signifikansi diperoleh dari bobot gabungan Kemungkinan, Magnitudo, dan Sensitivitas Penerima Dampak, dengan Skala Spasial dan Durasi sebagai faktor penyesuaian. Dampak kumulatif dievaluasi sesuai dengan Panduan Praktik Baik IFC tentang Penilaian Dampak Kumulatif (2013). Apabila terdapat perbedaan antara persyaratan regulasi Indonesia dan ESF AIIB (2024) - terkait risiko iklim, penghitungan GRK Lingkup 1–3, protokol GBV/SEAH, identifikasi kelompok rentan, dan keterlibatan pemangku kepentingan -Apabila terdapat perbedaan antara persyaratan regulasi Indonesia dan ESF AIIB (2024) terkait risiko iklim, penghitungan GRK Lingkup 1–3, protokol GBV/SEAH, identifikasi kelompok rentan, dan keterlibatan pemangku kepentingan maka standar yang lebih ketatlah yang berlaku.

Penilaian ini mengacu pada dua belas laporan pemantauan UKL-UPL per semester (2020–2025), catatan limbah Pertek BMAL tahun 2024–2025 untuk tiga unit IPAL, catatan cerobong emisi Pertek untuk lima cerobong genset dan dua boiler Miura, neraca limbah berbahaya (Neraca Limbah B3) kuartal pertama 2026, Studi Kelayakan (391 halaman), ANDAL 2020, dan Rencana Induk 2024.

Baseline Lingkungan dan Sosial

Kualitas udara ambien dan tingkat kebisingan di keempat titik pemantauan (Kawasan Pemukiman di Desa Barusari, Jl. Dr. Sutomo, Jl. Dr. Kariadi, Gedung Medika Sentral) secara konsisten berada dalam batas standar PP 22/2021 dan Keputusan Gubernur Jawa Tengah (Kep Gub Jateng) 8/2001 sepanjang catatan UKL-UPL periode 2020–2025. Kinerja pengolahan air limbah sangat baik: pembacaan outlet IPAL Garuda pada Januari 2025 menunjukkan BOD 12 mg/L, COD 42,1 mg/L, dan TSS <13 mg/L, yang memenuhi ambang batas Peraturan Kementerian Lingkungan Hidup (PermenLH) 68/2016 sebesar 30, 100, dan 30 mg/L masing-masing, dengan efisiensi penghilangan 96–97%. Kelima cerobong pembangkit dan dua unit boiler telah memenuhi ketentuan PermenLH 15/2019. Pengelolaan limbah B3 berdasarkan kontrak dengan PT PRIA telah didokumentasikan secara lengkap. Oleh karena itu, kondisi awal ini menunjukkan kepatuhan yang telah teruji, sehingga menjadi acuan yang jelas untuk mengukur perubahan yang terjadi selama fase konstruksi.

Garis dasar sosioekonomi mengidentifikasi warga Barusari RT 1/RW 5 sebagai penerima dampak utama dari masyarakat, dengan 45 penyandang disabilitas terdaftar di Kecamatan Semarang Selatan, populasi lansia dan pasien berpenghasilan rendah yang signifikan, serta sekitar 40 pedagang kaki lima (PKL) di Jl. Dr. Sutomo dan Jl. Dr. Kariadi. Jawa Tengah mencatat 42.938 kasus Kekerasan Berbasis Gender (KBG) pada tahun 2024, yang menetapkan lingkungan KBG dasar yang tinggi yang relevan dengan penilaian risiko arus masuk tenaga kerja. Sebanyak 335 kasus kekerasan terhadap perempuan tercatat di Kota Semarang (Tabel 36), termasuk kekerasan fisik dan seksual, dengan perempuan sebagai mayoritas korban. Di Kecamatan Semarang Selatan, tempat Rumah Sakit Dr. Kariadi berada, dilaporkan 10 kasus

Dokumen baseline warisan menunjukkan bahwa bangunan warisan CBZ/RSDK yang ditetapkan secara nasional (Bangunan Bersejarah yang Ditunjuk Secara Nasional, Keputusan Menteri No. 370/M/2017) menunjukkan kerentanan struktural yang signifikan: pondasi dinding bata pada kedalaman sekitar 120 cm, kekuatan tekan beton serendah fc' 19,03 MPa, dan defleksi rangka atap kayu sebesar 80 mm, padahal batas yang diperbolehkan hanya 33 mm. Sebagian bangunan terletak pada jarak kurang dari satu meter dari Gedung Elang. Sebuah struktur bunker masa perang yang dibangun sekitar tahun 1939, di dekat area IPAL, mungkin menandakan adanya sisa-sisa arkeologi bawah permukaan lainnya.

Ringkasan Penilaian Dampak

Penilaian ini mengidentifikasi 27 dampak. Semuanya telah dikurangi menjadi tingkat signifikansi sisa Sedang atau di bawahnya melalui langkah-langkah mitigasi dalam ESMP dan rencana-rencana khusus. Dua di antaranya ditetapkan sebagai Item Manajemen Prioritas yang memerlukan pelaporan bulanan kepada Direktur RSDK dan tim pengamanan AIIB selama masa konstruksi.

Risiko Infeksi yang Diperoleh di Rumah Sakit (B.2.1) Kritis sebelum mitigasi, sisa dampak Sedang. Ini adalah risiko dengan konsekuensi tertinggi dalam matriks. Pekerjaan pembongkaran dan konstruksi menghasilkan debu yang mengandung spora Aspergillus yang dapat menembus sistem HVAC dan mencapai pasien dengan sistem kekebalan yang lemah di ICU, ICCU, unit hematologi-onkologi, NICU, dan unit transplantasi - di mana tingkat kematian akibat aspergillosis paru invasif dapat mencapai 30–90%. Protokol ICRA - yang diterapkan pada setiap paket pekerjaan di dekat zona klinis, yang mewajibkan pemasangan papan penutup tertutup dari lantai hingga langit-langit di bawah tekanan negatif, filtrasi HEPA, inspeksi IPC harian dengan wewenang menghentikan pekerjaan, serta korelasi bulanan antara data pemantauan infeksi terkait perawatan kesehatan (HAI) dengan aktivitas konstruksi -di mana tingkat kematian akibat aspergillosis paru invasif dapat mencapai 30–90%. Protokol ICRA, yang diterapkan pada setiap paket pekerjaan di dekat zona klinis, yang mewajibkan pemasangan papan penutup tertutup dari lantai hingga langit-langit di bawah tekanan negatif, filtrasi HEPA, inspeksi IPC harian dengan wewenang menghentikan pekerjaan, serta korelasi bulanan antara data pemantauan infeksi terkait perawatan kesehatan (HAI) dengan aktivitas konstruksi mengurangi signifikansi sisa menjadi Sedang.

Kerusakan fisik struktur warisan budaya (B.7.1) Mitigasi awal Tingkat Tinggi, risiko sisa Tingkat Sedang. Kombinasi antara pembongkaran dengan jarak kurang dari satu meter dari struktur warisan budaya yang tercatat rentan secara struktural, penggalian dalam dan pemasangan tiang pancang, serta sifat kerusakan warisan budaya yang tidak dapat dipulihkan membenarkan peringkat mitigasi awal Tingkat Tinggi. Mitigasi mencakup spesialis konservasi warisan budaya yang berkualifikasi, pemantauan PPV sesuai ISO 4866 dengan tingkat ambang batas 2 mm/s, survei kondisi struktural sebelum dan sesudah pekerjaan untuk setiap sub-fase konstruksi, serta persetujuan tertulis dari Badan Pemeriksa Keuangan (BPK) Jawa Tengah sebelum pekerjaan apa pun dilakukan di dalam zona penyangga warisan budaya.

Dampak tambahan pada fase konstruksi yang dinilai sebagai mitigasi pra-konstruksi tingkat “Major”: debu dan PM_{10} (A.1.1), kebisingan konstruksi (A.2.1), pelepasan ACM (A.3.1), dan paparan bahaya alam (A.5.1) - dikelola melalui pemantauan real-time di sepanjang pagar dengan pemicu penghentian pekerjaan, survei wajib bahan yang mengandung asbes (ACM) sebelum pembongkaran dengan

penanggulangan berlisensi, penghalang akustik, dan desain struktural yang sesuai dengan SNI 1726:2019.

Dampak sosial -Dampak tambahan pada fase konstruksi yang dinilai sebagai mitigasi pra-konstruksi tingkat "Major": debu dan PM_{10} (A.1.1), kebisingan konstruksi (A.2.1), pelepasan ACM (A.3.1), dan paparan bahaya alam (A.5.1) dikelola melalui pemantauan real-time di sepanjang pagar dengan pemicu penghentian pekerjaan, survei wajib bahan yang mengandung asbes (ACM) sebelum pembongkaran dengan penanggulangan berlisensi, penghalang akustik, dan desain struktural yang sesuai dengan SNI 1726:2019.

Dampak sosial risiko SEA/SH (B.6.1, Sedang), marginalisasi kelompok rentan (B.6.2, Sedang), kelangsungan layanan (B.1.1, Sedang), dan dampak terhadap mata pencaharian pedagang internal dan PKL eksternal (B.5.1, C.1.1) - dikelola melalui Kode Etik wajib yang dilengkapi jalur rujukan Kekerasan Berbasis Gender (GBV), Rencana Aksi Kelompok Rentan (VGAP), Rencana Kelangsungan Operasional Rumah Sakit (HOCP), sensus mata pencaharian pedagang sebelum pembongkaran, serta relokasi dan reintegrasi perdagangan sementara yang sesuai dengan ESS AIIB.

Dua dampak dinilai Positif: penciptaan lapangan kerja lokal (B.5.3) dan peningkatan pendapatan pedagang akibat konsentrasi tenaga kerja konstruksi (B.5.2). Dampak fase operasional - air limbah, limbah B3, emisi cerobong asap, dan lalu lintas -Dampak fase operasional air limbah, limbah B3, emisi cerobong asap, dan lalu lintas merupakan peningkatan bertahap yang dapat dikelola dari kondisi dasar yang dikelola dengan baik, sambil menunggu konfirmasi kuantitatif melalui perpanjangan Pertek BMAL, pembaruan Rintek Limbah B3, perpanjangan Pertek Emisi, dan pembaruan Andalalin. Pengoperasian GMS-DC memberikan peningkatan manfaat bersih dalam kualitas layanan, infrastruktur pengendalian infeksi, dan ketahanan iklim.

Dampak Kumulatif

Tiga jalur interaksi kumulatif telah diidentifikasi. Selama konstruksi, kombinasi beban kebisingan dan PM_{10} dari pekerjaan GMS-DC & SoE, pemeliharaan RSDK yang dilakukan secara paralel, serta konstruksi perkotaan latar belakang meningkatkan signifikansi efektif pra-mitigasi pada reseptor pemukiman Kelurahan Barusari dan pada pasien ICU/ICCU - sehingga memerlukan ambang batas pemantauan di sepanjang batas lokasi yang ditetapkan berdasarkan standar ambien, bukan hanya perhitungan kenaikan proyek saja.sehingga memerlukan ambang batas pemantauan di sepanjang batas lokasi yang ditetapkan berdasarkan standar ambien, bukan hanya perhitungan kenaikan proyek saja. Selama operasi, pembaruan Pertek BMAL dan penyegaran Andalalin merupakan alat kuantitatif utama untuk mengkarakterisasi kontribusi kumulatif air limbah dan lalu lintas dalam sistem infrastruktur tingkat kota Kota Semarang. Emisi gas rumah kaca ditangani melalui Sistem Manajemen Bangunan (BMS) Smart Hospital, spesifikasi refrigeran dengan GWP rendah, pemasangan panel surya fotovoltaik, dan kepatuhan terhadap standar GBCI Greenship, sehingga menyelaraskan proyek ini dengan lintasan NDC Indonesia.

Penilaian Perubahan Iklim

Penilaian risiko iklim mengidentifikasi banjir, tekanan panas, perluasan wilayah penyebaran penyakit yang ditularkan oleh vektor, dan keandalan pasokan energi sebagai bahaya iklim utama bagi lokasi

RSDK dalam rentang waktu 10–30 tahun. Langkah-langkah adaptasi telah diintegrasikan ke dalam desain GMS-DC & SoE: sistem drainase yang dirancang sesuai standar 1-in-50-year, selubung bangunan yang tahan panas, sistem HVAC Smart Hospital dengan pemantauan kualitas udara dalam ruangan secara berkelanjutan, serta kemitraan prioritas pemulihan bersama Perusahaan Listrik Negara (PLN). Inventarisasi GRK mengikuti metodologi Protokol IPCC 2006/2019 dan WRI/WBCSD untuk Lingkup 1 (pembakaran stasioner, refrigeran, armada kendaraan), Lingkup 2 (listrik jaringan PLN), dan Lingkup 3 (transportasi, rantai pasokan, karbon tertanam). Target pengurangan emisi GRK operasional bersih sebesar 25–30% dibandingkan skenario bisnis seperti biasa (business-as-usual) pada tahun 2035 telah ditetapkan, yang akan dicapai melalui panel surya fotovoltaik (PV), manajemen energi BMS, pencahayaan LED, refrigeran dengan GWP rendah, dan perluasan layanan telemedisin. Nilai dasar kuantitatif akan dikonfirmasi dalam Dokumen Hidup v1.0 setelah penyelesaian dataset Pertek Emisi yang diperbarui.

Keterlibatan Pemangku Kepentingan dan Penyelesaian Keluhan

Rencana Keterlibatan Pemangku Kepentingan (SEP) mencakup tiga putaran konsultasi: Putaran 1 (M1, Mei–Juni 2026, tahap KA-ANDAL); Putaran 2 (M5, September 2026); dan Putaran 3 (M7, November 2026, Sidang Pleno KPA). Semua kegiatan dirancang agar mudah diakses, responsif gender, dan inklusif terhadap kelompok rentan, dengan fasilitasi dalam bahasa Jawa, penerjemahan bahasa isyarat, serta kunjungan rumah bagi peserta yang mengalami keterbatasan mobilitas. Apa yang Kami Dengar / Apa yang Kami Lakukan masuk dalam catatan dokumen tentang bagaimana hasil konsultasi memengaruhi keputusan proyek.

Mekanisme Penanganan Keluhan (GRM) proyek ini dibangun di atas platform SIPETIK milik RSDK yang sudah ada dan diperluas dengan saluran telepon hotline, formulir pengaduan secara daring, kotak saran fisik di tempat yang mudah diakses, serta kotak rahasia untuk Kekerasan Berbasis Gender (GBV)/Pelecehan Seksual dan Eksploitasi Anak (SEAH) yang dikelola oleh koordinator perempuan. GRM mencakup pekerja, pasien, vendor, dan masyarakat sekitar, dengan KPI konfirmasi dalam 5 hari dan penyelesaian dalam 30 hari. Semua data GRM dipisahkan berdasarkan jenis kelamin dan status kerentanan, serta dilaporkan setiap kuartal kepada tim pengamanan AIIB.

Mekanisme Pengelolaan Keluhan

Dalam mengelola keluhan terkait dampak dan risiko proyek, RSUP Dr. Kariadi Semarang perlu membentuk dan menerapkan Mekanisme Penanganan Pengaduan atau Grievance Redress Mechanism yang menyediakan saluran formal, mudah diakses, rahasia, dan memiliki batas waktu untuk menerima, mencatat, menelaah, dan menyelesaikan keluhan dari pasien, pendamping pasien, staf, mahasiswa, kontraktor, pemasok, pengunjung, serta masyarakat sekitar selama tahap konstruksi, persiapan operasional, dan operasional. GRM harus berlandaskan pada prinsip aksesibilitas, transparansi, ketidakberpihakan, kerahasiaan, responsivitas gender, larangan tindakan balasan, perlindungan data pribadi, serta penghormatan terhadap kebutuhan penyandang disabilitas dan kelompok rentan lainnya. RSUP Dr. Kariadi perlu mengonsolidasikan dan memperkuat saluran pengaduan yang tersedia, seperti pengaduan secara langsung, layanan telepon, WhatsApp, surat elektronik, formulir pengaduan digital, kotak saran, layanan hubungan pasien, dan mekanisme pengaduan internal bagi staf, ke dalam prosedur khusus proyek yang terstruktur dengan pembagian

tanggung jawab, batas waktu respons, prosedur eskalasi, dan persyaratan dokumentasi yang jelas. Mekanisme tersebut harus mencakup tahap penerimaan, registrasi, klasifikasi, penilaian, investigasi apabila diperlukan, penyelesaian, pemberian umpan balik kepada pengadu, pemantauan, dan pelaporan, dengan prosedur terpisah untuk keluhan umum dari pasien dan masyarakat, keluhan tenaga kerja dan kondisi tempat kerja, serta keluhan terkait Kekerasan Berbasis Gender, Eksploitasi dan Pelecehan Seksual, dan Pelecehan Seksual. Keluhan terkait Kekerasan Berbasis Gender, Eksploitasi dan Pelecehan Seksual, serta Pelecehan Seksual harus ditangani melalui saluran rahasia khusus oleh focal point terlatih dengan pendekatan yang berpusat pada penyintas dan peka terhadap trauma, yang mengutamakan keselamatan segera, persetujuan berdasarkan informasi, rujukan ke layanan medis, psikososial, hukum, dan perlindungan, serta pencegahan tindakan balasan. Apabila keluhan tidak dapat diselesaikan pada tingkat rumah sakit, pengadu harus dapat mengeskalasikan keluhannya kepada Unit Pelaksana Proyek, Kementerian Kesehatan, instansi pemerintah terkait, atau Mekanisme Penanganan Keluhan bagi Pihak Terdampak Proyek AIIB. GRM harus dikomunikasikan kepada seluruh pemangku kepentingan dan diintegrasikan ke dalam Rencana Pengelolaan Lingkungan dan Sosial, kode etik kontraktor, dokumen pengadaan, kontrak kerja, orientasi staf, serta materi informasi publik agar dapat secara efektif mengelola risiko lingkungan, sosial, ketenagakerjaan, gender, dan keselamatan masyarakat.

Tindakan Prioritas untuk Live Dokumen v3.0

Tindakan berikut ini harus diselesaikan sebelum ESIA ditingkatkan ke v3.0 (target: 12 Agustus 2026):

Menyelesaikan survei dasar utama musim transisi M1 - kualitas udara ambien, kebisingan, air permukaan, air tanah, survei lapangan keanekaragaman hayati, penghitungan lalu lintas, dan persepsi sosioekonomi - serta mengintegrasikan hasilnya ke dalam Bab 4–6 dan Lampiran F.

Menyelesaikan survei dasar utama musim transisi M1, kualitas udara ambien, kebisingan, air permukaan, air tanah, survei lapangan keanekaragaman hayati, penghitungan lalu lintas, dan persepsi sosioekonomi, serta mengintegrasikan hasilnya ke dalam Bab 4–6 dan Lampiran F.

Selesaikan penyusunan terpadu Addendum AMDAL (KA-ANDAL → ANDAL → RKL-RPL), perpanjangan Pertek BMAL, perpanjangan Pertek Emisi, pembaruan Rintek Limbah B3, dan pembaruan Andalalin berdasarkan kontrak 113-AMS-2026, agar tepat waktu untuk tinjauan paralel oleh Komisi Penilai AMDAL.

Melaksanakan Konsultasi Publik Putaran 1 yang mencakup Pengumuman oleh Pemrakarsa (minimal 10 hari kerja), sesi tanggapan KA-ANDAL, dan FGD khusus dengan kelompok rentan (lansia, perempuan, penyandang disabilitas, pengasuh, dan kelompok pasien berpenghasilan rendah).

Membentuk GRM proyek - termasuk integrasi SI PETIK, semua saluran komunikasi publik, dan penanggung jawab rahasia untuk GBV/SEAH - sebelum mobilisasi lapangan.

Menyelesaikan survei lapangan warisan budaya oleh tim spesialis cagar budaya (Mei 2026) serta inventarisasi GRK dan Penilaian Risiko Iklim oleh spesialis iklim (Juni 2026), dan integrasikan temuan tersebut ke dalam Bab 7 dan 9 masing-masing.

Membentuk GRM proyek, termasuk integrasi SI PETIK, semua saluran komunikasi publik, dan penanggung jawab rahasia untuk GBV/SEAH sebelum mobilisasi lapangan.

Finalisasi alokasi anggaran ESMP (target indikatif: 10–12% dari total belanja modal proyek) dan konfirmasikan alokasi belanja modal GMS-DC & SoE yang mencakup alat kesehatan, pekerjaan standar, dan pekerjaan non-standar.

Mekanisme Pengelolaan Keluhan

Dalam mengelola keluhan terkait dampak dan risiko proyek, RSUP Dr. Kariadi Semarang perlu membentuk dan menerapkan Mekanisme Penanganan Pengaduan atau Grievance Redress Mechanism yang menyediakan saluran formal, mudah diakses, rahasia, dan memiliki batas waktu untuk menerima, mencatat, menelaah, dan menyelesaikan keluhan dari pasien, pendamping pasien, staf, mahasiswa, kontraktor, pemasok, pengunjung, serta masyarakat sekitar selama tahap konstruksi, persiapan operasional, dan operasional. GRM harus berlandaskan pada prinsip aksesibilitas, transparansi, ketidakberpihakan, kerahasiaan, responsivitas gender, larangan tindakan balasan, perlindungan data pribadi, serta penghormatan terhadap kebutuhan penyandang disabilitas dan kelompok rentan lainnya. RSUP Dr. Kariadi perlu mengonsolidasikan dan memperkuat saluran pengaduan yang tersedia, seperti pengaduan secara langsung, layanan telepon, WhatsApp, surat elektronik, formulir pengaduan digital, kotak saran, layanan hubungan pasien, dan mekanisme pengaduan internal bagi staf, ke dalam prosedur khusus proyek yang terstruktur dengan pembagian tanggung jawab, batas waktu respons, prosedur eskalasi, dan persyaratan dokumentasi yang jelas. Mekanisme tersebut harus mencakup tahap penerimaan, registrasi, klasifikasi, penilaian, investigasi apabila diperlukan, penyelesaian, pemberian umpan balik kepada pengadu, pemantauan, dan pelaporan, dengan prosedur terpisah untuk keluhan umum dari pasien dan masyarakat, keluhan tenaga kerja dan kondisi tempat kerja, serta keluhan terkait Kekerasan Berbasis Gender, Eksploitasi dan Pelecehan Seksual, dan Pelecehan Seksual. Keluhan terkait Kekerasan Berbasis Gender, Eksploitasi dan Pelecehan Seksual, serta Pelecehan Seksual harus ditangani melalui saluran rahasia khusus oleh focal point terlatih dengan pendekatan yang berpusat pada penyintas dan peka terhadap trauma, yang mengutamakan keselamatan segera, persetujuan berdasarkan informasi, rujukan ke layanan medis, psikososial, hukum, dan perlindungan, serta pencegahan tindakan balasan. Apabila keluhan tidak dapat diselesaikan pada tingkat rumah sakit, pengadu harus dapat mengeskalasikan keluhannya kepada Unit Pelaksana Proyek, Kementerian Kesehatan, instansi pemerintah terkait, atau Mekanisme Penanganan Keluhan bagi Pihak Terdampak Proyek AIIB. GRM harus dikomunikasikan kepada seluruh pemangku kepentingan dan diintegrasikan ke dalam Rencana Pengelolaan Lingkungan dan Sosial, kode etik kontraktor, dokumen pengadaan, kontrak kerja, orientasi staf, serta materi informasi publik agar dapat secara efektif mengelola risiko lingkungan, sosial, ketenagakerjaan, gender, dan keselamatan masyarakat.

1 INTRODUCTION

1.1 Project Overview & Rationale

RSUP Dr. Kariadi (RSDK) is a Class A teaching hospital located in Semarang, Central Java. It serves as the highest referral hospital in Central Java and a national referral for certain cases. The hospital also operates as a *Rumah Sakit Pendidikan Penyelenggara Utama* (RSPPU), a main teaching hospital that trains medical students, young doctors, and specialist and sub-specialist residents in partnership with the Faculty of Medicine of Universitas Diponegoro.

Currently, the hospital faces limitations in its facilities and infrastructure. Existing buildings are fragmented across the campus, and the capacity of beds, operating rooms, and diagnostic equipment is no longer sufficient to meet the growing demand for services. To address this situation, the Government of Indonesia, through the Ministry of Health, plans to redevelop RSUP Dr. Kariadi by constructing two new integrated service buildings: the Medical Central Unit and Central Diagnostic Center (GMS-DC), and the Service of Excellent (SoE) Unit. The project will increase bed capacity from 543 to 856, expand operating rooms, and introduce modern medical equipment such as MRI, Cathlab, and advanced diagnostic tools.

The rationale for the project is to strengthen RSDK in three main areas. First, to improve the quality and capacity of healthcare services, so that patients in Central Java and surrounding regions can access better treatment without having to seek care abroad. Second, to strengthen the hospital's role as a teaching hospital by providing modern facilities that support clinical education, specialist training programs, and clinical research. Third, to support the national health transformation agenda under the 2025–2029 RPJMN and the Ministry of Health Strategic Plan, while moving towards the hospital's vision of becoming a leading hospital at the Asian level with sustainable growth. The total project duration is approximately 60 months, covering preparation, construction, and the first handover of buildings within the 2026–2030 period. The physical construction and implementation activities will be carried out over approximately 36 months, with financing sourced from the Asian Infrastructure Investment Bank (AIIB) and counterpart funds from the non-tax state revenue (PNBP) public service agency (BLU) of RSUP Dr. Kariadi.

1.2. Purpose of the Environmental and Social Impact Assessment

Under the AIIB Environmental and Social Framework (ESF) specifically its Environmental and Social Policy and ESS1 — the borrower must prepare a comprehensive Environmental and Social Impact Assessment (ESIA) incorporating an Environmental and Social Management Plan (ESMP). This document fulfils four interlocking purposes:

- To provide AIIB and the Ministry of Health with an evidence-grounded assessment satisfying ESS1 and supporting the AIIB safeguards review.
- To provide the Komisi Penilai AMDAL of Central Java Province with a harmonised evidence base supporting issuance of the integrated Persetujuan Lingkungan, alongside the AMDAL Addendum, renewed Pertek BMAL and Pertek Emisi, renewed Rintek Limbah B3, and the Andalalin refresh.
- To serve RSDK management and its Environmental Management Unit as a Living Document, updated monthly across the project lifecycle to translate regulatory and lender requirements into actionable commitments.
- To give affected stakeholders, patients and caregivers, the workforce, surrounding communities (Kelurahan Barusari and adjacent neighborhoods), heritage authorities, and vulnerable groups, transparent information disclosure and a credible Grievance Redress Mechanism.

Where national standards and AIIB ESF requirements diverge, the more stringent standard applies throughout.

1.3. Scope of Work

This Environmental and Social Impact Assessment (ESIA) covers the redevelopment of RSDK under Phase 1 and Phase 2 of the Master Plan (KMK No. HK.01.07/MENKES/1816/2024). The assessment is prepared to fulfill the environmental and social safeguard requirements of the Asian Infrastructure Investment Bank (AIIB) as the lender providing the foreign loan (PHLN) for these two phases, with counterpart funding from Non-Tax State Revenue (PNBP) BLU RSUP Dr. Kariadi. Subsequent phases of the Master Plan are outside the scope of this ESIA as they are not part of the current AIIB-supported project.

The ESIA scope covers the following project components within Phase 1 and Phase 2:

1. **Physical Construction and Infrastructure**

- Medic Central Unit and Central Diagnostic Center Building: a 7-story building plus 1 basement, with a total floor area of 41,999 m², to be built on a 6,411 m² vacant plot within the existing hospital compound;
- Service of Excellent Unit Building: a 7-story building plus 1 basement, with a total floor area of 32,628 m², to be built on a 4,897 m² plot after demolition of existing structures;

- Site infrastructure including internal roads, utility connections, landscaping, and a zero run-off drainage system.

2. **Procurement and Installation of Medical Equipment**

- Advanced diagnostic and treatment equipment such as MRI, Cathlab, echocardiography, ventilators, anesthesia machines, and bedside monitors;
- Operating room equipment, ICU devices, and laboratory instruments;
- Installation of radiation-based equipment (LINAC, SPECT-CT) subject to BAPETEN safety licensing.

3. **Information and Communication Technology Systems (Smart Hospital)**

- Integrated Building Management System (IBMS/BAS) for HVAC, lighting, and energy monitoring;
- Fiber optic network, IP-PBX telephone, IP-based CCTV, and nurse call systems;
- Artificial Intelligence applications for radiology analysis and patient risk prediction;
- Electronic medical record systems with cloud backup.

4. **Capacity Building and Human Resource Development**

- Specialist and sub-specialist education programs (PPDS hospital-based and university-based);
- Technical training for medical staff, nurses, and technicians (approximately 250 participants);
- Clinical Research Unit (CRU) development for clinical research, stem cell, and biobank activities.

5. **Project Management and Supervision**

- Detailed Engineering Design (DED) consultancy;
- Construction Management (MK) consultancy;
- Project Management Unit (PMU) and Project Implementation Unit (PIU) operations.

The ESIA study covers the pre-construction, construction, and operational phases, with a total implementation period of approximately 60 months (2026–2030). The geographical scope is limited to the project site within the existing RSUP Dr. Kariadi compound on Jalan Dr. Sutomo No. 16, Semarang, and its immediate surrounding area that may be affected by project activities.

The assessment will identify and evaluate potential environmental and social impacts associated with each project component, including but not limited to: construction-related noise, dust, vibration, and traffic disruption; management of medical waste, hazardous waste (B3), and wastewater; radiation safety; occupational health and safety for construction workers and hospital staff; community health and safety; land use and visual impacts; and impacts on utilities and existing hospital operations during the demolition and construction period.

The ESIA will also assess the cumulative impacts of the redevelopment in the context of the hospital's continuous operation as a Class A referral and teaching hospital, and will propose mitigation measures, management plans, and monitoring arrangements consistent with AIIB's Environmental and Social Framework, Indonesian national regulations (PP No. 22/2021 and related laws), and international good practice. Since the project is built entirely on land already owned by RSUP Dr. Kariadi, no land acquisition or involuntary resettlement is required.

1.4. Financing and Associated Facilities

Not all works listed in Section 1.2 will be fully financed by AIIB. According to the RSUP Dr. Kariadi Readiness Criteria (February 2026), the GMS-DC & SoE redevelopment financing structure is as follows:

- AIIB Financing (Dana PHLN): 70.64% (Rp 1,004,000,000,000 / USD 62,360,248) covers civil works for the two main buildings (Gedung Medik Sentral-Diagnostic Center and Gedung Service of Excellent), site infrastructure (internal roads, utility connections, landscaping, and zero run-off drainage system), medical equipment procurement (advanced diagnostic and treatment equipment such as MRI, Cathlab, ventilators, anesthesia machines, and laboratory instruments), consulting services (Detailed Engineering Design, Construction Management supervision, and Financial Audit), and project management.

- Counterpart Financing (Dana Pendamping): 29.36% (Rp 417,195,324,865 / USD 25,912,753) covers partial medical equipment, human resource capacity enhancement (specialist and sub-specialist education programs and technical training for medical staff), and portions of consulting and project management services. This counterpart funding is sourced entirely from the non-tax state revenue (PNBP) of RSUP Dr. Kariadi's Public Service Agency (BLU) budget.

- Operational and Maintenance Costs, allocated from PNBP BLU RSDK and Rupiah Murni (RM) from the national budget (APBN); these are outside the scope of AIIB project financing and will be managed separately by RSDK under the supervision of the Ministry of Health.

In addition to the above, the demolition of existing structures on the SoE footprint (approximately 4,897 m²) is required as a physical prerequisite for the AIIB-financed SoE construction but is not financed by AIIB. As demolition is an activity that is not funded by AIIB but is essential for the project, directly linked to the AIIB-financed scope, and conducted within the project footprint and timeframe under the Borrower's control, it is treated as an Associated Facility under the AIIB Environmental and Social Framework (ESF) 2024. The environmental and social impacts of demolition, including construction and demolition waste generation, dust, noise, vibration, hazardous materials handling, worker safety, and service continuity during demolition, are therefore fully addressed within this ESIA and the associated Environmental and Social Management Plan (ESMP). The Borrower (Ministry of Health/RSDK) remains responsible for ensuring that demolition activities are conducted in full compliance with the ESMP, regardless of the funding source for the demolition itself.

Consequently, all components of the GMS-DC & SoE redevelopment, whether financed by AIIB, financed through counterpart funds, or treated as an Associated Facility, are integral to the same

project and managed under a unified governance structure (PMU at the central level and PIU at RSDK). No other component meets the criteria of an Associated Facility under AIIB ESF 2024, as none are independently operated or controlled by third parties separate from the Borrower.

Associated Facilities Screening Conclusion: One Associated Facility identified — the demolition of existing structures on the SoE footprint, which is not AIIB-financed but is essential for the project. The entire project scope, whether AIIB-financed, counterpart-financed, or Associated Facility, is subject to the same ESIA assessment and ESMP management requirements under the supervision of the Ministry of Health and RSDK.

1.5. Assessment Methodology

The methodology is designed to produce a transparent, evidence-based, and proportionate characterization of impacts, and is set out in full in Chapter 7. It is proportionate to the nature and scale of the GMS-DC & SoE redevelopment, an urban hospital construction project within an operational Class A referral and teaching hospital, financed through an AIIB loan, while meeting the rigor required by the AIIB Environmental and Social Framework (ESF) 2024 and Indonesian national regulations (PP No. 22/2021).

The methodology integrates four analytical frames:

Modified Leopold Matrix, used as a structured scoping and screening tool to ensure systematic identification of potential interactions between project activities and environmental and social receptors. Its function is to confirm completeness of the impact inventory rather than to assign final significance ratings.

Cumulative Impact Assessment (CIA), conducted in accordance with the IFC Good Practice Handbook on Cumulative Impact Assessment (2013), with consideration of the project's most relevant cumulative scenarios, including parallel construction and operational activities within the hospital complex (e.g., simultaneous demolition, construction, and ongoing patient care), overlapping impacts from multiple contractors, and the combined effects of construction noise, dust, vibration, traffic disruption, and utility interruptions on sensitive receptors (patients, staff, and surrounding community).

AIIB ESF Gap Analysis, comparing the project's environmental and social commitments against AIIB's Environmental and Social Standards (ESS1 to ESS3), as well as the Environmental and Social Exclusion List (ESEL). The screening covers: ESS1 (Environmental and Social Risks and Impacts), ESS2 (Land Acquisition and Involuntary Resettlement — screened out as the project is built on land already owned by RSDK), ESS3 (Biodiversity and Living Natural Resources — screened out given the urban site context with no natural habitats).

Living Document Approach, the ESIA is treated as a living document, updated at defined project milestones including completion of the Detailed Engineering Design (DED), pre-construction stage, mid-construction review, and operational handover. Updates will incorporate new baseline data,

stakeholder consultation feedback, changes in project design or scope, and any changes in regulatory requirements.

Each identified impact is characterized across nine dimensions before significance is determined:

- Nature, positive or negative
- Likelihood, probability of occurrence
- Impact type, direct, indirect, or cumulative
- Magnitude, scale or intensity of the change
- Spatial scale, site-specific, local, or regional extent
- Duration, short-term, medium-term, or long-term
- Reversibility, reversible, partially reversible, or irreversible
- Receptor sensitivity, vulnerability and importance of the affected receptor
- Severity, an integrative judgment derived from the combination of magnitude, duration, and reversibility

These nine dimensions feed into a four-level significance rating (Minor, Moderate, Major, or Critical) derived through a defined scoring matrix that combines likelihood, magnitude, and receptor sensitivity, with spatial scale and reversibility serving as modifying factors that may upgrade or downgrade the preliminary rating. The scoring matrix is presented in Chapter 7 to ensure transparency and replicability of expert judgment.

Significance ratings are recorded both pre-mitigation and as residual values after applying the AIIB ESS1 mitigation hierarchy (avoidance, minimization, restoration, and offset). Where residual impacts remain Significant or higher, additional management measures are specified in the Environmental and Social Management Plan (ESMP).

The assessment spans three project phases, preparation, construction, and operation, across the three nested spatial scales of the Area of Influence defined in Chapter 5 (site-specific, local, and regional). The regional scale is included for completeness, although for this urban hospital site most impacts are anticipated to be site-specific or local in extent.

1.6. Data Sources

This ESIA draws on the most extensive documentary base of any hospital in the TRUST portfolio, including the Feasibility Study GMS-DC & SoE (PT Pandu Persada, 2025); the RSDK Master Plan 2024; the ANDAL 2020 with its approved RKL-RPL and *Izin Lingkungan*; twelve semesters of UKL-UPL monitoring reports (2020–2025); the Pertek BMAL, Pertek Emisi, and Rintek Limbah B3 evidence files; the Andalalin reference dossier; occupational health and safety (K3) and lightning-protection

documentation; the 2025 *Kajian Gedung Heritage*; and Ministerial Decree 370/M/2017 designating RSDK a National-Level Cultural Heritage Property.

1.7. Study Limitations

This assessment was prepared within a compressed timeline of approximately 1.5 months, against the 6–12 months typical for a full-scope ESIA of comparable complexity. Four caveats apply and should be read alongside all significance ratings and mitigation recommendations:

- *Baseline data*: The assessment relies substantially on secondary data sources (BPS census data, RSDK service statistics, provincial environmental monitoring reports, Semarang City Data It iPublication, and national heritage registers). Baseline monitoring programs are recommended to commence prior to construction mobilization. Primary field surveys for environmental and social components are completed at the end June 2026.
- *Project description completeness*: The existing masterplan does not fully specify the detailed project implementation sequence or construction methodology. Impact characterizations are therefore based on conservative assumptions regarding triggering activities, phasing, and proximity to sensitive receptors. The ESIA will be updated in parallel with the detailed engineering design. *Stakeholder consultation depth*: Meaningful multi-round consultation with all affected community groups, heritage authorities, and specialist technical reviewers (heritage conservationists, infection control specialists) has completed and input for ESIA Document.
- *Significance ratings reflect professional judgment*: All significance ratings, including the pre-mitigation to residual trajectories in **Error! Reference source not found.Error! Reference source not found.**, are based on professional judgment by the ESIA team informed by analogous hospital construction projects in Indonesia and internationally. They should be treated as indicative until confirmed by pre-construction monitoring data.

2 PROJECT DESCRIPTION

2.1. Project Type and Scope

The project is a brownfield redevelopment within the existing, fully operational RSUP Dr. Kariadi Semarang (RSDK) complex, the sole Class-A National Referral Hospital in Central Java and a *Rumah Sakit Pendidikan Penyelenggara Utama* (RSPPU). It comprises the construction of two integrated high-rise clinical buildings, supported by the upgrading of campus utilities and environmental infrastructure to absorb the additional operational load:

- Medic Central Unit and Central Diagnostic Center (GMS-DC), a 7-story building plus 1 basement, with a total floor area of 44,856 m², to be built on a 6,411 m² vacant plot within the existing hospital compound. It integrates the Emergency Department (IGD), Central Operating Theatres, Cathlab, Intensive Care (ICU/ICCU/PICU/HCU), Burn Unit, Isolation Rooms, Central Laboratory,

Diagnostic Imaging, CSSD, Pharmacy Depot, Blood Donor and Transfusion Unit, and inpatient wards; and

- Building of Service of Excellent (SoE), a 7-story building plus 1 basement, with a total floor area of 33,215 m², to be built on a 4,897 m² plot following demolition of existing structures. It houses Polyclinic services, Centers of Excellence (mother & child, uronephrology, cardiovascular), Hemodialysis, NICU, Pediatric and Adult Inpatient Care, Medical Rehabilitation, Nuclear Medicine Inpatient, Psychiatric Inpatient, and Organ Transplant Isolation.

Together these two buildings form the Integrated Service Building (*Gedung Layanan Terpadu*). The scope also includes campus road and utility re-routing, landscaping, and the augmentation of the IPAL (wastewater), temporary storage of hazardous-waste storage (TPS *Limbah* B3) and stack-emission infrastructure required to serve the expanded capacity.

The project is preliminarily classified as **Category B (Moderate Risk)** under the AIIB Environmental and Social Policy, because it is an upgrade and expansion within an existing health-service compound rather than a greenfield development; no involuntary resettlement is implicated (ESS2 not applicable, as the footprint sits on existing RSDK land); Indigenous Peoples (ESS3) is not applicable; and the principal risks, construction nuisance, service continuity, heritage interface, traffic, and operational uplift in waste streams, are all amenable to standard mitigation-hierarchy treatment.

2.1.1 Initiator and Parties Involved

Table 1 Initiator and Parties Role

Party	Role
Initiator	RSDK Semarang (Public Service Agency under the Ministry of Health)
Designated Person-in-Charge of Environment (*Penanggung Jawab Lingkungan*)	Bapak Agus Akhmadi
Executing Agency	Ministry of Health of the Republic of Indonesia
Implementing Agency	Directorate General of Health Services, Ministry of Health of the Republic of Indonesia
Lender	Asian Infrastructure Investment Bank (AIIB), TRUST Project funding
Feasibility Study Author	PT Pandu Persada, Bandung, Laporan Akhir FS GMS-DC (December 2025)
National Environment Authority	Environmental Service, *Dinas Lingkungan Hidup Provinsi Jawa Tengah / Komisi Penilai AMDAL Provinsi*
Traffic Authority	Semarang City Transportation Agency and Transportation Agency, *Dinas Perhubungan Kota Semarang and Dinas Perhubungan Provinsi Jawa Tengah*
Spatial Planning Authority	Department of Spatial Planning, Dinas Penataan Ruang Kota Semarang
Heritage Authority	Cultural Heritage Conservation Center Region X / Cultural and Tourism Office Cultural Heritage Conservation Center Region X / Cultural and Tourism Office, Balai Pelestarian Cagar Budaya Wilayah X / Dinas Kebudayaan dan Pariwisata Provinsi Jawa Tengah
Academic Partner	Universitas Diponegoro (UNDIP) Fakultas Kedokteran

Party	Role
Off-site B3 Transporter	PT PRIA, contract is valid until 31 December 2026. (SPMK No. BJ.01.02/D.X.10/1490.1/2025.

Source: Readiness Criteria RSDK (2026); FS GMS-DC (2025).

2.1.2 Project Location

The Project site is the existing RSDK complex in Kota Semarang, Provinsi Jawa Tengah. The complex occupies 188,080 m² (per the land certificate (*Sertifikat Tanah*) on file, equivalent to approximately 18.8 hectares) and is bounded by Jl. Dr. Sutomo on one side and Jl. Dr. Kariadi on the other, providing the principal vehicular accesses to the complex. The PKKPR number 07022210213374075 issued on 28 June 2024 confirms the spatial suitability of the planned activities. Per the FS Section 4.1, the site falls within the Education and Health Strategic Area of the Perda Kota Semarang 5/2021 (Updated spatial planning RTRW 14/2011), in immediate proximity to Universitas Diponegoro, and is also identified within the "*Kawasan Strategis Sosial dan Budaya*" due to its vicinity to administrative, educational and cultural anchors of the city

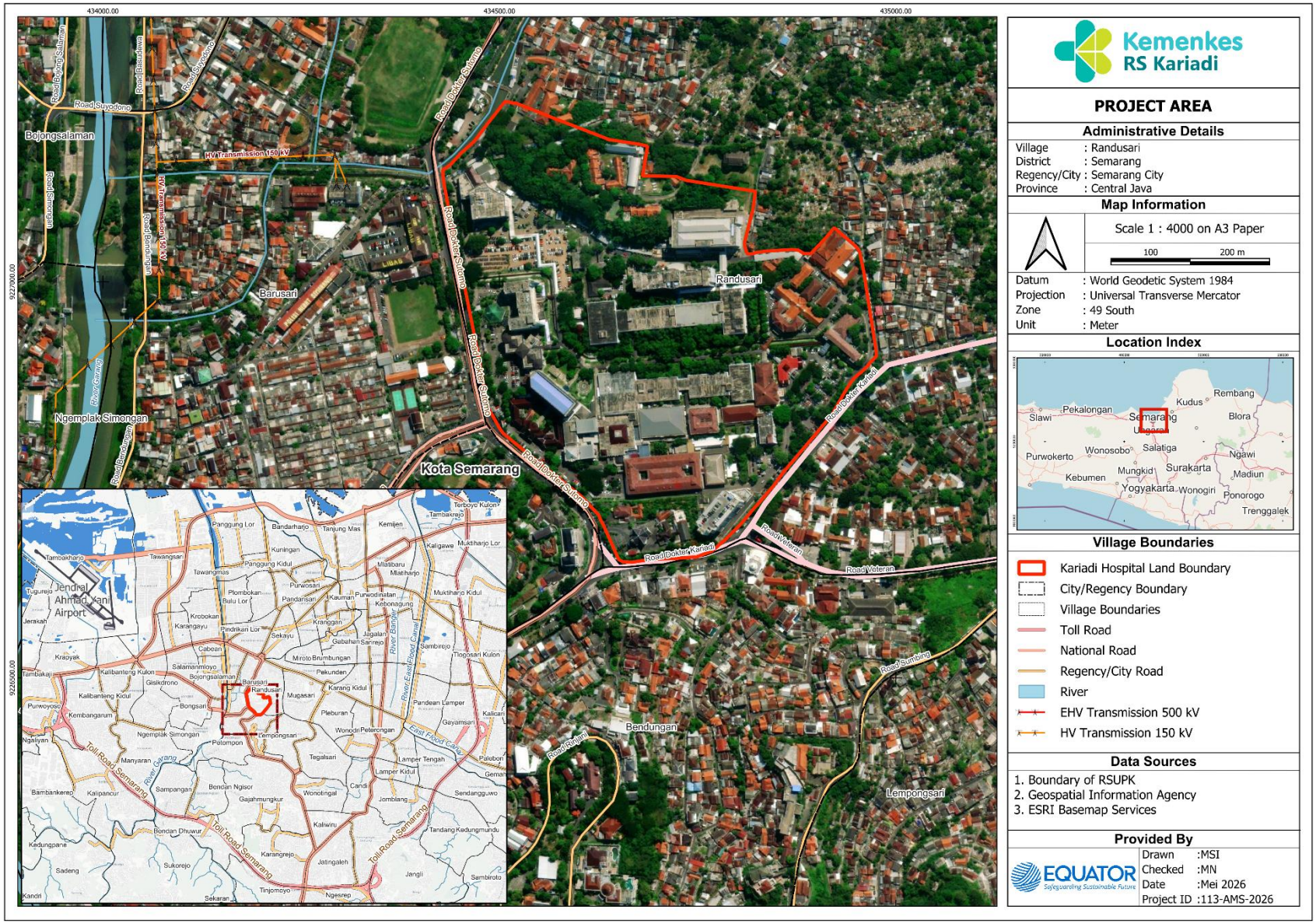


Figure 1 Redevelopment of RSDK project location

The Feasibility Study (FS) document – in Section 4.2 – characterizes the site topography as relatively flat with modest local variations, allowing GMS-DC construction without extensive cut-and-fill, a consideration favorable to construction-phase mass-balance and timeline planning. The same FS section identifies the site as adjacent to the flooding prone area with low to moderate ratings (*Kawasan Rawan Bencana Banjir Kelas Rendah hingga Sedang*) of Kota Semarang, reflecting the city's general topographic gradient from the south (*perbukitan*) toward the north (*dataran rendah*). This climate-related risk is treated in detail in Chapter 8.

Site capacity analysis follows the Regulation of Health Minister (Permenkes) 40/2022 on hospital technical building requirements, which prescribes a minimum 80 m² of total building floor area per bed for a Class A general hospital. Applied to the existing operational bed inventory plus the planned increment from the GMS-DC, the calculation comfortably fits within the 188,080 m² site footprint with land headroom available for the eventual long-horizon FS-projected service growth. The detailed site capacity calculation will be reproduced in Annex F at v1.0 along with the GMS-DC building footprint and Master Plan zoning overlay.

2.1.3 Project Purpose and Benefits

RSDK serves a catchment of over 36 million people but faces capacity and infrastructure constraints amid rising demand for intensive, critical-care and specialist services, and its national mandate for medical education and research. The Integrated Service Building directly addresses these gaps. Key benefits include:

- Addition of 856 inpatient beds across the two new buildings (466 in GMS-DC and 386 in SOE), with priority allocation to high-dependency care (ICU, ICCU, HCU, NICU, PICU, isolation) and KRIS-standard wards.
- Centralization of diagnostic and high-acuity services (laboratory, radiology, cathlab, operating theatres, CSSD) to improve clinical workflow, patient safety and efficiency.
- Expanded centers of excellence (cardiovascular, brain & spine, transplant, mother & child, oncology) supporting the hospital's transformation toward an Asia-level standard.
- Strengthening of the academic and research mission as a Teaching Hospital (RSPPU) in partnership with UNDIP.
- Integration of a Smart Hospital and Green Building framework, energy and water efficiency, digital health records, and environmental monitoring (Section 2.5).

2.2 Land Ownership and Tenure Status

A clear understanding of the land tenure arrangements underpinning the GMS-DC & SoE redevelopment is essential for two reasons. First, it determines whether the project triggers land

acquisition and involuntary resettlement safeguards under AIIB ESS 2. Second, it establishes the legal basis upon which construction may proceed and upon which third-party interests, including those of vendors, patients, staff, and neighbouring communities, are assessed and managed.

This section describes the existing land ownership structure, the applicable legal instruments, the spatial planning compliance status, and the implications for AIIB Environmental and Social Standards.

2.2.1 Existing Land Ownership

The entire project footprint falls within the existing RSDK hospital complex. The land is a state-owned asset classified as Barang Milik Negara (BMN) and is held under the authority of the Ministry of Health of the Republic of Indonesia. Legal tenure is established through Sertifikat Tanah Hak Pakai No. 04/05 of 1996, which records a total landholding of 188,080 m² (approximately 18.8 hectares). The certificate is registered in the RSDK administrative dossier and is recorded in the national BMN ledger.

The legal status of the land is designated as *Hak Pakai* (Right to Use) under the framework of Government Regulation (*Peraturan Pemerintah*, PP) No. 27 of 2014 concerning the Management of State and Regional Property, as amended by PP No. 28 of 2020. Under this framework, RSDK holds the operational management right to use and develop the land for the purposes of healthcare service delivery, medical education, and supporting institutional functions. The land remains under the ultimate ownership of the State and cannot be sold, mortgaged, or transferred without the formal approval of the Ministry of Finance through the Directorate General of State Assets (Direktorat Jenderal Kekayaan Negara, DJKN).

Importantly, the GMS-DC & SoE redevelopment does not require the acquisition of any new land. All construction activities, including demolition of the existing building, excavation, piling, and erection of the new GMS-DC & SoE structure, will take place entirely within the boundaries of the existing 188,080 m² site. The physical development is focused on optimising the land that RSDK already holds, rather than expanding the hospital's spatial footprint into adjacent areas.

Table 2 Summary of land tenure status for the GMS-DC & SOE project site.

Aspect	Detail
Land certificate	Sertifikat Tanah Hak Pakai No. 04/05 of 1996
Certified area	188,080 m² (≈ 18.8 ha)
Asset classification	Barang Milik Negara (BMN), State-Owned Asset
Managing institution	RSDK, under the Ministry of Health
Legal tenure type	Hak Pakai (Right to Use) / Hak Pengelolaan (Right to Manage)
Governing regulation	PP No. 27/2014 as amended by PP No. 28/2020 concerning Management of State/Regional Property
BMN custodian	Directorate General of State Assets (DJKN), Ministry of Finance
Site address	Jalan Dr. Sutomo No. 16, Randusari, Kecamatan Semarang Selatan, Kota Semarang, Jawa Tengah 50244
Site boundaries	Bounded by Jl. Dr. Sutomo and Jl. Dr. Kariadi, providing principal vehicular access

2.2.2 Spatial Planning and Land-Use Compliance

The suitability of the project site for healthcare infrastructure development is confirmed through three complementary spatial planning instruments, each operating at a different level of regulatory authority:

- *Land Certifcate (Sertifikat Tanah)*: The land certificate confirms RSDK's legal landholding of 188,080 m² and establishes the cadastral boundary of the hospital complex.
- Approval of Compliance with Land Use Regulations *(Persetujuan Kesesuaian Kegiatan Pemanfaatan Ruang – PKKPR)*: Certificate number 07022210213374075, issued on 28 June 2024 through the OSS-RBA (Online Single Submission – Risk-Based Approach) system, confirms that the planned GMS-DC & SoE activities are spatially suitable under the applicable land-use designation. This is the current-generation spatial suitability instrument required for all development activities under the post-Omnibus Law regulatory framework.
- *Spatial and Regional Planning (Rencana Tata Ruang Wilayah – RTRW)*: Under Perda Kota Semarang No. 5 of 2021 (amending Perda No. 14 of 2011), the project site is designated within the Pendidikan dan Kesehatan (Education and Health) Strategic Area. This zoning classification explicitly accommodates large-scale healthcare infrastructure, confirming that the GMS-DC & SoE redevelopment is fully aligned with the city's long-term spatial plan for the 2021–2041 planning horizon.

Additionally, the historical of City Plan Description (*Keterangan Rencana Kota* – KRK) issued in 2018 remains on file as the reference document for the broader complex, although the PKKPR now supersedes it as the operative spatial conformity instrument under current regulations.

The site is situated within Bagian Wilayah Kota (BWK) I of the Semarang City spatial plan, in a zone designated for Public and Social Services (*Sarana Pelayanan Umum* – SPU). This designation confirms that the hospital's existing operations and its planned vertical expansion are in full conformity with the urban land-use framework for the South Semarang district.

2.2.3 Confirmation of No Land Acquisition

The Readiness Criteria document prepared by RSDK (February 2026) explicitly confirms that the infrastructure development under Master Plan Phases I and II is focused entirely on the optimisation of land already held by the hospital. No new land acquisition is required, and no population resettlement is triggered by the project.

This confirmation is reiterated across the following parameters:

- *Land area required for construction*: The physical works will be carried out on a total building area of 213,465 m², which falls within the certified 188,080 m² site boundary (the larger figure

accounts for total gross floor area across multiple storeys, while the certified area refers to the ground-level site footprint).

- *Population resettlement*: No residents will be displaced or resettled as a result of the project, since the land is entirely owned and controlled by RSDK. However, a number of tenants operating businesses within the RSDK area will be affected (Refer to chapter 5.5.3).
- *Land acquisition procedures*: No land acquisition procedures under Law No. 2 of 2012 (Land Acquisition for Development in the Public Interest) or its implementing regulations are applicable.
- *Land acquisition costs*: No budget allocation is required for land acquisition or population resettlement compensation.
- *Social and economic rehabilitation*: As there is no land acquisition, no compensation or socioeconomic rehabilitation programme arising from land acquisition is needed. However, compensation in the form of alternative land/place shall be provided to tenants within the RSDK area who are affected during construction phase.

The evidence is documented in the Surat Akte Tanah and the BMN records maintained by the RSDK administration. These records have been verified by the project team and are available for review by the AIIB safeguards team upon request.

2.2.4 Adjacent Land Parcels and Ongoing Status Transfers

While the GMS-DC project footprint itself sits on land already held by RSDK, it is important to note that certain parcels within the broader hospital complex boundary have historically been associated with other state institutions. Specifically, portions of the complex include land that was previously under the management of PT Kereta Api Indonesia (PT KAI) and the Indonesian National Armed Forces (*Tentara Nasional Indonesia* – TNI). The process of formally transferring the BMN status of these parcels to the Ministry of Health / RSDK has not yet been fully completed.

This administrative transfer has been identified as a high-rated legal/land risk in the project's Readiness Criteria assessment, reflecting potential impacts on construction scheduling if not resolved promptly. RSDK is pursuing intensive inter-ministerial coordination to expedite the formal reclassification. To prevent delays to construction commencement, RSDK's Finance and Planning Directorate should prioritize initiating the BMN inventory and KPKNL submission process in parallel with ongoing environmental permitting and construction procurement activities, as the formal approval process typically requires 60–90 working day.

This pending administrative transfer has been identified in the Readiness Criteria risk assessment as a high-rated risk (Legal/Land category), reflecting the potential for construction scheduling delays if the transfer process is not resolved in time. The recommended mitigation strategy involves intensive inter-ministerial coordination to expedite the formal reclassification of BMN status from the originating institutions (PT KAI and TNI) to the Ministry of Health.

It is important to emphasise that this issue is an administrative reclassification within the state asset management system, not a private land acquisition. The land in question has been physically occupied and continuously managed by RSDK for decades. No private landowners, communities, or informal occupants are affected by this transfer. The transfer does not trigger AIIB ESS2 (Land Acquisition and Involuntary Resettlement) because it involves a change of custodianship between government agencies over land already in public use, rather than the compulsory taking of private land or the displacement of persons.

The PIU will monitor the progress of this administrative transfer and will report on its status to the AIIB safeguards team as part of the quarterly progress reporting cycle. Should any unanticipated complication arise, which could affect the project schedule or the rights of third parties, it will be disclosed and addressed through the established project governance and grievance redress mechanisms.

2.2.5 Implications for AIIB Environmental and Social Standards

The land tenure status described above has direct consequences for the applicability of AIIB safeguard standards to this project.

Table 3 AIIB ESS applicability assessment in relation to land tenure status

AIIB Standard	Applicability	Rationale
ESS1, Environmental and Social Assessment	Fully applicable	The project is classified as Category B (Moderate Risk) under the AIIB ESS 1. All aspects of ESS1 apply, including: (i) Environmental and Social Assessment, (ii) Labour and Working Conditions (OHS, workforce management, worker GRM), (iii) Stakeholder Engagement and disclosure to all affected parties (internal tenants/vendors, hospital staff, patients, surrounding communities), (iv) cultural heritage, (v) gender, and (vi) management of other environmental and social risks and impacts, regardless of whether land acquisition is involved.
ESS2, Land Acquisition and Involuntary Resettlement	Not triggered (for land acquisition)	The project does not involve acquisition of private land, compulsory purchase, or expropriation. All works take place on existing state-owned land under RSDK management. However, ESS2 livelihood restoration obligations are triggered for vendor displacement (B.5.1a and B.5.1b), which is addressed separately in the Restoration Action Plan ~~Framework (RAPF)~~ and the ESMP.
ESS3 – Indigenous Peoples	Not triggered	No indigenous peoples have been identified as affected parties in this project.

In summary, the GMS-DC & SoE redevelopment will take place entirely within the established boundaries of the RSDK hospital complex, on land that has been held by the institution as a state-owned asset for decades. The land tenure is legally established through the Sertifikat Tanah Hak Pakai No. 04/05 of 1996, supported by current BMN registration, and confirmed as spatially suitable by the PKKPR issued in June 2024. No private land acquisition, compulsory purchase, or community resettlement is required.

The only residual land-related matter is the administrative transfer of BMN custodianship for certain parcels historically associated with PT KAI and TNI, which is being resolved through inter-ministerial coordination and does not affect private parties or trigger AIIB ESS2 land acquisition provisions.

This project is confirmed to involve no form of land acquisition. Furthermore, the street vendors (PKL) operating on the sidewalk across the road, especially outside the hospital boundary, yet still within the project's surrounding area—will remain entirely undisturbed. They will not face any eviction or relocation, whether during the construction phase or throughout the subsequent full operational period of the project.

Although two internal canteen tenants are relocated from their existing premises, they are transferred directly into permanent trading spaces within the new GMS-DC & SoE building and thus maintain continuous operations throughout the construction and operational phases with no trading gap.

2.3 Screening for Associated Facilities

The screening for Associated Facilities follows the AIIB ESF definition, facilities that are not funded by the project but are essential for project viability and would not have existed or been expanded without the project. The screening identifies two external facilities classified as Linked Activities that require management attention beyond the project boundary.

- PT PRIA — B3 wastes transporter and processing company. GMS-DC & SoE commissioning will increase RSDK's medical B3 waste generation across all seven regulated streams (A337-1 through B337-5), with post-development volumes projected at approximately 2,000 kg/day. PT PRIA, operating under the existing service contract with RSDK (contract no. BJ.01.02/D.X.10/1490/2025, valid until 31 December 2026), is the sole licensed transporter and processor for these streams. According to the Contract Document, the scope of work for PT PRIA encompasses the transportation, management, and disposal of hazardous and toxic waste (B3) originating from the hospital, including both medical and non-medical hazardous waste. Pursuant to Government Regulation (PP) No. 22/2021, hazardous waste management activities must possess an environmental approval (AMDAL), a technical approval (Pertek), and an operational feasibility certificate (SLO) for the transportation and processing of hazardous waste. Based on the verification results from the Ministry of Environment's Integrated One-Stop Service (OSS) website, PT PRIA holds valid permits, including the AMDAL, technical approval, and SLO (https://pelayananterpadu.kemenlh.go.id/index.php/perizinan/rekap-perizinan.html). As a company that provide service on the waste management, PT PRIA serves multiple clients/consumsumers other than RSDK. Based on the company profile, PT Putra Restu Ibu Abadi (PRIA) is a KLHK-licensed hazardous waste management company established in 2010, headquartered in Mojokerto, East Java, offering vertically integrated LB3 services, collection, transportation, processing, recycling, and disposal. The company operates a fleet of 129 licensed vehicles, including box trucks (solid/packaged waste), open-top trucks (bulk/sludge waste), and tank trucks (liquid waste), all driven by DIRJEN HUBDAR-certified personnel, demonstrating a credible logistical capacity for healthcare and industrial LB3 streams. At its Mojokerto facility, PRIA employs an incinerator (up to 1,200°C) for solid and liquid waste, an electrocoagulation

system (1,000 L/day) for liquid effluents, and a dedicated TL lamp processor (400 kg/day), with additional capability to recycle LB3 into commercial products (bricks, paving blocks, low-grade paper) compliant with SNI and TCLP standards. However, the brochure does not disclose specific air emission control systems (e.g., scrubbers, baghouse filters, or CEMS) or compliance with national emission standards, representing a key information gap. No publicly verifiable environmental or social incidents involving PT PRIA were identified, although this assessment is limited to a single self-published marketing document; further verification through KLHK's SIPLB3 database, PROPER ratings, and direct site visits is recommended to fully validate the company's operational and environmental compliance.

- RSDK does not control PT PRIA's facility, but its operational performance, manifest discipline, treatment capacity, and regulatory compliance, is directly material to RSDK's own environmental obligations under PP 22/2021 and PermenLHK 6/2021. The refreshed Rintek Limbah B3 will confirm whether the current contractual volume ceiling is sufficient for the post-GMS-DC & SoE load. RSDK is required to conduct quarterly transporter audits and verify that PT PRIA maintains its processing facility license throughout the operational period.

- TPA Jatibarang, Domestic and Non-B3 Waste Disposal. Post-development domestic solid waste generation is projected at approximately 159 m^3/day, routed to TPA Jatibarang via the DLH Kota Semarang collection system. RSDK does not control TPA operations, but waste reduction at source, segregation, organic processing, and recycling, reduces the volume transferred and partially offsets the project's contribution to the municipal waste stream. Waste minimization targets are incorporated in the operational ESMP.

Both linked activities are monitored through the quarterly PT PRIA audit and the monthly waste register, with findings reported in the PIU's semi-annual environmental and social progress report.

- The **demolition of existing structures** on the SoE footprint (approximately 4,897 m^2) is required as a physical prerequisite for the AIIB-financed SoE construction but is **not financed by AIIB**. As demolition is an activity that is not funded by AIIB but is essential for the project, directly linked to the AIIB-financed scope, and conducted within the project footprint and timeframe under the Borrower's control, it is treated as an **Associated Facility** under the AIIB Environmental and Social Framework (ESF) 2024. The demolition of existing structures on the SOE footprint, which is not AIIB-financed but is essential for the project. The entire project scope, whether AIIB-financed, counterpart-financed, or Associated Facility, is subject to the same ESIA assessment and ESMP management requirements under the supervision of the Ministry of Health and RSUP Dr. Kariadi.

- As the hospital's capacity expands after reconstruction, the wastewater generated from its operations will also increase. Consequently, the volume of wastewater managed by the wastewater treatment plant (WWTP) will increase. Based on the hospital's current wastewater discharge permit, the existing WWTP is still sufficient to manage the hospital's wastewater after reconstruction. Therefore, it is not an Associated Facility.

2.3.1 Physical Project Components

2.3.2 New Buildings and Structures

The buildings to be constructed within the scope of this project consist of the Central Medical-Diagnostic Centre (Gedung Medik Sentral - Diagnostic Centre, GMS-DC) Building and the Service of Excellence (SoE) Building, both of which are proposed under a financing scheme by the AIIB. The two new buildings are high-rise reinforced concrete structures, each comprising seven stores plus one basement. Their principal parameters are summarized below.

Table 4 Key Parameters of the New Buildings

Parameter	GMS-DC	Service of Excellent (SOE)
Function	Emergency, surgical, intensive & cardiac care, diagnostics	Centers of excellence, outpatient, rehabilitation, mother & child
Total floor area	41,999 m²	32,628 m²
Building footprint	On vacant land of 6,411 m²	On land of 4,897 m² (existing buildings to be demolished)
Stores	7 floors + 1 basement	7 floors + 1 basement
Bed capacity	335 beds	432 beds
Structural system	Reinforced-concrete frame, earthquake-resistant design (Beton ready-mix f'c 25–35 MPa)	Reinforced-concrete frame, earthquake-resistant design
Foundation	Bored pile (Ø0.6–0.8 m) for high-rise blocks; mini-pile for low-rise elements	Bored pile / mini pile per DED

Source: Master Plan RSUP Kariadi 2024; Readiness Criteria (2026). Floor areas and bed counts are Master-Plan figures; the construction-stage values will be reconciled against the Detailed Engineering Design (target July 2026).

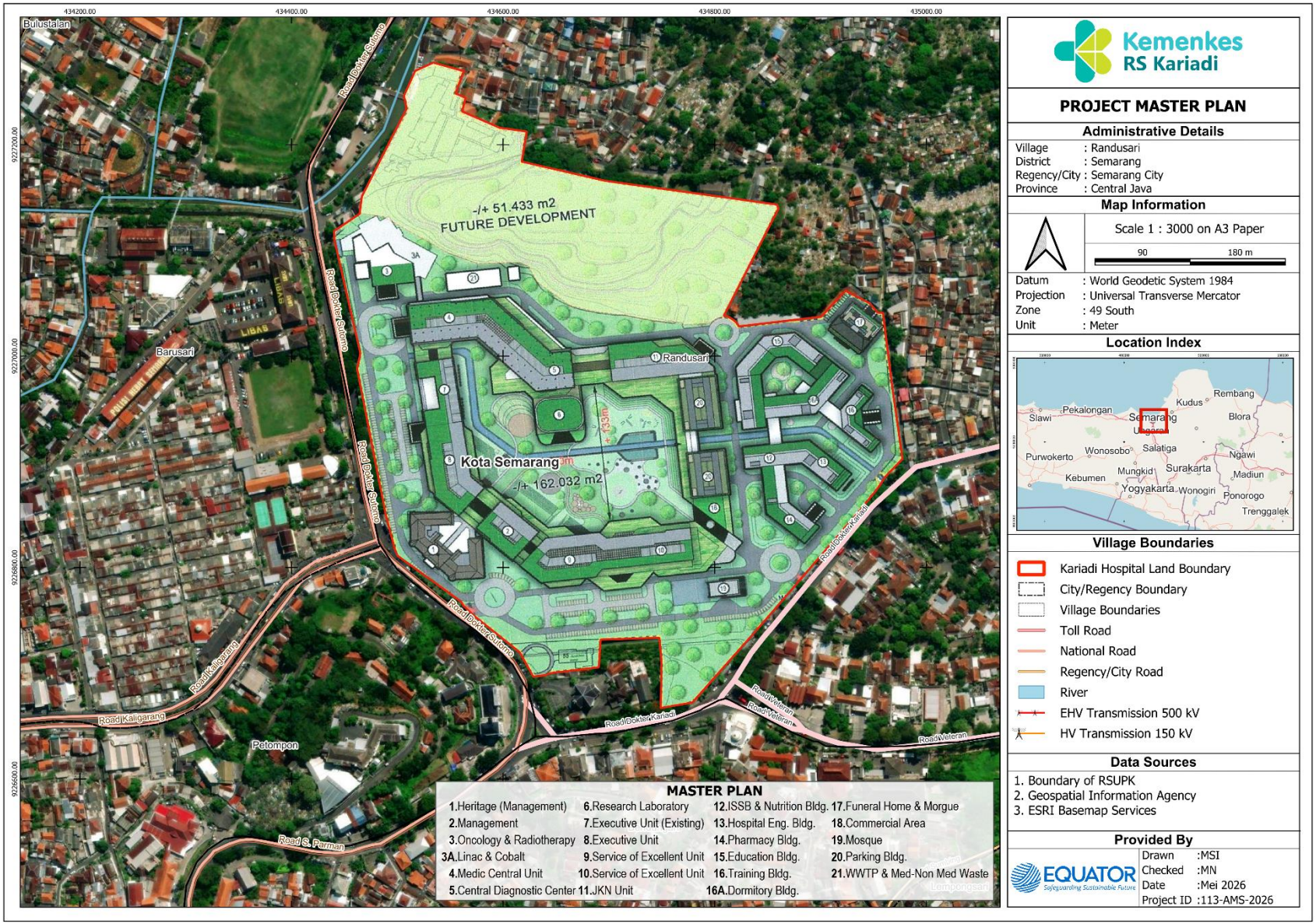


Figure 2 RS Dr. Kariadi Redevelopment Plan

Table 5 Floor Program, Gedung Medik Sentral & Diagnostic Center (GMS-DC)

Floor	Principal Functions	Beds
Basement	Parking, logistics, service circulation	—
Ground	IGD (100), Pharmacy depot, Emergency Radiology, Blood Donor unit	100
1	Operating theatres (OK) and Cathlab, Pharmacy depot	36
2	Laboratory, Inpatient Radiology, UPD, CSSD	—
3	NICU, SCN, PICU, child isolation, Burn Unit, Obstetrics, delivery rooms	87
4	ICU, ICCU, HCU, Pharmacy depot	120
5	Pediatric inpatient ward (KRIS)	100
6	VIP (pediatric & obstetric), inpatient wards, management rooms	28
Total		**335**

Source: Recap Desk Masterplan RSUP Kariadi 2024 (sheet GMS).

Table 6 Floor Program, Gedung Service of Excellent (SOE)

Floor	Principal Functions	Beds
Basement	Parking, logistics, service circulation	—
Ground	Registration, Hydrotherapy, Outpatient Radiology, Medical Records, KMKB	—
1	Brain & Spine, Cardiovascular, Uro-Nephrology & Transplant, Dermatovenereology & Aesthetic services; Pharmacy & Lab sampling	—
2	Mother & Child, Medical, Surgery/Ophthalmology/ENT, MDT services, treatment rooms	—
3	VIP wards, management rooms	75
4	VIP wards, transplant inpatient, Pharmacy depot	79
5	Adult inpatient ward (KRIS)	140
6	Adult inpatient ward, Simulation Center	138
Total		**432**

Source: Rekap Desk Masterplan RSUP Kariadi 2024 (sheet SOE).

2.3.3 Supporting Infrastructure and Utilities

To complement the two main buildings mentioned above, several supporting facilities and infrastructure will also be constructed, all of which are proposed for inclusion under the AIIB financing scheme. Campus utilities and environmental infrastructure will be augmented to serve the expanded capacity. The key systems and their post-development capacities are summarized below.

Table 7 Supporting Infrastructure and Utilities (Post-Development)

System	Description and Capacity
Road & circulation	Campus accessed via Jl. Dr. Sutomo (collector road, 8 m carriageway). Internal circulation upgraded with ambulance lanes, patient drop-off, and disability-accessible pedestrian routes. Construction traffic limited to ≤5-tonne axle loads.
Parking	Post-development capacity ≈ 2,385 car SRP and ≈ 2,317 motorcycle SRP, via structured and podium parking (Andalalin approval KP.3986/LT.408/DRJD/2020).

System	Description and Capacity
Water supply	Primary: PDAM Tirta Moedal; backup: 9 licensed deep wells (SIPA, ≈ 265 m³/day). Post-development total demand ≈ 6,944 m³/day; development increment ≈ 1,476 m³/day.
Electricity	PLN primary supply upgraded from 5,540 to 8,000 kVA; on-site genset fleet (11 units, ≈ 9,000 kVA total) on emergency standby, diesel fuelled.
Wastewater (IPAL)	Three existing units (Sentral 1,200; Rajawali 250; Garuda 96 m³/day) plus a new IPAL Medik Sentral (200 m³/day), combined ≈ 1,746 m³/day; aerobic biological treatment discharging to Banjir Kanal Barat (PermenLHK 68/2016 standards).
Medical gases	Centralized system (O_2, N_2O, medical air, vacuum, N_2) with new outlets per DED.
Domestic solid waste	Collection to TPS (240 m³) → TPA Jatibarang; post-development ≈ 159 m³/day.
Hazardous (B3) waste	TPS Limbah B3 with emergency-response facilities → licensed third party (PT PRIA); post-development ≈ 3.0 m³/day (≈ 2,000 kg/day).
Incinerator	New unit (later phase): 500 kg/hr, dual-chamber 800/1,000 °C, scrubber APC, stack H = 24 m, internal RSDK use only.
Drainage	U-ditch (1 × 1 m) → Kota Semarang drainage → Banjir Kanal Barat; supported by infiltration wells and *biopori* (zero run-off concept).
Kitchen & laundry	Nutrition (Gizi) and laundry remain at existing facilities with capacity expansion; the former Laundry & Boiler building is demolished to free the GMS-DC footprint.

Source: FS GMS-DC (2025); Master Plan RSUP Kariadi 2024; existing Pertek BMAL, Pertek Emisi and Rintek Limbah B3 records.

2.3.4 Cultural Heritage Interface

The RSDK complex is ~~as~~ registered as a National-Level Cultural Heritage Property (Bangunan Cagar Budaya Peringkat Nasional) under Decree of the Minister of Education and Culture No. 370/M/2017, and the Master Plan 2024 incorporates a heritage-management approach for its historic buildings and landscape. A Cultural Heritage Impact Assessment study serves as the basis for the establishing the cultural heritage baseline, impact assessment, chance-find procedures and construction monitoring (including vibration monitoring for heritage-adjacent works). The full heritage description is provided in the Environmental and Social Baseline (Chapter 5).

2.3.5 Smart and Green Hospital Strategy

The redevelopment incorporates a Smart Hospital and Green Hospital strategy, consistent with the FS and with AIIB resource-efficiency and climate expectations. The four pillars are summarized below.

Table 8 Smart and Green Hospital Strategy

Pillar	Key Measures
Smart Hospital	Building Management System (BMS); Electronic Medical Records (EMR); patient-tracking and bed-management; energy and water sub-metering; telemedicine and tele-radiology readiness; cybersecurity for the integrated clinical IT environment.
Green Hospital	High-efficiency HVAC with HEPA filtration for clinical zones; optimised building envelope; water efficiency (low-flow fittings, rainwater-harvesting opportunity); indoor-air-quality monitoring; daylighting and circadian-friendly lighting; mature-tree retention where compatible with the footprint; and a solar-PV opportunity (quantified in Chapter 8).
Climate-resilient infrastructure	Drainage sized for extreme-rainfall events with climate-change uplift (BMKG / IPCC AR6); redundant power via the augmented genset fleet; and a prioritised PLN restoration partnership.

Resource circularity	Segregation infrastructure for B3, recyclables and organics; renewed off-site B3 transporter chain (PT PRIA) and domestic-waste contracts; and circular-economy provisions for medical-equipment lifecycle.

Source: FS GMS-DC (2025), Section 5.5; Master Plan RSUP Kariadi 2024.

2.3.6 Project Lifespan and Phase Schedule

The overall master plan development spans approximately 15 years (2021–2035), divided into 15 sequential building phases. This ESIA focuses on Phase 1 (GMS-DC) and references subsequent phases where cumulative impacts are relevant.

Table 9 Project Lifespan and Phase Schedule

Phase No.	Building / Component	Planned Period	Duration
1	Gedung Medika Sentral (GMS-DC) Anchor phase, assessed in this ESIA	2027–2030	4 years
2	Park & Motorcycle Parking Building (Taman & Gedung Parkir Motor)	2028	1 year
3	Learning Center (Gedung Pusat Riset)	2030	1 year
4	Parking Building A (Gedung Parkir A)	2030–2031	2 years
5	Mosque Building, Visiting Lobby & Parking D (Gedung Masjid, Lobby Besuk & Parkir D)	2032	1 year
6	Rehabilitation Building (Gedung Rehabilitasi)	2032	1 year
7	Motorcycle Parking Building (Gedung Parkir Motor Irja)	2033	1 year
8	Incinerator Building (Gedung Insinerator)	2033	1 year
9	Outpatient Building & Parking (Gedung Rawat Jalan & Parkir)	2034–2035	2 years
10	Guest House Building (Gedung Guest House)	2035	1 year
11–14	Inpatient Building A, B C, D (Gedung Rawat Inap A, B, C, D)	2035–2039*	2 years each
15	Sport Center (Pool, Gym, Guest House, Cinema)	2039–2041	2 years

2.3.7 Supporting Infrastructure

- *Road Access and Circulation*. The hospital campus is accessed via Jl. Dr. Sutomo (primary collector, 8 m carriageway, MST 10 tons). Construction traffic will use vehicles ≤5-tonne axle to remain within road capacity. Internal circulation will be upgraded with designated ambulance lanes, patient drop-off, and pedestrian paths including disability-accessible routes.
- *Parking*. Post-development total parking capacity: 2,385 SRP for cars (existing 1,419 + development 966) and 2,317 SRP for motorcycles (existing 715 + development 1,602). Parking structures include parking building (*Gedung Parkir*) A (225 car + 428 motorcycle SRP) and distributed surface and podium parking per Andalalin approval No. KP.3986/LT.408/DRJD/2020.

- *Wastewater Treatment (IPAL)*. Based on the current capacity of the IPAL facilities (over 1,500 m^3/day), RSDK does not need to expand the treatment capacity. However, due to updates in wastewater volume and sources, it is anticipated that the IPAL facilities will be required to update their operating permit and revise the monitoring plan. The allocated budget covers water quality monitoring activities as well as the discharge IPAL maintenance and strengthening, and network rejuvenation of GTO for better operational.
- *Generator Sets (Genset)*. Phase 1 adds 1-unit genset (1,000 kVA) at GMS-DC. Post-development total genset capacity: 9,000 kVA (11 units existing 8,000 kVA + 1,000 kVA new). PLN primary supply will be upgraded from 5,540 MW to 8,000 MW. Genset operates in emergency standby mode only, fueled by diesel (solar).
- *Kitchen / Nutrition Installation*. Instalasi Gizi (Nutrition) remains at existing facility. Catering for expanded inpatient beds will be handled through existing kitchen with capacity expansion under subsequent phases.
- *Laundry*. Existing laundry facility handles all inpatient linen. The Ex-Laundry & Boiler building (881 m^2) will be demolished to make way for GMS-DC and laundry function consolidated into the main facility.

2.4 Demolition Plan, Internal Transfer Plan, and State-Owned Asset Disposal

2.4.1 Demolition Plan

The GMS-DC & SoE redevelopment involves the selective demolition of existing structures within the RSDK complex to make way for new buildings. The demolition program is sequenced in line with the Master Plan RSDK 2024 (KMK No. HK 01.07.MENKES/1816/2024) and the ANDAL 2020, which identified demolition-related impacts, noise, vibration, dust, debris, and temporary service disruption, as key environmental and social risks during construction. It is important to note that the demolition activities of the old buildings are excluded from the AIIB financing scheme and are anticipated to be funded through alternative sources. However, the construction of the new Central Medical-Diagnostic Centre (GMS-DC) and the Service of Excellence (SoE) buildings cannot proceed without the prior clearing and demolition of these existing structures. Under the AIIB Environmental and Social Framework (ESF), a facility or activity is considered an Associated Facility (AF) if it is not funded under the project, is essential for the project's viability, and would not have been conducted if the project did not exist. Because the redevelopment is entirely dependent on this land clearing, the demolition phase meets these criteria and is therefore identified as a potential Associated Facility.

The demolition sequence is phased to ensure uninterrupted clinical operations throughout the construction period. No demolition commences in any building in active service until the receiving facility for relocated services is fully operational and has received its Certificate of Proper Function (SLF).

Phase 1, Demolition for the Gedung Medic Central Unit and Diagnostic Center (GMS-DC)

The GMS-DC building (7 floors + 1 basement; 41,999 m² GFA) will be constructed primarily on a currently vacant plot of approximately 6,411 m². The only structure requiring demolition in this phase is the decommissioned former Laundry and Boiler building, a single-storey structure of 881 m².

The selected demolition method is top-down manual demolition using hand-breaker and jackhammer, chosen specifically to limit dust generation and ground-borne vibration to adjacent wards that will remain in active clinical use. The estimated volume of demolition debris is approximately 705 m³, to be hauled off-site to a licensed receiving facility in Genuk (approximately 15 km from the hospital) at a rate of approximately one truck trip per day. As the laundry function has been consolidated into the main laundry facility elsewhere on campus, no service disruption results from this demolition.

A Pre-Construction Risk Assessment (PCRA) and Infection Control Risk Assessment (ICRA) will be conducted prior to commencement, consistent with Permenkes 27/2017 and the hospital's infection prevention and control protocols. A heritage walkover survey of adjacent colonial-era structures will be completed before any works begin, given the proximity of the demolition zone to Gedung Garuda and other nationally registered heritage buildings within the RSDK complex.

Phase 2, Demolition for the Gedung Service of Excellent (SoE)

The SoE building (7 floors + 1 basement; 32,628 m² GFA) will be constructed on a site of approximately 4,897 m² that currently contains active operational buildings, including Gedung Elang and associated structures housing clinical and administrative functions.

Phase 2 demolition may only commence once the GMS-DC building has been completed, commissioned, has received its SLF, and all services previously housed within the Phase 2 demolition footprint have been successfully transferred to the new GMS-DC or to other designated receiving spaces within the complex.

The demolition methodology for Phase 2 follows the same principles established in Phase 1. However, Gedung Elang presents a specific heritage constraint: it is directly adjacent to a nationally registered Cultural Heritage Property, with separation distances of less than one metre at certain points. Demolition sequencing for Gedung Elang therefore requires heritage-sensitive methodology, including vibration monitoring at heritage fabric against heritage-specific trigger and action levels, pre- and post-works structural condition surveys for each sub-phase, and prior notification to and written approval from the Regional Cultural Heritage Authority (*Balai Pelestarian Kebudayaan*, BPK Jawa Tengah) and the Semarang City Culture and Tourism Office (Disbudpar Kota Semarang) before any works are initiated.

Subsequent Phases (Master Plan Phase 3 onwards)

The Master Plan 2024 envisages further development phases beyond the PHLN-funded Phase 1 and Phase 2 scope. These future phases may require the demolition of additional structures across the wider campus. Any such demolition will be subject to a separate AMDAL addendum or renewal, a heritage assessment where applicable, and a standalone Demolition Management Plan consistent with the principles established in this ESIA.

General Environmental and Social Management Measures for Demolition

The following measures apply across all demolition phases, consistent with the ANDAL 2020 RKL-RPL framework, AIIB ESS1 requirements, and the contractor's CESMP obligations:

- *Dust suppression*, continuous water spraying during active demolition, installation of dust screens and hoarding around the perimeter, and prohibition of demolition activity during high-wind conditions.
- *Noise and vibration control*, demolition working hours restricted to 07:00–17:00 on working days (no weekend or public holiday works without PIU approval); non-impact manual methods required within the heritage exclusion zone; continuous vibration monitoring at the nearest heritage structure and occupied ward.
- *Debris management*, segregation of demolition waste at source (concrete, steel, brick, and hazardous materials); transport in covered trucks to a licensed receiving facility; no on-site burning or open dumping.
- *Asbestos-Containing Materials (ACM)*, RSDK has conducted asbestos audit on July 2026 to identify ACM in the building to be demolished. In addition, a management framework for ACM is provided in this ESIA document (Annex B) to guide the RSDK and the contractor.
- *Worker and community safety*, perimeter fencing and barrier systems throughout; flagmen deployed for truck movements; PPE compliance per SMK3 and PP 50/2012; daily pre-work safety briefings.
- *Traffic management*, debris haul trucks scheduled outside peak hospital traffic hours (07:00–09:00 and 16:00–18:00); coordination with Semarang City Transportation Office (Dishub Kota Semarang) for any temporary road management measures required.

2.4.2 Asbestos-Containing Material (ACM) Inspection and Management Protocol

The RSDK Semarang redevelopment requires the demolition of several existing structures, including the former Laundry & Boiler Building, Gedung Elang (Cardiac Installation Building), and a number of ancillary support buildings, the majority of which were constructed during periods when asbestos-containing materials (ACM) were widely used in Indonesian hospital and industrial buildings. To assess this risk, a targeted asbestos audit was undertaken in July 2026 comprising visual inspection, selective bulk sampling, and laboratory analysis using Scanning Electron Microscopy (SEM) coupled with Energy Dispersive X-ray Spectroscopy (EDS), elemental mapping, and X-Ray Diffraction (XRD). Three representative samples were collected from accessible areas within the demolition footprint: Sample 1 from the Selasar (connecting corridor) of the Gedung Heritage, Sample 2 from the Selasar of the Pav. Merak, and Sample 3 from the area of the former garage (Eks Garasi).

Laboratory results indicate that the three samples exhibit distinctly different characteristics. Sample 1 (Gedung Heritage corridor) shows a low indication of asbestos: SEM imaging reveals relatively coarse, rigid, cylindrical structures that do not display the fine longitudinal fibrillation and fibril bundles characteristic of asbestos minerals; EDS analysis is dominated by oxygen (~53.5 wt%), calcium (~20.6 wt%) and carbon (~18.5 wt%) with only trace magnesium (0.3 wt%) and low silicon (3.8 wt%),

consistent with a calcium-based building material such as cement, mortar, plaster, lime or calcium carbonate; and XRD supports this interpretation, indicating a multiphase crystalline material with a dominant calcium-based phase (tentatively calcite) and minor silicate phases, without evidence of Mg–Si–O co-localisation on fibre bodies. Sample 2 (Pav. Merak corridor) contains abundant, fine, flexible, curvilinear fibres arranged in bundles that readily separate longitudinally into finer fibrils, a morphology closely resembling serpentine-group minerals including chrysotile, while EDS and elemental mapping identify Mg (3.1–9.7 wt%), Si (5.6–8.3 wt%) and O on or near the fibre structures, although the signal remains partly influenced by the surrounding calcium-rich matrix. Sample 3 (Eks Garasi) similarly displays a very dense, dominant network of long, flexible, tangled and partly frayed fibres, with elemental mapping indicating O, Si and Mg across the fibre-rich areas, again consistent with a magnesium-silicate fibrous phase.

Importantly, while the morphology and chemistry of Samples 2 and 3 are consistent with chrysotile asbestos, the available XRD patterns do not explicitly identify chrysotile, amosite, crocidolite, or any other regulated asbestos phase, as the diffractograms do not provide definitive phase names, 2θ positions, d-spacings or reference card numbers. As a result, no sample can currently be declared definitively asbestos-positive or asbestos-negative on laboratory evidence alone. Consistent with the WHO/IARC position that all forms of asbestos, including chrysotile, are carcinogenic with no safe exposure threshold, a precautionary approach is therefore maintained: Sample 1 is treated as a calcium-based material with low asbestos indication, but remains subject to routine monitoring and must be re-assessed prior to any demolition or renovation impact; Samples 2 and 3 are treated as suspect ACM until confirmatory analysis using Polarised Light Microscopy (PLM) and/or Transmission Electron Microscopy (TEM) is completed, in line with the audit's recommendations. Pending such confirmation, the suspect materials shall not be cut, drilled, sawn, abraded, broken or otherwise disturbed, and any work that may affect them shall be preceded by a risk assessment, controlled work procedures, and approval by the Hospital K3 Unit (K3RS) and facility management.

ACM will be managed under a phased framework consistent with Indonesian regulations (PP 22/2021, PermenLHK 9/2024, Permenaker 5/2018 and Permen PUPR 18/2021) and relevant international standards (AIIB ESP, IFC EHS Guidelines for Construction and Demolition, ISO 16000-7 and WHO Air Quality Guidelines), with the more protective standard applying where requirements overlap. The framework is directly informed by the Targeted Asbestos Audit completed in July 2026 (Dr. Yuwono Budi Pratiknyo, MT, C.EIA, IPM), which examined three bulk samples collected from the demolition footprint, the Selasar Penghubung Gedung Heritage (Sample 1), the Selasar Penghubung Pav. Merak (Sample 2) and the area of the former Eks Garasi (Sample 3), using SEM, SEM-EDS, elemental mapping and XRD. On the basis of those laboratory results, Sample 1 is classified as a low-indication calcium-based material that is not currently treated as ACM (subject to re-assessment if impacted by demolition), while Samples 2 and 3 are classified as suspect ACM pending confirmatory PLM/TEM analysis, consistent with the WHO/IARC position that all forms of asbestos, including chrysotile, are carcinogenic with no safe exposure threshold.

Management will follow four sequential steps: (i) Phase 1, Audit, Risk Classification and Register: the presumptive ESIA assessment and the July 2026 targeted audit will be consolidated into a site-wide Asbestos Register and ACM/suspect-ACM location map recording building identity, material type,

location, physical condition, estimated area, photographic evidence, laboratory results, risk rating and handling history; (ii) Phase 2, Confirmatory Analysis and Pre-Demolition Survey: PLM/TEM confirmation prioritised on Samples 2 and 3, supplementary bulk sampling of visually similar materials across the demolition footprint to delineate the lateral extent of suspect ACM, a pre-demolition inspection by a licensed occupational hygienist, and issuance of a Demolition Asbestos Clearance Certificate as a mandatory pre-condition to the release of the demolition permit; (iii) Phase 3, Removal and Abatement: licensed B3 asbestos abatement contractor operating under the Avoid → Minimise → Contain → Dispose hierarchy, with differentiated procedures for friable (Class A) and non-friable (Class B) materials, HEPA-filtered negative-pressure enclosures and wet methods for any friable ACM, sealed on-site packaging of removed material, and mandatory independent clearance air monitoring (phase-contrast microscopy, with TEM confirmation if fibre counts approach the action level) before any enclosure is dismantled or any area is released for re-occupation; and (iv) Phase 4, Ongoing Controls during Construction: personal, area and boundary air monitoring against the OSHA action level of 0.1 f/cc (8-h TWA) and 1.0 f/cc short-term excursion limit, B3 hazardous-waste packaging, labelling, manifest-tracking and consignment to a licensed disposal facility, a Chance Find Procedure to be invoked for any previously unidentified ACM encountered during the works, role-specific training and fit-tested respiratory protection for all abatement personnel, and long-term medical surveillance of workers in accordance with Permenaker 5/2018. The detailed procedural, institutional and reporting requirements, including contractor qualification criteria, action levels, waste-chain documentation, and the respective responsibilities of the Project Implementation Unit (PIU), the RSDK OHS Officer (K3RS), the licensed abatement contractor and the independent occupational hygienist, are set out in the Asbestos Management Framework at Annex B, which will be updated to incorporate the findings of the July 2026 audit and the Phase 2 confirmatory analysis.

2.4.3 Internal Staff and Patient Transfer Plan

The phased demolition and construction sequence requires the relocation of clinical services, staff, patients, medical records, and supporting equipment from buildings within the demolition footprint to designated receiving facilities within the RSDK complex, without interruption to clinical service delivery.

It is noted that the Internal Staff and Patient Transfer Plan is currently being developed by RSDK through coordination between the Directorate of Medical Services, Directorate of Nursing, Directorate of Human Resources, and the Project Implementation Unit (PIU). The plan is expected to be finalised prior to the commencement of Phase 2 demolition works, at which point the transfer of active clinical services becomes a prerequisite. For Phase 1, no clinical transfer is required, as the former Laundry and Boiler building has already been decommissioned from active service.]

In preparing the Internal Transfer Plan, RSDK is recommended to address, at minimum, the following elements:

- *Inventory and assessment*. A complete inventory of all service units, personnel (medical, nursing, allied health, and non-clinical staff), active inpatients, and medical and non-medical equipment located within the Phase 2 demolition footprint. The inventory must capture the actual bed

occupancy rate (BOR), classification of critical vs. non-critical services, and infrastructure dependencies (medical gases, backup power, IT/EMR networks).

- *Designated PIC and transfer team*. Appointment of a Person-in-Charge (PIC) for each transfer stage per service unit, with a clear reporting line to the PIU and the Director as Project Director.
- *Phased transfer schedule*. A transfer schedule aligned with the master construction schedule, ensuring that demolition activities never overlap with service capacity gaps. Transfers are executed unit by unit to avoid a simultaneous reduction in bed capacity across multiple services.
- *Patient transfer protocol*. A standard operating procedure for inpatient transfers covering: patient prioritisation (critical, intermediate, stable); internal transport method (stretcher, wheelchair, internal ambulance for critical cases); medical escort requirements during transfer; readiness checks at the receiving facility (medical gases, monitoring equipment, call systems); and post-transfer documentation in the electronic medical record (EMR).
- *Equipment and medical record transfer*. A plan for the relocation of major medical equipment (MRI, CT-Scanner, LINAC, ventilators, etc.) covering decontamination, recalibration, and recommissioning at the new location. For medical records, coordination with the EMR unit to ensure continuity of patient data access throughout the transition period.
- *Communication and notification*. Patients and families to be notified of transfer schedule and new location at least 14 days in advance. Staff are to be notified of new assignments at least 30 days in advance. Academic institutions conducting clinical training within the affected area (including FK UNDIP and other affiliate institutions) to be informed and consulted.
- *Service continuity and contingency*. A contingency plan ensuring that emergency (IGD), intensive care (ICU/ICCU/NICU/PICU), and surgical (IBS) services are not interrupted during transfer. Identification of temporary referral partners at affiliated hospitals in the event that capacity temporarily falls below minimum operational thresholds during the transition.
- *Staff wellbeing*. Attention to the psychosocial impact on displaced staff, including orientation to new work environments, adjustment of shift schedules and rosters, and availability of adequate support facilities (rest areas, lockers, toilets and ablution facilities) at the new location.

The Internal Transfer Plan must be finalised no later than six months before the commencement of Phase 2 demolition, approved by the Director of RSDK, and submitted to the PMU and AIIB as a safeguard compliance document prior to disbursement of the relevant loan tranche.

2.4.4 State-Owned Asset (BMN) Disposal Plan

Buildings and equipment within the demolition footprint are State-Owned Assets (*Barang Milik Negara*, BMN) recorded in the SAKTI institutional financial system of RSDK and administered under the oversight of the Directorate General of State Assets (DJKN), Ministry of Finance. The formal deletion of BMN records for buildings to be demolished must comply with the applicable legal framework, principally Government Regulation No. 27 of 2014 on State/Regional Asset Management

(as last amended by PP 28/2020), Minister of Finance Regulation (PMK) No. 83/PMK.06/2016 on Procedures for the Destruction and Deletion of State-Owned Assets, and their implementing provisions.

It is noted that the State-Owned Asset Disposal Plan (*Rencana Penghapusan* BMN) for buildings within the GMS-DC & SoE redevelopment footprint is currently being developed by the Finance and Planning Division of RSDK in coordination with the KPKNL (State Assets and Auction Service Office) Semarang. The plan, including the formal deletion approval from DJKN, must be in place prior to the commencement of demolition works**.**

Drawing from the regulatory framework and from the BMN disposal procedures documented and implemented by RSAB Harapan Kita (3 Diamond Hospital ESIA-ESMP), the general steps for the disposal of BMN buildings to be demolished are as follows:

- *Step 1, Inventory and condition assessment*. The BMN Work Team (AKBMN) conducts a physical inventory of all buildings and building components within the demolition scope. Findings are recorded in a signed Inventory Minutes Report. Asset condition is updated in the SAKTI application from "good" or "minor damage" to "severe damage" based on technical assessment by IPSRS (the Hospital Facilities Maintenance Unit). Formal termination of asset use is recorded in SAKTI.

- *Step 2, Request for deletion recommendation to Eselon I*. The BMN Administrator prepares a deletion recommendation request letter addressed to the Eselon I authority (Directorate General of Advanced Health Services, Ministry of Health), accompanied by: the BMN list, the Inventory Minutes Report, a Severe Damage Statement, a No Operational Disruption Statement, and an Absolute Responsibility Statement, all signed by the Hospital Director as the Authorized Asset User (Kuasa Pengguna Barang).

- *Step 3, Request for deletion approval from DJKN/KPKNL*. Upon receipt of the Eselon I deletion recommendation, the BMN Administrator submits a formal deletion approval request to DJKN via KPKNL Semarang, with the full supporting documentation package.

- *Step 4, Auction (for components retaining economic value)*. For demolition materials or building components that retain residual economic value, including structural steel, aluminium, copper wiring, and serviceable M/E equipment, KPKNL facilitates an auction through the lelang.go.id portal. The auction process includes scheduling and announcement; physical inspection of assets by prospective bidders; participant document verification; the auction event attended by KPKNL auction and selling officials; BAST (Handover Minutes) issuance to the auction winner; and remittance of net auction proceeds to the state treasury as Non-Tax State Revenue (PNBP).

- *Step 5, Destruction*. Building components with no economic value, or materials unsold following the auction process, are destroyed through the physical demolition carried out by the appointed contractor. Destruction is recorded in a Destruction Minutes Report, which serves as the basis for the Eselon I to issue the formal BMN Deletion Decree (SK Penghapusan BMN).

- *Step 6, Deletion from BMN records*. Upon receipt of the SK Penghapusan BMN, the BMN Administrator inputs the deletion in the SAKTI application, formally removing the asset from the institutional BMN item list. All deletion documents are archived in accordance with the applicable records management regulations.

No cultural heritage buildings within the RSDK complex will be removed from the state property register or demolished. Given that a number of buildings within the RSDK complex carry National-Level Cultural Heritage designation, the BMN deletion process for any heritage-registered building, if any, must obtain additional recommendations and approval from BPK Jawa Tengah and the Ministry of Education and Culture, consistent with Law No. 11 of 2010 on Cultural Heritage and PP No. 1 of 2022 on Cultural Heritage Registration and Preservation. In principle, a registered heritage building may not be demolished without formal authorization from the competent heritage authority, based on a heritage feasibility assessment.

For medical equipment still recorded as BMN but no longer serviceable, for instance, equipment within buildings scheduled for demolition, the same deletion pathway applies. Equipment with residual value above the PMK threshold is processed through auction; equipment below the threshold, or unsaleable, is processed through direct destruction with full documentation.

RSDK, through its Finance and Planning Directorate, is strongly advised to initiate the BMN inventory and begin the KPKNL submission process in parallel with the environmental permitting and construction procurement processes. The DJKN/KPKNL approval process typically requires a minimum of 60–90 working days and constitutes a legal prerequisite for demolition to proceed.

2.5 Project Schedule and Phasing

Physical construction of the Gedung Layanan Terpadu is planned over approximately 60 months (2025–2029), with AIIB financing focused on Master-Plan Phase 1 and 2 (GMS-DC and SOE) and supporting infrastructure. The indicative annual schedule is summarized below.

Table 10 Indicative Implementation Schedule

Year	Principal Activities
2025	Proposal preparation and submission to the Executing Agency and National Development Planning (Bappenas).
2026	Lender appraisal and approval; financing agreement; PIO establishment; DED and Construction-Management consultant procurement; construction tendering; safeguards documents (ESIA, AMDAL Addendum, Pertek, Rintek, Andalalin).
2027	Commencement of construction works; HR training needs analysis.
2028	Continued construction; medical-equipment procurement; first handover of GMS-DC & Diagnostic Center with supporting equipment.
2029	Completion of construction; equipment installation and commissioning; first handover of the Service of Excellent building; capacity-building.

Source: Readiness Criteria RSDK (2026), Tabel 3.

Within the wider Master Plan, the hospital's redevelopment is sequenced into successive building stages extending beyond the AIIB-financed package. This ESIA focuses on the anchor stage (GMS-DC and SoE) and references subsequent stages only where *cumulative impacts* are relevant (assessed in Chapter 7).

2.6 Project Construction Phases

2.6.1 Preconstruction Phase

The Preconstruction phase includes all activities required to mobilize the contractor (GMS-DC) without disrupting ongoing clinical services in the active hospital complex. No land acquisition is needed, as the entire development footprint (74,627 m²) is already held under the hospital's land title (Sertifikat Hak Pakai No. 04 and 05, 1996). Activities are organized into five sequential groups:

1. Permitting and coordination
    a. Obtain construction permits (PBG), AMDAL addendum approval, Pertek BMAL, Pertek Emisi, Rintek Limbah B3, incinerator operating permit, and Andalalin update.
    b. Coordinate with the Ministry of Health, DLH Kota Semarang, Dishub, BAPETEN (for radiological installations), and Bandara Ahmad Yani for tower-crane aviation clearance.
2. Design and consultation
    a. Complete the Detailed Engineering Design (target: July 2026).
    b. Issue the Persetujuan Bangunan dan Gedung (PBG) after obtaining the Persetujuan Lingkungan.
    c. Conduct the Initiator Announcement and Public Consultation Round 1 (May–June 2026).
3. Baseline and heritage surveys
    a. Cultural heritage walkover survey (adjacent colonial structures).
    b. M1 transitional-season primary baseline survey.
    c. Topographic and geotechnical surveys (soil data confirm the water table at –5.0 m, which is above the maximum basement depth of –3.5 m; deep dewatering is therefore not anticipated).
4. Grievance mechanism and contractor preparation
    a. Establish the Grievance Redress Mechanism (GRM).
    b. Procure the contractor and manage mobilization, including approval of the Contractor's Environmental and Social Management Plan (C-ESMP).
    c. Set up the contractor base camp, site office, storage areas, 12 portable MCK units (following Permenkes 70/2016), fencing, and temporary utilities.

2.6.2 Construction Phase

The Construction Phase of the redevelopment project will be carried out over approximately 36 months (2027–2029) within the existing operational hospital compound, requiring careful coordination to maintain uninterrupted hospital services. The stage begins with the recruitment of the construction workforce, prioritizing local labor from Semarang and surrounding areas, with positions requiring specialized skills (e.g., heavy equipment operators, structural steel workers, and M&E installers) sourced from the wider regional market. This is followed by the mobilization of materials, equipment, and construction machinery to the site via access routes coordinated with hospital operations to minimize disruption to patient flow and emergency vehicle access. A construction basecamp and its supporting facilities, including site offices, worker accommodation, material storage yards, workshops, and parking areas, will be established within the project compound, with utility connections, waste management facilities, and security arrangements integrated with the existing hospital infrastructure. To maintain hospital operations, relocation and reorganization of affected hospital facilities and services (including inpatient wards, diagnostic units, and support services) will be undertaken in a phased manner according to the master schedule, with temporary access routes and emergency egress maintained at all times.

The demolition of existing structures will be undertaken as a prerequisite for new construction. Basement excavation work will require dewatering to manage groundwater levels, with discharge water tested and treated before release to comply with water quality standards. The construction of sub-structures and superstructures of both buildings (GMS-DC & SoE) will follow, including pile foundations, reinforced concrete frames, structural walls, floor slabs, and mechanical and electrical rough-in works. The stage concludes with architectural finishes and landscaping, including façade installation, interior fit-out, road and pathway works, planting, and drainage system completion, including the zero run-off drainage system, before handover for operational commissioning. Equipment demobilization and site cleanup will mark the end of the Construction Stage. Demolition of existing structures. Demolish the former Laundry & Boiler building (881 m^2, one story) using the top-down manual method (hand-breaker and jackhammer) to minimize dust and vibration to adjacent wards. Generated demolition debris: ≈705 m^3 (Phase 1). Haul the debris off-site to a licensed receiving facility in Genuk (±15 km) at an estimated rate of one truck trip per day.

2.6.3 Operational Phase

The operational phase begins upon commissioning of GMS-DC and is expected to deliver the expanded service capacity outlined in FS Bab 5. Operational-phase activities include continuous clinical service delivery across IGD, surgical, ICU/NICU/PICU/ICCU, Cathlab, Diagnostic Center, oncology, inpatient and outpatient functions; continuous environmental management of IPAL, TPS Limbah B3, stack emissions, ambient-air monitoring, and B3 manifest discipline; routine maintenance per the institutional SOP corpus; and staff training and capacity-building per the Implementation Arrangements in Chapter 11.

Operational-phase service projections drawn from FS Section 5.5 indicate substantial growth in patient volumes across multiple service lines. Cathlab activity is projected to grow from 9,846

procedures in 2028 to 16,001 procedures in 2037 (a 62 per cent increase), with capacity remaining at six units throughout. In-house patient laboratory services (*Laboratorium pasien* – RS) volume is projected to grow from 1.95 million tests in 2028 to 3.16 million tests in 2037, including Patologi Klinik (1.74 → 2.83 million), Patologi Anatomi (40,000 → 65,000), and Microbiology.

2.6.4 Decommissioning Considerations

Decommissioning is not anticipated within the project horizon. The GMS-DC is designed as a long-life institutional asset of an established teaching hospital. Should partially decommissioning of older buildings within the wider complex be considered as part of future Master Plan updates, those activities would be subject to a separate environmental clearance and a heritage-aware approach for any colonial-era structures.

2.7. Project Alternative

No formal alternatives analysis was carried out for the GMS-DC & SoE redevelopment. The justification for the absence of such an analysis is set forth in this section.

- *Site alternative*. The project is sited entirely within the existing 188,080 m² RSDK complex on land already owned by the hospital. Relocating the GMS-DC to a separate site was not a viable option: RSDK's mandate as the sole Class-A National Referral Hospital in Central Java requires that emergency, surgical, intensive-care, and diagnostic functions remain physically integrated within the established clinical campus. A greenfield or off-site alternative would have severed clinical pathways, disrupted the hospital's RSPPU teaching mission, and introduced involuntary resettlement and land acquisition risks that do not exist under the current configuration.

- *Technology and design alternative*. The integration of IGD, Kamar Bedah, ICU, ICCU, and Cathlab services within a single contiguous building block, as proposed in the GMS-DC, reflects a deliberate clinical engineering decision supported by the Feasibility Study of PT Pandu Persada (December 2025). Distributing these functions across multiple existing buildings was considered during the Master Plan review process but rejected on the grounds that dispersed placement would sustain the intra-complex patient transfer times and clinical pathway inefficiencies that the project is specifically designed to resolve. The Smart and Green Hospital strategies embedded in the GMS-DC & SoE design further distinguish this configuration from a conventional retrofit approach.

- *"No project" alternative*. The no-project scenario, maintaining the hospital at its current configuration without the GMS-DC, is not a realistic option. The 2025 operational data documents an IGD handling 51 to 145 patients per day against a 58-bed emergency capacity, an ICU bed-occupancy rate of 84.58%, and an ICCU rate of 98.85%. These figures indicate that the hospital is operating at or beyond safe capacity thresholds for its most critical services. Continued deferral of the redevelopment would progressively compromise patient safety, deepen the service capacity gap for Central Java's 36-million-person catchment, and leave RSDK unable to

meet its national referral obligations. The no-project alternative is therefore not considered feasible from either a clinical or a public health standpoint.

In summary, the site, clinical program, and institutional constraints that define the GMS-DC & SoE redevelopment collectively leave no meaningful alternative to the proposed project. The ESIA therefore proceeds on the basis of the project as described in Sections 2.1 through 2.6.

3. POLICY, LEGAL, AND ADMINISTRATIVE FRAMEWORK

This chapter sets out the regulatory and institutional framework governing the ESIA-ESMP for the GMS-DC & SoE redevelopment at RSDK, Semarang. Three tiers of requirements apply: (i) the national legislation of the Republic of Indonesia; (ii) the Environmental and Social Framework (ESF) of the Asian Infrastructure Investment Bank (AIIB); and (iii) relevant international standards and guidelines. Where national requirements and the AIIB ESF differ, the more stringent standard applies throughout this assessment.

3.1 National Legal Framework of the Republic of Indonesia.

Indonesian environmental governance is built on an overarching environmental protection law supported by implementing government and ministerial regulations. The instruments most relevant to this Project address environmental impact assessment (AMDAL), wastewater and air emissions, hazardous waste, demolition, spatial planning, traffic, hospital services, cultural heritage, and labor and occupational health and safety.

3.1.1 Environmental Constitution

- The primary instrument governing environmental management is Law No. 11 of 2020 on Job Creation (UU Cipta Kerja), which introduced an integrated, risk-based approach to business licensing and centralized AMDAL assessment under government authority (replacing the former multi-stakeholder review commission). Its environmental provisions are operationalized through two principal government regulations, supplemented by ministerial regulations:

- PP No. 22 of 2021 on Environmental Protection and Management is the central instrument. It replaces the former stand-alone environmental permit with an integrated Environmental Approval (*Persetujuan Lingkungan*) embedded in business licensing and establishes: AMDAL and UKL-UPL procedures and criteria; environmental quality standards for water, air, and marine environments; management requirements for hazardous (B3) and non-B3 waste; ecosystem damage criteria; and supervision and administrative sanctions. AMDAL is required for activities with potentially significant impacts, including infrastructure of the scale of the GMS-DC & SoE redevelopment, and mandates meaningful public participation, documented impact prediction and mitigation, and periodic compliance monitoring. Assessment is undertaken by a *Komisi Penilai* AMDAL at provincial or national level depending on the activity.

- PP No. 28 of 2025 on Risk-Based Business Licensing (replacing PP 5/2021) classifies activities into four risk categories, low, medium-low, medium-high, high, and calibrates licensing accordingly. High-risk activities require AMDAL documentation and emergency prevention and response plans. The GMS-DC & SoE redevelopment is treated as consistent with the medium-high to high-risk classification. The regulation also strengthens the Online Single Submission (OSS) system, separating basic prerequisites, Spatial Utilization Conformity (KKPR), Environmental Approval,

and Building Approval (PBG) from business-specific licensing, with enforcement through tiered administrative sanctions.

- PermenLHK No. 4, 5, and 6 of 2021 provide procedural details: No. 4 governs AMDAL preparation, assessment, and preparer qualifications; No. 5 sets the typology of activities requiring AMDAL versus the simpler UKL-UPL regime; and No. 6 governs UKL-UPL and management of below-threshold activities.
- PermenLHK No. 136 of 2024 delegates approval authority from the central government (KLHK) to provincial and district/city governments and mandates use of the Amdalnet information system. For this Project, the relevant authority is the Komisi Penilai AMDAL Provinsi Jawa Tengah, with the Persetujuan Lingkungan issued by the Governor of Central Java or KLHK subject to final jurisdictional determination.

3.1.2 EIA Framework and Environmental Approvals

Because an Environmental Approval already exists for the broader RSDK complex and the Project constitutes a significant modification, the AMDAL follows the Addendum pathway (KA-ANDAL → ANDAL → RKL-RPL). The resulting Persetujuan Lingkungan integrates the AMDAL outputs with the Technical Recommendation on Wastewater Discharge (Pertek BMAL), the Technical Recommendation on Air Emissions (Pertek Emisi), and the B3 Waste Technical Document (Rintek Limbah B3). It is a statutory prerequisite for the Building Approval (PBG) and the Certificate of Proper Function (SLF) required before occupancy. The Traffic Impact Analysis (Andalalin) is processed separately, and spatial suitability was confirmed through the PKKPR issued on 28 June 2024 under the OSS-RBA system.

3.1.3 Wastewater Management

Healthcare wastewater is regulated by PermenLH No. 11 of 2025 on Wastewater Quality Standards and Domestic Wastewater Treatment Technology Standards (replacing PermenLH No. 68 of 2016), supplemented by PermenLHK No. 5 of 2014, Appendix XLIV on health-facility wastewater limits. PermenLH 11/2025 introduces stricter parameter thresholds, operator competency certification for treatment plants (IPAL), mandatory periodic testing by accredited laboratories, and clearer standards for treated wastewater reuse. These instruments form the basis of RSDK's 2024–2025 IPAL quality testing; the principal numerical limits are summarized in Table 10.

Table 11 National Wastewater Quality Standards

Parameter	Limit (PermenLH 68/2016 / PermenLHK 5/2014)
pH	6 – 9
BOD	30 mg/L
COD	100 mg/L
TSS	30 mg/L

Parameter	Limit (PermenLH 68/2016 / PermenLHK 5/2014)
Free NH_3-N (Ammonia)	10 mg/L (PermenLH 68/2016) / 0.1 mg/L (PermenLHK 5/2014 Lamp. XLIV)
Total Coliform	3,000 MPN/100 mL
Phosphate (PO_4)	2 mg/L
Oil & Grease	5 mg/L
Detergent (MBAS)	2 mg/L

RSDK operates three IPAL units (Garuda, Sentral, and Rajawali). Monthly sampling is performed by KAN-accredited laboratories under the SNI 8990:2021 and SNI 9063:2022 protocols, using the SNI 6989-series methods for physical-chemical parameters and APHA 9221B/C for microbiological parameters. The renewed Pertek BMAL will accommodate the GMS-DC & SoE operational uplift.

3.1.4 Air Emissions Management.

Dust, equipment emissions, and odor from construction in the hospital area must be mitigated; non-compliance may attract administrative, financial, or criminal penalties. The legal basis comprises Law No. 32 of 2009 on Environmental Protection and Management, PP No. 22 of 2021, Permenkes No. 7 of 2019 on Hospital Environmental Health, PermenLHK No. P.7 of 2018 on Climate Change Risk Assessment, and Central Java Provincial Regulations No. 4 of 2023 and No. 1 of 2024.

The Central Java regulations provide the legal umbrella for air pollution control, ambient air status, and the Air Pollutant Standard Index (ISPU), define provincial authority and sanctions, and adopt the PP 22/2021 thresholds as the reference for ambient air and emission (stack) standards. Business actors generating emissions must regularly test stack emissions and ambient air and report the results to the Governor and the Mayor/Regent. These standards inform the RSDK UKL-UPL semester report, and the updated Emissions Pertek (assigned to EGI) will reflect the GMS-DC & SoE improvements.

3.1.5 Hazardous and Medical Waste Management (B3)

Hazardous waste (Limbah B3) is governed by Chapter VIII of PP No. 22 of 2021, PermenLHK No. 6 of 2021, and PermenLHK No. P.56 of 2015 on healthcare-facility B3 waste, with mercury-bearing devices further regulated by PermenLH No. 13 of 2025 and regional medical-waste arrangements set out in Permenkes No. 18 of 2020.

PermenLHK P.56/2015 establishes the management cycle for medical waste, infectious and pathological, sharps, pharmaceutical and chemical, and heavy-metal (mercury) streams, through: segregation at source using color-coded, symbol-marked containers (puncture-proof for sharps); temporary storage in licensed facilities (TPS B3) for periods ranging from 2 to 90 days depending on waste type and storage temperature; manifested transport in licensed, closed vehicles; thermal treatment (autoclave, microwave, radio-frequency irradiation, or incinerator); burial only for pathological waste or remote facilities without treatment capacity; and disposal of incinerator ash in designated B3 final-disposal facilities. Permenkes 18/2020 adds a region-based (proximity) approach,

requiring regional infrastructure provision and government supervision across hospitals, community health centers, clinics, and laboratories. PermenLH 13/2025 classifies mercury-containing medical devices as B3 and requires all such waste to be managed by 31 December 2030, with a transition period for safe dismantling. The principal B3 streams generated at RSDK are summarized in Table 12.

Table 12 Hazardous Waste Codification

Code	Waste Stream
A337-1	Infectious medical waste
A337-2	Pathological waste
A337-3	Sharps
B337-1	Pharmaceutical waste (including psychotropic)
B337-2	Laboratory chemicals and reagents
B337-4	WWTP sludge
B337-5	Incinerator ash

RSDK operates a licensed Temporary B3 Waste Storage Facility (TPS Limbah B3) with the emergency-response provisions required by PermenLHK 6/2021, and contracts off-site processing to a licensed third-party transporter and processor. The updated Rintek Limbah B3 will reflect the GMS-DC & SoE uplift.

Asbestos-containing materials

Given the age of the complex and the planned demolition and renovation works, asbestos is a material B3 concern. It is regulated under Law No. 32 of 2009, PP No. 74 of 2001 on Hazardous and Toxic Materials, PP No. 101 of 2014 on Hazardous Waste, Minister of Labor Regulation (Permenaker) No. PER.04/MEN/1985 on Occupational Safety in Asbestos Use, and Perpres No. 7 of 2019 on Occupational Diseases (which recognises asbestosis, mesothelioma, and lung cancer). These instruments require permits, labelling, controlled handling and disposal, personal protective equipment, ventilation, exposure monitoring, and worker medical surveillance.

Considering the high risk of ACM, RSDK commit to manage ACM and, therefore, has prepared an SOP of ACM management to anticipate the occurrence of ACM found prior old buildings demolition. In addition, asbestos management framework attached in this ESIA document (Annex B) can be used as guidance for RSDK in mitigating ACM risk during demolition activity.

3.1.6 Radioactive waste management

RSUP Dr. Kariadi Semarang operates a Nuclear Medicine service under two operating licences issued by BAPETEN:

- KTUN No. 06875.351.5.090724 (9 July 2024, valid until 31 October 2027), operation of the In Vivo Diagnostic Nuclear Medicine Facility using PET (F-18 as FDG and PSMA; Ga-68 as DOTATATE) and SPECT (I-131), located at the Unit Kedokteran Nuklir & Teranostik Molekuler.

- KTUN No. 03939.347.3.260424 (26 April 2024, valid until 28 August 2027), amending licence No. 04905.347.1.290822, operation of the Therapeutic Nuclear Medicine Facility using I-131 and Sm-153, located at the Ruang Hot-Lab, Unit Kedokteran Nuklir, Instalasi Radiologi.

Both licences are held in the name of BLU RSUP Dr. Kariadi Semarang (NIB 9120202881023). Radiation protection supervision is the legal responsibility of the named Petugas Proteksi Radiasi (PPR) Medik Tk. 1: Rustanto, Anggoro Praja Mukti, and Kartutik, S.Si, one of whom is designated as the hospital's Radiation Protection Officer (RPO/PPR) for the purpose of radioactive waste management under Indonesian regulations.

Management of radioactive waste at RSUP Dr. Kariadi complies with national requirements, including PP No. 61 of 2013 on Radioactive Waste Management, PerKa BAPETEN No. 8 of 2016 on Radioactive Waste Management, PP No. 22 of 2021 and PermenLHK No. 9 of 2024 on hazardous waste (B3) where the two regimes overlap, and the licence-specific conditions in Lampiran III of each KTUN. International practice is anchored to IAEA GSR Part 3 (International Basic Safety Standards for Radiation Protection and Safety of Radiation Sources) and the WHO position on radiation safety in health-care facilities. All radioactive waste handling, storage, decay, transfer and disposal at the facility is performed under the supervision and sign-off of the designated RPO/PPR, in dedicated engineered containment (lead-shielded cabinets, dedicated hot-lab and isolation rooms), and is held in delay-decay storage until activity levels fall below the BAPETEN clearance limit before being released to the appropriate pathway.

Radiation-protection measures, including the shielding adequacy of the Nuclear Medicine building, are documented in Dokumen Rencana Teknis Bangunan Gedung Penahan Radiasi No. PR.05.01/D.X/3047/2024 (26 March 2024), which establishes the patient-throughput and per-patient activity ceilings that bound the radioactive waste generation rate (e.g. up to 100 F-18 FDG patients per week at a maximum of 55.5 GBq/week; 20 I-131 SPECT patients per week at 22.2 GBq/week; up to 1,110 GBq/year of I-131 and 1,295 GBq/year of Sm-153 for therapeutic use).

Existing radioactive waste generation, handling and disposal arrangements at RSDK are summarised in Table 13.

Table 13 Existing Radioactive Waste Management of RSUP Dr. Kariadi Semarang

Aspect	Description
Waste generator	*Unit Kedokteran Nuklir & Teranostik Molekuler* (PET/SPECT) and *Ruang Hot-Lab Unit Kedokteran Nuklir Instalasi Radiologi* (therapy)
Regulatory framework	PP No. 61/2013; PerKa BAPETEN No. 8/2016; PP No. 22/2021; PermenLHK No. 9/2024; IAEA GSR Part 3; conditions of KTUN 06875.351.5.090724 and KTUN 03939.347.3.260424
Authorised radionuclides	F-18 (FDG, PSMA), Ga-68 (DOTATATE), I-131 (diagnostic and therapeutic), Sm-153 (therapeutic)
Radiation Protection Officer (PPR)	Rustanto, Anggoro Praja Mukti, or Kartutik, S.Si (PPR Medik Tk. 1), one designated as RPO for radioactive waste
Engineered containment	Hot-lab, isolation rooms, lead (Pb)-shielded delay-decay cabinets, dedicated shielded storage room, dose-calibrated isolation toilets for therapy inpatients

Aspect	Description
Temporary storage, solid	Lead-shielded, multi-compartment decay cabinets within the radioactive waste storage room; delay-decay storage by radionuclide until activity falls below the BAPETEN clearance limit, after which the RPO/PPR signs off release
Temporary storage, liquid (patient excreta)	Dedicated heated isolation toilets and septic/delay tanks designed for F-18, I-131 and Sm-153 containment; decay-storage for a period sufficient for activity to fall below the BAPETEN discharge clearance limit before RPO-evaluated release to the hospital wastewater treatment plant
Treatment / release criteria	Solid waste: only released when exposure ≤ BAPETEN clearance limit. Liquid waste: only released to the WWTP when activity ≤ discharge clearance limit, evaluated by the RPO/PPR. Sm-153 and I-131 therapy inpatients confined to isolation rooms until dose-rate at 1 m meets the release criterion
Monitoring and reporting	Routine documentation in the Logbook Penanganan Limbah Pelayanan Kedokteran Nuklir; periodic reporting to BAPETEN as required under the licence conditions; use of calibrated contamination monitor, dose calibrator and survey meters listed in Lampiran II of KTUN 03939.347.3.260424
End-of-life of sources	Any radioactive source no longer in use must be formally decommissioned (dilimbahkan) in accordance with applicable BAPETEN regulations, per Condition 6 of KTUN 03939.347.3.260424
Onward disposal	Waste that cannot be cleared is consigned to a BAPETEN-licensed radioactive-waste management operator for treatment, conditioning and final disposal at a licensed facility

The radioactive waste streams generated by existing and continuing services are summarised in Table 14.

Table 14 Radioactive Waste Streams at RSUP Dr. Kariadi Semarang

Waste Type	Waste Form	Source / Stream	Temporary Storage Method
Radioactive contaminated solid waste, cotton, gauze, tissues, gloves, plastic, spatulas, contaminated PPE, residual radiopharmaceuticals, vials, ampoules, syringes, contaminated radiopharmaceutical containers	Solid	Diagnostic Nuclear Medicine (F-18 FDG, F-18 PSMA, Ga-68 DOTATATE, I-131 SPECT) at Unit Kedokteran Nuklir & Teranostik Molekuler; Therapeutic Nuclear Medicine (I-131, Sm-153) at Ruang Hot-Lab Unit Kedokteran Nuklir Instalasi Radiologi	Stored in lead (Pb)-shielded cabinets within the designated radioactive-waste storage room. Cabinets are compartmentalised to allow delay-decay segregation by radionuclide (F-18, Ga-68, I-131, Sm-153) and storage until activity falls below the BAPETEN solid-waste clearance limit, after which the RPO/PPR signs off and the material is released to the appropriate disposal pathway
Radioactive wastewater, urine and faeces from patients receiving radioisotope therapy, primarily I-131 and Sm-153	Liquid	Therapeutic Nuclear Medicine, Ruang Hot-Lab Unit Kedokteran Nuklir Instalasi Radiologi	Patients receiving radiopharmaceuticals use dedicated heated toilets in isolation rooms. Wastewater is routed to dedicated septic / delay tanks constructed for the safe containment of radioactive liquid waste from nuclear medicine activities, with retention periods

Waste Type	Waste Form	Source / Stream	Temporary Storage Method
			sufficient for activity to decay below the BAPETEN discharge clearance limit before RPO/PPR evaluation and conditional discharge to the hospital wastewater treatment plant
Contaminated linen	Solid (textile)	Patient treatment in Nuclear Medicine; in particular I-131 and Sm-153 therapy isolation rooms	Placed into designated sealed boxes in the patient area by staff wearing appropriate PPE; boxes transferred to the radioactive-waste storage room and held for a period that ensures exposure levels fall to ≤3× background (or otherwise meets the BAPETEN release criterion). The RPO/PPR evaluates and signs off before the linen is released to the hospital laundry for cleaning

3.1.7 Building Demolition

Demolition is governed by Regulation of Public Works and Housing (PermenPUPR) No. 18 of 2021 on Building Demolition Standards, which covers the classification of buildings and the actors and stages involved. Demolition proceeds through five stages, review, determination, implementation, supervision, and post-demolition, and may use manual, mechanical, hydraulic, steel-ball pendulum, blasting, load-based, or other methods (including non-explosive techniques, wire-saw and diamond-core cutting, cut-and-lift, pusher-arm and deliberate-collapse methods, wire-rope pulling, clamshell, thermal lances, and water jets). The regulation identifies the principal pollution risks, water, noise, air/dust, visual, activity disruption, and vibration, and requires demolition materials (B3 waste, air- and soil-contaminating materials, and general demolition waste) to be disposed of in accordance with applicable waste regulations. Pre-demolition ACM inspection will be conducted by the RSDK/demolition contractor to ensure there is no ACM used in the buildings.

3.3.1. Spatial Planning

Spatial planning is governed by Perda Kota Semarang No. 14 of 2011 on the City Spatial Plan (RTRW) 2011–2031, as amended by Perda No. 5 of 2021. RSDK lies within the city's Strategic Area for Social and Cultural Affairs (Education and Health). Spatial suitability of the Project was confirmed through PKKPR No. 07022210213374075, issued on 28 June 2024 under PP No. 21 of 2021 on Spatial Use Planning

3.1.8 Traffic and Transportation

Traffic impact analysis is governed by Transportation Minister Regulation (PermenHub) 17/2021 on the Andalalin process. The GMS-DC & SoE redevelopment requires a refreshed Andalalin study to quantify trip generation associated with the expanded facility, peak-hour traffic loading on the surrounding road network, revised parking demand, and Traffic Management Plan requirements during the construction phase. The Andalalin refresh is subject to approval by Dinas Perhubungan Kota Semarang or Provinsi Jawa Tengah depending on the jurisdiction of the affected road network.

3.1.9 Health and Hospital Services

Hospital service delivery is governed by Law No. 17 of 2023 on Health, which consolidates earlier hospital-specific legislation. The principal implementing regulations are Permenkes 3/2020 (classification), 24/2016 (building technical requirements), 7/2019 (environmental health), 26/2022 (equipment standards), 27/2017 (infection prevention and control), and 40/2022 (building, infrastructure, and equipment technical requirements). Permenkes 40/2022 provides the 80 m^2/bed minimum floor-area metric used in the GMS-DC & SoE site capacity analysis.

3.1.10 Cultural Heritage

Cultural heritage is protected under Law No. 11 of 2010 on Cultural Heritage, PP No. 1 of 2022 on the National Register and Preservation of Cultural Heritage, Law No. 5 of 2017 on the Advancement of Culture, and Permen PUPR No. 19 of 2021 on heritage-building preservation. RSDK was established in 1925 and is registered as a National-Level Cultural Heritage Property by Decree of the Minister of Education and Culture No. 370/M/2017. All demolition, excavation, vibration-generating, and construction works in or adjacent to heritage areas must be planned to avoid irreversible impacts on protected fabric, structural integrity, spatial character, visual setting, and associated cultural values. Any previously unidentified archaeological remains or artefacts will be managed through a formal Chance Find Procedure consistent with Law No. 11 of 2010, PP No. 1 of 2022, Permen PUPR No. 19 of 2021, and AIIB ESS1.

3.1.11 Labor, Occupational Health and Safety, and GBV/SEAH

Employment and occupational health and safety are governed by Law No. 13 of 2003 on Manpower (as amended by Law No. 11 of 2020 and Law No. 6 of 2023) and PP No. 50 of 2012 on the Occupational Health and Safety Management System (SMK3). The construction phase must operate under a certified SMK3 program and comply with the additional AIIB ESF requirements on labor and working conditions, including the ILO Core Conventions and the prohibition of child and forced labor, as set out in Section 3.2 and Chapter 9.

Prevention of gender-based violence and sexual exploitation, abuse, and harassment (GBV/SEAH) is supported by the regulations summarized in Table 12.

Table 15 Regulations Relevant to Preventing Gender-Based Violence

No.	Regulation	Key Requirements
1	Law No. 13 of 2003 on Manpower	Requires OSH protection without gender discrimination, prevention guidelines and anti-violence clauses in Company Regulations or Collective Labor Agreements, and confidential, safe reporting mechanisms.
2	Law No. 12 of 2022 on Sexual Violence Crimes	Defines physical, non-physical, and electronic forms of sexual violence; provides for prevention, protection, victim recovery, restitution, and criminal sanctions.
3	Kepmenaker No. 88 of 2023	Guidelines for preventing and handling workplace sexual violence, including establishment of a dedicated complaints task force.
4	Permenkes No. 68 of 2013	Obligation of health providers to report suspected violence against children.
5	Permenkes No. 25 of 2014	Child health measures, including awareness, emergency treatment, and referral for child victims.
6	Permenkes No. 2 of 2025	Reproductive health measures addressing domestic and sexual violence.
7	Kepmenkes No. 1226/Menkes/SK/XII/2009	Guidelines for integrated hospital services for women and child victims of violence.

3.1.12 Social Protection of Affected Informal Workers

Indonesian law protect informal workers, such as street vendors, who are affected by land acquisition for public-interest projects. This protectin includes compensation, relocation, and livelihood restoration support. To be eligible for this support, workers must continuously used the land for at least ten years and be recognized by the land rights owner and/or the local village head.

This project may trigger AIIB ESS2 requirement regarding impacts on formal tenant (Section 3.2.3). Therefore, the proponent must apply this legal framework to address any impacts on informal users in and around the hospital site. Specifically, if the Project affects lease agreements, tenant operations, or restaurants within or adjacent to the hospital, AIIB ESS2 provisions must be applied, requiring compensation and livelihood support as appropriate.

Table 16 International Frameworks and Guidelines Applied in this ESIA

Framework / Source	Application to this ESIA
World Bank Group EHS Guidelines, General (2007)	Cross-cutting environmental, occupational, and community H&S benchmarks
WBG EHS Guidelines, Healthcare Facilities (2007)	Sector-specific standards for hospital design, waste, and emissions
WBG EHS Guidelines, Wastewater & Ambient Water Quality, Air Emissions	Pollution prevention benchmarks supplementing national BMAL/BMUE
WHO, Safe Management of Wastes from Health-Care Activities (2014)	Authoritative guidance on healthcare waste segregation, treatment, and final disposal

IFC, Good Practice Handbook on Cumulative Impact Assessment (2013)	Methodological basis for the cumulative impact analysis in Section 6.4
IPCC Guidelines for National GHG Inventories (2006, 2019 Refinement)	Methodology for the GHG inventory in Chapter 8
ILO Core Conventions	Labor and working conditions provisions
UN Convention on the Rights of Persons with Disabilities (CRPD)	Universal Design accessibility provisions in GMS-DC & SoE
UNFCCC Paris Agreement (2015) and Indonesian NDC	Mitigation alignment with national NDC commitments

3.2 AIIB Environmental and Social Framework

The AIIB ESF (2024) sets the environmental and social standards the Bank applies to the projects it finances. It comprises the Environmental and Social Policy (ESP), three Environmental and Social Standards (ESS1, ESS2, ESS3), and the Environmental and Social Exclusion List (ESEL).

The ESP sets overarching principles for risk management and project categorisation: Category A (high risk), Category B (moderate risk), Category C (low risk), and Category FI (financial intermediary). The GMS-DC & SoE redevelopment is preliminarily classified as **Category B (Moderate Risk)**, reflecting an upgrade and expansion within an existing tertiary hospital rather than a greenfield development; this has been confirmed during AIIB safeguards review. Category B requires a full ESIA-ESMP, a Stakeholder Engagement Plan (SEP), and a Grievance Redress Mechanism (GRM).

3.2.1 ESS1 Environmental and Social Assessment and Management

ESS1 is the primary applicable standard and provides the framework for Chapters 4 to 13 of this ESIA. It requires: a comprehensive impact assessment applying the mitigation hierarchy (avoid → minimise → restore/offset); a climate risk assessment over a 10–30-year horizon; a greenhouse gas (GHG) inventory covering Scope 1, 2, and 3 emissions; assessment and management of GBV/SEAH risks; identification and protection of vulnerable groups; a cultural heritage chance-find procedure; and an accessible, gender-responsive, and inclusive stakeholder engagement and grievance redress process.

3.2.2 ESS2 Involuntary Resettlement

ESS2 is **applicable**. The Project is entirely within the existing 188,080 m² RSDK complex on Hospital-owned land, with no land acquisition or physical or economic displacement. However, there are food tenants in the RSDK area will be affected by this project, especially during construction phase (Chapter 7.1.5).

3.2.3 ESS3 Indigenous Peoples

ESS3 is **not applicable**. Kota Semarang is not a recognised Masyarakat Adat domain, and the site is an established urban tertiary hospital compound with no identified indigenous community presence.

3.2.4 Environmental and Social Exclusion List (ESEL)

The ESEL prohibits Bank financing of defined activities, including the production of or trade in weapons, tobacco, alcohol, gambling facilities, PCB-containing products, ozone-depleting substances, and unsustainable fishing. None of the GMS-DC & SoE redevelopment activities engage these exclusions.

3.3 Other International Frameworks Applicable in Indonesia

This ESIA also draws on international standards that provide methodological benchmarks and supplement national requirements where gaps exist (Table 18).

Table 17 International Frameworks and Guidelines Applied in this ESIA

Framework / Source	Application to this ESIA
World Bank Group EHS Guidelines, General (2007)	Cross-cutting environmental, occupational, and community health and safety benchmarks
WBG EHS Guidelines, Healthcare Facilities (2007)	Sector-specific standards for hospital design, waste, and emissions
WBG EHS Guidelines, Wastewater & Ambient Water Quality; Air Emissions	Pollution-prevention benchmarks supplementing national BMAL/BMUE
WHO, Safe Management of Wastes from Health-Care Activities (2014)	Authoritative guidance on healthcare waste segregation, treatment, and disposal
IFC, Good Practice Handbook on Cumulative Impact Assessment (2013)	Methodological basis for the cumulative impact analysis in Section 6.4
IPCC Guidelines for National GHG Inventories (2006, 2019 Refinement)	Methodology for the GHG inventory in Chapter 8
ILO Core Conventions	Labour and working conditions provisions
UN Convention on the Rights of Persons with Disabilities (CRPD)	Universal Design accessibility provisions in GMS-DC & SoE
UNFCCC Paris Agreement (2015) and Indonesian NDC	Mitigation alignment with national NDC commitments

3.4 Gap Analysis between AIIB ESF and Indonesian Legislation

Table 14 presents a gap analysis between national regulatory requirements and the AIIB ESF. It identifies areas of broad consistency, areas where the AIIB ESF introduces additional or more specific requirements, and the approach adopted in this ESIA to address each gap. In all cases, the more stringent requirement applies.

Table 18 Gap Analysis, Indonesian Legislation and AIIB ESF

Aspect	National Regulatory Requirement	AIIB ESF Requirement (ESS1)	Approach in this ESIA
Scope of impact assessment	AMDAL covers physical-chemical, biological, socio-economic-cultural, and public health components	ESS1 additionally requires climate risk assessment, GHG Scope 1–3 accounting, and GBV/SEAH risk assessment	Full AIIB scope applied; climate risk and GHG inventory included in Chapters 7 and 8
Associated facilities	Not explicitly required under standard AMDAL	AIIB requires RSDK to identify and assess the potential environmental and social risks and impacts of Associated Facilities	Conduct screening of Associated Facility
Stakeholder engagement	Public consultation at KA-ANDAL and ANDAL stages	Documented SEP across the full project lifecycle; gender-responsive and inclusive of vulnerable groups	SEP prepared per AIIB requirements; consultation documented throughout the ESIA lifecycle
Grievance mechanism	Internal hospital complaint mechanism	Formal, accessible, independent GRM with defined KPIs, service-level agreements, and AIIB escalation pathway. In addition, separate GRMs must be established for workers, including both construction workers and RSDK workers.	GRM designed and documented per ESS1 in Chapter 12
Information disclosure	Initiator announcement via mass media (minimum 10 working days)	Formal disclosure of ESIA, ESMP, and SEP at least 30 days for Category B projects, and 60 days for Category A projects before AIIB's Board consideration	AIIB disclosure timeline and requirements applied
Climate considerations	Not explicitly required under standard AMDAL	Climate risk assessment (10–30-year horizon), GHG footprint, adaptation and mitigation strategy	Climate Risk Assessment and GHG inventory prepared per AIIB requirements in Chapters 7 and 8
Labor and working conditions	Labor Law (UU Ketenagakerjaan), as amended, and Occupational Health and Safety Management System (SMK3) (PP 50/2012)	ILO Core Conventions; prohibition of child and forced labor; GBV/SEAH protocols for construction workforce	AIIB labor requirements incorporated in Chapter 9 and reflected in contractor obligations
Child Labor & Minimum Working Age	UU 13/2003 (Labor Law): Minimum age 15 for regular work; ages 13–15 limited to light work only; work prohibited for children under 13. ILO Conventions 138 & 182 ratified by Indonesia	ESS2 requires prohibition of child labor and forced labor; compliance with ILO Core Conventions (including Conventions 138 & 182); age verification and safeguards for workers under 18	Contractor selection criteria and labor management procedures require age verification (KTP/identity documents); prohibition of workers under 18 in any capacity on GMS-DC& SoE construction site; ESS2 compliance integrated in Chapter 9 (LMP); monitoring framework documented in Chapter 14
Vulnerable groups	Addressed under separate legislation (UU 8/2016 on Persons with Disabilities; PermenPPA 8/2024; UU	Specific identification and tailored measures for elderly, women, children, persons with disabilities,	Vulnerable group assessment and measures documented in Chapters 5 and 10

	12/2022 on Sexual Violence/Permen PAN RB Pelayanan Publik Ramah Kelompok Rentan)	caregivers, low-income patients, and persons with mental disorders	
Cultural heritage	Law 11/2010 on Cultural Heritage; local heritage designation decrees	Chance Find Procedure; intangible heritage assessment; heritage walkover and impact assessment	Chance Find Procedure incorporated in Chapter 11; heritage impacts assessed in Chapter 6
Resource efficiency	Pollution prevention and waste management focus	Energy, water, and materials efficiency; circular economy principles; refrigerant management	Resource efficiency measures incorporated in the ESMP in Chapter 11

4. ENVIRONMENTAL BASELINE

The baseline draws principally on twelve semester UKL-UPL reports covering 2020 Semester 1 through 2025 Semester 2, the ANDAL 2020 reference baseline, the Pertek BMAL/Emisi/Rintek B3 evidence files, and the Master Plan RSUP Kariadi 2024. While the environmental and social baseline analysis in this report is currently established upon secondary data sourced from the hospital's official environmental monitoring databases, official government portals, and relevant published literature, it is recognized that a real-time, localized assessment is essential to capture the precise current conditions of the project footprint to supplement the secondary data. To ensure the utmost robustness of this ESIA and to satisfy the rigorous requirements of the AIIB ESF, a dedicated primary field survey will be conducted prior to the commencement of any physical works. This upcoming field campaign will serve to validate the secondary trends, fill localized data gaps, and establish a highly accurate, site-specific baseline that truly reflects the pre-construction environment and social dynamics of the project area. The primary survey is planned to be completed at the end of June 2026 at the latest. .

4.1 Geographic and Administrative Context

RSDK Semarang is located in Semarang City, Central Java Province. The site occupies a 188,080 m² area (as per land certificate submitted by RSDK) bounded by Jl. Dr. Sutomo and Jl. Dr. Kariadi. The administrative location and key spatial-context features are summarized below.

Table 19 Detail Location of RSDK

Aspect	Value / Reference
Province	Central Java
City	Semarang City
Sub-district (Kecamatan)	Subdistrict Semarang Selatan
Kelurahan	RSDK is located in Randusari. Adjacent residential area is Ward of Barusari and adjacent neighbourhoods
RTRW reference	Perda Kota Semarang 5/2021 (Perubahan RTRW 14/2011), Education & Helath strategic area
Spatial-suitability instrument	PKKPR 07022210213374075, issued 28 June 2024
Land area (Sertifikat Tanah)	188,080 m² (≈ 18.8 ha)
Receptor sensitivity	Settlement RT 1/RW 5 Ward of Barusari and other surrounding neighbourhoods (UKL-UPL ambient-air locations)
Disaster context (FS Section 4.1.5)	Adjacent to Low to Medium Class Flood Disaster Prone Area

The RSDK is administratively situated at Jalan Dr. Sutomo No. 16, Randusari, South Semarang, positioned along a major urban corridor that connects the southern residential areas to the city's central landmarks like Tugu Muda. The hospital frontage faces a high-traffic primary artery, which often experiences significant congestion during peak business hours due to its central location. It is

strategically linked to the regional infrastructure, located roughly 6 kilometers from the Krapyak Toll Gate, providing efficient access for patient referrals from outside the city. For local commuters, the site is highly accessible via the Trans Semarang bus network (notably Corridor 2 and 5), and it remains conveniently close to major transit hubs, sitting approximately 10 minutes from Semarang Poncol Railway Station and 15 minutes from Ahmad Yani International Airport.

The land occupied by the hospital is a state-owned asset (*Barang Milik Negara*) with the legal status designated as *Hak Pakai* (Right to Use) or *Hak Pengelolaan* (Right to Manage) under the Ministry of Health, governed by Government Regulation (*Peraturan Pemerintah*/PP) No. 27 of 2014 (as amended by PP No. 28 of 2020) concerning the Management of State/Regional Property. In terms of spatial planning, the facility is situated within a zone dedicated to Public and Social Services (*Sarana Pelayanan Umum*/SPU) as prescribed by Semarang City Regional Regulation (*Perda*) No. 5 of 2021 regarding the Semarang City Regional Spatial Plan (RTRW) for 2021-2041, specifically within the Bagian Wilayah Kota (BWK)-I planning area. This designation confirms that the hospital's current infrastructure and future development plans are in full conformity with the urban land-use framework for the South Semarang district, particularly regarding the provision of large-scale health infrastructure.

4.2 Climate and Meteorology

Semarang City is characterised by a tropical monsoon climate governed by two principal atmospheric systems. The wet season (November–May) is driven by the northwest monsoon, which advects moist air from the Java Sea, while the dry season (June–October) is dominated by the southeast trade winds. In 2022, the city recorded annual rainfall of 2,664 mm, with more than 80% concentrated in the wet season. Mean relative humidity ranges from 70% to 92%, and wind speeds vary between 1.11 and 1.89 m/s, indicating consistently moisture-laden atmospheric conditions.

This seasonality generates compound hydrological risks across the Project area. Wet-season flooding results from intense rainfall exceeding drainage capacity in low-lying zones, whereas the dry season produces water stress and diminished groundwater recharge. The city's coastal location further amplifies these vulnerabilities, as tidal inundation (*rob*) frequently coincides with peak rainfall events, particularly in the northern districts (Regulation of Semarang City No. 7/2024, *Dinas Penataan Ruang*).

A site-specific precipitation analysis for the RSDK location, based on an 18-year dataset (2000–2017) obtained from the Central Java Provincial Government, confirms a pronounced monsoonal regime with a distinct bimodal–unimodal annual distribution (Table 19). The wet season extends from October to June, with precipitation consistently peaking in January.

Table 20 Rainfall data of Semarang City from 2000 – 2017 (18 year)

Month/Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Jan	484	269	259	373	332	241	689	154	421	225	433	253	495	477	736	238	399	399
Feb	252	388	418	568	450	319	369	198	806	552	332	248	269	378	377	273	298	298
Mar	163	300	193	173	111	299	197	257	227	75	337	183	218	204	157	212	250	250

Month/Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Apr	138	299	298	262	262	133	190	202	85	243	210	121	168	296	74	258	188	188
May	284	114	127	134	172	81	232	115	55	354	263	81	87	222	182	185	165	165
Jun	51	240	22	0	49	324	27	25	58	110	107	59	110	347	129	69	79	79
Jul	44	47	8	11	26	91	2	12	2	46	79	52	2	115	182	2	82	82
Aug	80	1	1	1	1	102	0	25	81	27	190	0	0	82	10	6	50	50
Sept	147	184	5	106	83	164	0	1	70	78	171	75	3	20	0	1	67	67
Oct	196	176	66	264	46	294	36	220	114	25	272	53	267	99	45	0	132	132
Nov	439	195	272	264	250	179	228	228	304	171	205	512	272	146	194	280	204	204
Dec	202	179	148	443	244	237	266	429	353	285	413	214	328	242	193	209	268	268

Source: https://semarangkota.bps.go.id/ and https://data.jatengprov.go.id/

Over the 18-year period, January rainfall averaged approximately 382 mm, exhibiting significant inter-annual variability, with extreme monthly totals of 736 mm (2014) and 689 mm (2006). February ranked as the second wettest month, averaging 373 mm and reaching a maximum of 806 mm in 2008.

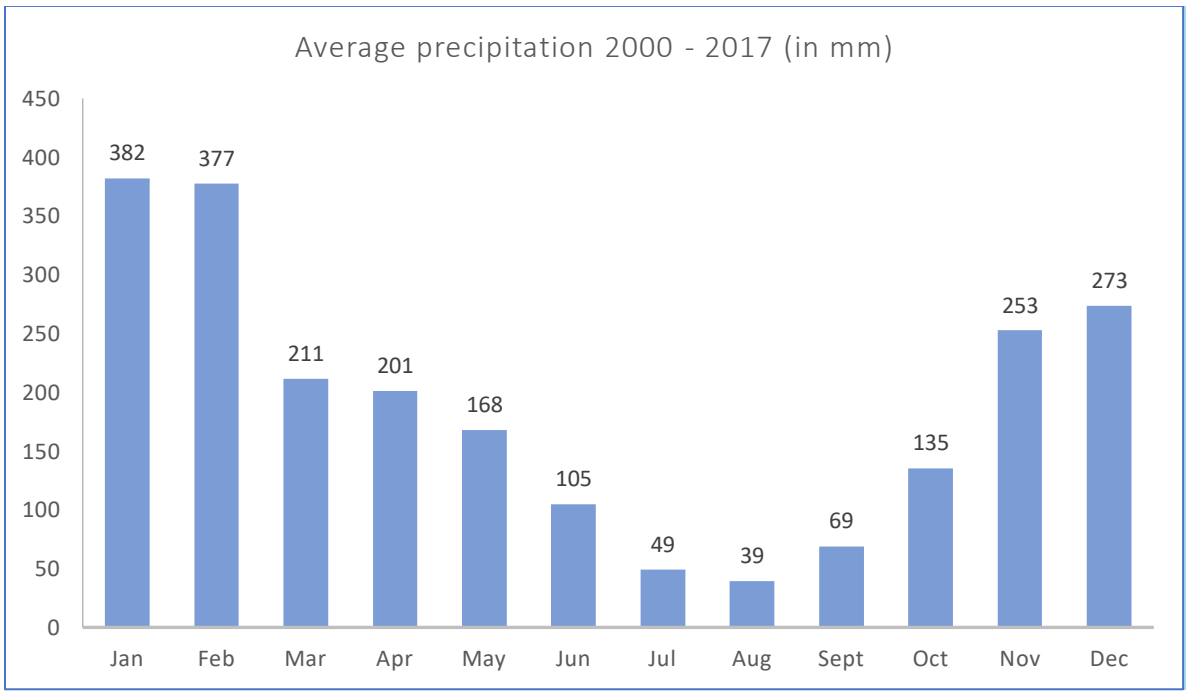


Figure 3 Monthly average precipitation in Semarang City from 2000 – 2017

Source: https://data.jatengprov.go.id/

The dry season is well defined between July and September, with August being the driest month, averaging 39 mm. The severity of the dry period is evidenced by multiple years in which monthly rainfall reached 0–1 mm, particularly during August and September. The pronounced seasonality carries direct implications for climate-related hazards in the Project area. Heavy rainfall events during the early wet-season months, frequently exceeding 400–500 mm per month, substantially elevate the risk of inland and pluvial flooding as a result of urban drainage saturation. Conversely, the recurrence

of near-zero monthly rainfall during the peak dry season corroborates the moderate drought risk classification for the Semarang Selatan region.

Regional wind patterns are governed by the Australian–Asian monsoon system. During the wet season, prevailing winds originate from the west (west monsoon), whereas the dry season is characterised by easterly to northeasterly flows (east monsoon). Mean hourly wind speeds exhibit mild seasonal variation, ranging from 7.7 to 11.6 km/h, with the windiest period typically occurring between December and March.

4.3 Topography and Geology

Semarang exhibits a marked north–south topographic gradient, ranging from coastal lowlands to hilly uplands. The northern zone comprises flat coastal and alluvial plains with slopes of 0–2% and elevations of 0.75–3.5 m above sea level (masl), encompassing the city's principal urban districts, including the port of Tanjung Emas, Simpang Lima, and Candi Baru. In contrast, the southern sector rises into hilly terrain with slopes of 2–40% and elevations of 90–359 masl, with prominent high points located in Jatingaleh, Gombel, Banyumanik, Tembalang, Mijen, and Gunungpati. The overall elevation range of 0.75–348 masl exerts a strong influence on land use, infrastructure development, and hazard exposure across the city.

The geological framework of Semarang is structurally complex, characterised by multiple faults and folds that shape the regional morphology. The Kaligarang Fault, a north–south-trending structure aligned with the Kaligarang River near Bukit Gombel, traverses a zone of highly porous, discontinuously bedded volcanic rock susceptible to slope instability. Additional structural features include the Meteseh Fault, which intersects the Bukit Kencana Jaya area and cuts across the Notopuro Formation.

The regional stratigraphy, based on the Magelang–Semarang Geological Map (Thaden et al., 1996), comprises the following sequence from youngest to oldest: Alluvium (Qa), Gajahmungkur Volcanic Rocks (Qhg), Kaligesik Volcanic Rocks (Qpk), Jongkong Formation (Qpj), Damar Formation (QTd), Kaligetas Formation (Qpkg), Kalibeng Formation (Tmkl), and Kerek Formation (Tmk) (Figure 4). Lithologically, the city is dominated by alluvium, volcanic rocks (andesite, breccia, and lava flows), and sedimentary formations including the Damar, Kalibeng, Kaligetas, and Kerek units. Soil distribution reflects this topographic and geological diversity: the southern uplands (Tembalang, Banyumanik, Gunungpati, Mijen, Ngaliyan) are predominantly underlain by latosols and Mediterranean soils with moderate erosion resistance, whereas the northern lowlands (Genuk and surrounding areas) consist largely of alluvial soils, which are fertile but more susceptible to erosion and subsidence..

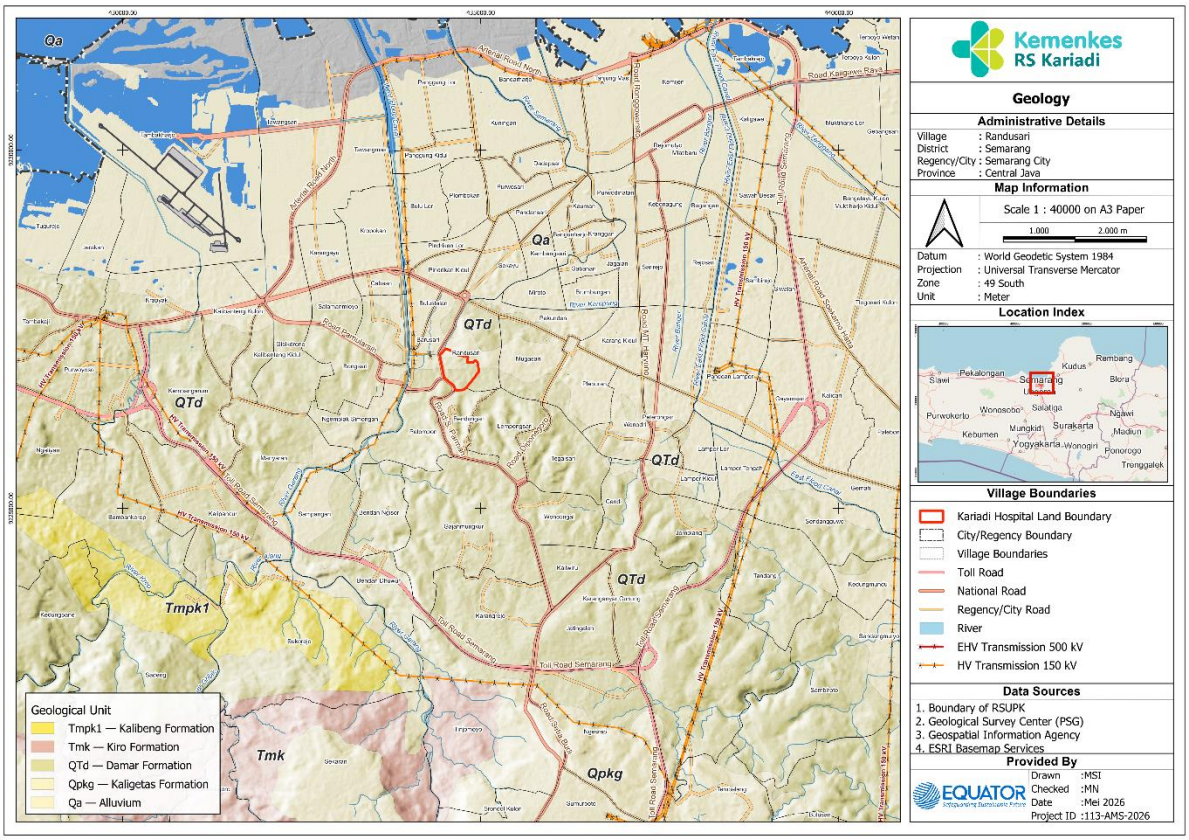


Figure 4 Geology of Semarang City[1]

Structural geology studies using Digital Elevation Models and Landsat imagery have revealed dominant north–south fault orientations, with additional NE–SW and NW–SE lineaments, indicating tectonic activity that has shaped the city's terrain (Hidayatillah et al., 2024). These structural weaknesses contribute to hazards such as landslides in the hilly areas and subsidence in the coastal plains.

The lowlands face recurrent flooding, coastal abrasion, and subsidence due to groundwater extraction, while the uplands are prone to erosion and slope instability. As highlighted in landform analysis studies using DEM data (Basworo et al., 2025), the city's geomorphology reflects both volcanic and sedimentary influences, underscoring the importance of integrated land-use planning and hazard mitigation strategies.

[1] The map is download from from https://cdn.arcgis.com/ on May 2026.

4.4 Hydrology and Hydrogeology

The hydrology of the RSDK is primarily influenced by the urban drainage system in Kota Semarang. Surface runoff from the RSDK area is directed through the institutional drainage system into the city's stormwater network. The surface water resources in Semarang City are mainly supported by a large system of rivers that run through its administrative borders. The main rivers in the area are Kali Garang, Kali Pengkol, Kali Kreo, East Floodway (Kali Banjir Kanal Timur), Kali Babon, Kali Sringin, Kali Kripik, and Kali Dungadem, among others. The Garang River begins at Mount Ungaran and flows north until it reaches Pegandan, specifically in the Tugu Soeharto area, where it meets the Kreo and Kripik rivers. These surface water systems are structured and overseen across 11 separate watersheds, which are: DAS Tugu, DAS Babon, DAS Banjir Kanal Barat (West Floodway), DAS Banjir Kanal Timur (East Floodway), DAS Barat (West), DAS Bringin, DAS Blorong, DAS Plumbon, DAS Silandak, DAS Tengah (Central), and DAS Timur (East). Figure 4-3 below shows the watershed in Semarang City.

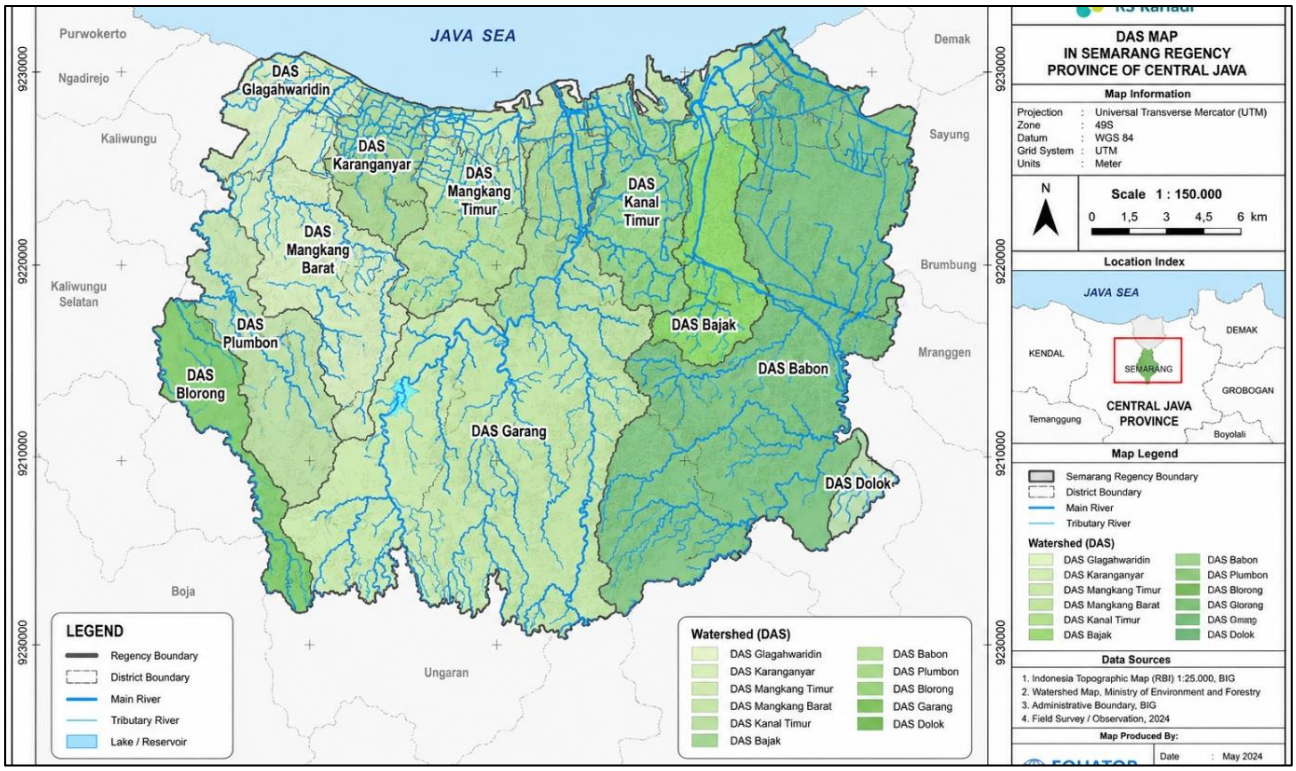


Figure 5 Hydrology of Semarang City

(Source: Dinas Penataan Ruang Kota Semarang, 2024)

4.4.1 Surface Water Quality around RSDK

The baseline surface water quality for the Project area was established through monitoring conducted at three locations along the nearest surface watercourse to the Project site (Jl. Sutomo): upstream, midstream, and downstream. Sampling was undertaken biannually in 2024 and 2025 to capture wet- and dry-season variability, with results benchmarked against the national water quality standards stipulated in Government Regulation PP No. 22/2021 (Tables 20 and 21).

In February 2024, monitoring indicated moderate organic and nutrient loading. Biochemical Oxygen Demand (BOD) was at or marginally above the regulatory limit of 3 mg/L, while Chemical Oxygen Demand (COD) remained compliant. Ammonia concentrations (0.32–1.17 mg/L) and total phosphate (0.35–0.50 mg/L) exceeded applicable thresholds at all locations. Dissolved oxygen (DO) ranged from 3.0 to 3.4 mg/L, falling below the 4 mg/L minimum standard. Microbiological parameters were substantially elevated, with total and faecal coliform counts exceeding 16,000 MPN/100 mL at all stations, indicating persistent faecal contamination.

By August 2024, water quality had deteriorated markedly at upstream and midstream locations, with BOD reaching 96 mg/L and COD 158 mg/L. Ammonia concentrations rose to 3.74 mg/L at the midstream station, while total phosphate exceeded 1.0 mg/L. DO declined to 1.8 mg/L at the midstream location. Oil and grease, phenol, sulphide, lead, and zinc were detected above regulatory limits, suggesting contributions from industrial or domestic wastewater discharges. The 2025 monitoring results confirmed this deteriorating trajectory. In September 2025, BOD and COD at the upstream location reached 41 mg/L and 179 mg/L respectively, while ammonia rose to 3.52 mg/L and total phosphate to 1.00 mg/L. Lead and zinc concentrations continued to exceed applicable standards. Microbiological contamination remained consistently high throughout both monitoring periods, and DO values approached or fell below the 4 mg/L minimum in the September 2025 campaign.

The consistent pattern of deterioration between wet- and dry-season campaigns, particularly at upstream and midstream locations, indicates that pollution sources are located proximate to the headwaters of the receiving watercourse, with the dry season producing pronounced reductions in assimilative capacity

Table 21 Surface water quality monitoring result in 2024

Parameter	Standard Limit (PP No.22/ 2021)	Feb 2024			Aug 2024		
		Up-stream	Middle	Down-stream	Up-stream	Middle	Down-stream
Temperature (°C)	±3 deviation	29	29	30	28	28	29
TDS (mg/L)	1000	262	295	266	287	292	324
TSS (mg/L)	50	12	23	<11	14	20	14
pH	6–9	7	7	7.1	7.8	7.4	7.5
DO (mg/L)	≥4	3.4	3	3.1	2.2	1.8	2.9
BOD (mg/L)	3	3	3	2	96	80	15
COD (mg/L)	25	15.3	15	<7.57	141	158	56.6
Ammonia (mg/L)	0.2	0.32	1.17	1.08	1.76	3.74	3.2
Nitrite (mg/L)	0.06	0.21	0.22	0.31	<0.02	<0.02	0.75
Nitrate (mg/L)	10	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82
Phosphate (mg/L)	0.2	0.35	0.5	0.49	0.7	0.88	1.16
Lead (Pb, mg/L)	0.03	0.087	0.038	0.026	0.087	0.038	0.026
Cadmium (Cd, mg/L)	0.01	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Nickel (Ni, mg/L)	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Zinc (Zn, mg/L)	0.05	<0.04	<0.04	<0.04	0.08	<0.04	0.08

Parameter	Standard Limit (PP No.22/ 2021)	Feb 2024			Aug 2024		
		Up-stream	Middle	Down-stream	Up-stream	Middle	Down-stream
Arsenic (As, mg/L)	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Mercury (Hg, mg/L)	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Oil & Grease (mg/L)	1	1.63	1.76	2.78	1.63	1.76	2.78
Detergent (mg/L)	0.2	<0.08	<0.08	0.17	0.39	0.17	0.11
Total Coliform (MPN/100ml)	5000	>16000	>16000	>16000	>16000	>16000	>16000
Fecal Coliform (MPN/100ml)	1000	>16000	>16000	>16000	>16000	>16000	>16000

Source: RSUP Dr. Kariadi (2026)

Table 22 Surface water quality monitoring result in 2025

Parameter	Standard Limit (PP No.22/ 2021)	Mar 2025			Sep 2025		
		Up-stream	Middle	Down-stream	Up-stream	Middle	Down-stream
Temperature (°C)	±3 deviation	29	28	29	27	28	29
TDS (mg/L)	1000	236	224	239	300	292	324
TSS (mg/L)	50	17	13	14	14	12	14
pH	6–9	6.7	6.6	6.7	7.2	7.3	7.5
DO (mg/L)	≥4	4.1	4	4.3	3.2	2.9	2.9
BOD (mg/L)	3	12	2	7	41	12	15
COD (mg/L)	25	40	<8.61	23.8	179	50.8	56.6
Ammonia (mg/L)	0.2	0.36	0.74	0.58	3.52	3.13	3.2
Nitrite (mg/L)	0.06	0.16	0.03	0.29	0.17	0.03	0.75
Nitrate (mg/L)	10	2.7	2.5	3.6	<2.99	<2.99	<2.99
Phosphate (mg/L)	0.2	0.14	0.13	0.36	1	0.72	1.16
Lead (Pb, mg/L)	0.03	0.042	0.072	0.047	0.046	0.042	0.026
Cadmium (Cd, mg/L)	0.01	<0.002	<0.002	<0.002	<0.009	<0.009	<0.009
Nickel (Ni, mg/L)	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Zinc (Zn, mg/L)	0.05	0.08	0.07	0.07	<0.63	<0.63	0.08
Arsenic (As, mg/L)	0.05	<0.01	<0.01	≤0.01	<0.01	<0.01	<0.01
Mercury (Hg, mg/L)	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Oil & Grease (mg/L)	1	1.45	0.89	<0.83	<1.09	<1.09	2.78
Detergent (mg/L)	0.2	<0.07	<0.07	<0.07	<0.08	<0.08	0.11
Total Coliform (MPN/100ml)	5000	>16000	>16000	>16000	>16000	>16000	>16000
Fecal Coliform (MPN/100ml)	1000	>16000	>16000	16000	>16000	>16000	>16000

Source: RSUP Dr. Kariadi (2026)

The municipal water supply system of Semarang City relies substantially on groundwater resources contained within designated Groundwater Basins (Cekungan Air Tanah/CAT), encompassing both shallow (unconfined) and deep (confined) aquifer systems. The most extensive and productive groundwater reserves are situated in the elevated southern districts, primarily within the sub-districts of Tembalang, Ngaliyan, and Mijen.

Groundwater abstraction at the RSDK is conducted under a Water Extraction Permit (Surat Izin Pengambilan Air/SIPA), in compliance with Government Regulation No. 121/2015 and Ministerial Regulation ESDM No. 12/2018. Routine monthly monitoring of abstraction volumes and water quality is carried out in accordance with established institutional standard operating procedures.

4.5 Air Quality and Noise

4.5.1 Ambient Air Quality

The ambient air quality monitoring at RSDK was conducted across two semesters (S1 and S2) in 2024 and 2025 at four locations: Barusari, Jl. Dr. Sutomo, Jl. Dr. Kariadi, and Gedung Medika Sentral (Table 22). All measured parameters were consistently below the thresholds stipulated in PP RI No. 22/2021, thereby satisfying both national regulatory requirements and the IFC Environmental, Health, and Safety (EHS) Guidelines, which defer to national ambient air quality standards where applicable.

Total Suspended Particulates (TSP) ranged from 4.63 to 80 µg/m³, well below the 230 µg/m³ limit. Carbon monoxide (CO) concentrations ranged from 1,145 to 2,290 µg/m³, equivalent to approximately 23% of the 10,000 µg/m³ threshold. Nitrogen dioxide (NO_2) and ozone (O_3) concentrations were recorded at 6.16–22.43 µg/m³ and 11.91–22.66 µg/m³ respectively, both substantially below their respective limits of 200 µg/m³ and 150 µg/m³. Sulfur dioxide (SO_2) levels ranged from 33.38 to 45.03 µg/m³, well within the 150 µg/m³ threshold. Lead (Pb) was either below the detection limit (<0.009 µg/m³) or measured between 0.018 and 0.022 µg/m³, considerably lower than the 2.8 µg/m³ limit.

Minor seasonal variations were observed, most notably higher TSP levels in Semester 1 of 2025, though all values remained well within the applicable limits. These results confirm that the RSDK area's ambient air quality is in full compliance with relevant standards, providing a robust environmental baseline for the project. Therefore, the initial condition for RSDK consistently meets air quality standards, indicating that although traffic and urban activities contribute to pollution levels, the concentrations are managed and do not present major health risks under present conditions. Considering that the ambient air quality monitoring conducted by RSDK provides recent, localized time-series data from around the proposed project site, the consultant considers the existing dataset to be sufficiently representative of the baseline air quality conditions prior to development. Consequently, conducting an additional primary ambient air quality survey at this stage would offer limited technical value, as the data would likely no longer reflect real-time conditions given the anticipated one-year lag before physical works begin. Instead, it is recommended that primary ambient air quality measurements be strategically deferred and executed immediately prior to the commencement of demolition and construction activities to establish an accurate, current 'Day Zero' baseline for compliance tracking.

Table 23 Table Ambient air quality monitoring results in 2024 and 2025

Location	Parameter	TSP (µg/m³)	CO (µg/m³)	NO_2 (µg/m³)	O_3 (µg/m³)	SO_2 (µg/m³)	Pb (µg/m³)
	Threshold	**230**	**10000**	**200**	**150**	**150**	**2.8**
Barusari	S1 2024	20.06	2004	6.16	12.79	33.8	<0.009
	S2 2024	14.34	1374	14.72	19.55	34.74	<0.009
	S1 2025	37.38	1672	18.87	16.33	37.89	0.018
	S2 2025	4.63	1672	10.57	16.45	40.88	<0.009
Jl. Dr. Sutomo	S1 2024	36.42	1145	11.87	16.21	35.23	0.019
	S2 2024	46.04	2061	22.43	21.12	42.6	<0.009
	S1 2025	62.82	1145	14.27	12.22	36.26	0.022
	S2 2025	20.7	1340	13.1	11.91	35.33	<0.009
Jl. Dr. Kariadi	S1 2024	27.66	2290	8.3	17.26	38.99	<0.009
	S2 2024	36.31	1718	13.52	22.17	42.34	<0.009
	S1 2025	67.61	1340	15.48	14.54	39.09	0.021
	S2 2025	17.65	1340	16.93	22.66	45.03	<0.009
Medika Sentral	S1 2024	22.27	1145	14.3	18.76	38.39	<0.009
	S2 2024	80	1374	14.22	17.53	40.66	<0.009
	S1 2025	69.39	1672	15.13	14.91	33.38	0.019
	S2 2025	22.65	1340	8.72	12.91	35.09	<0.009

Source: compiled from RSDK primary data.

4.5.2 Stationary Source Emissions

Emissions from stationary sources at RSDK mainly come from two boiler stacks, known as Cerobong Miura 1 and Cerobong Miura 2, as well as from the exhaust of five generator sets located in various buildings, including the Genset Service Building, Genset Rajawali Building, Genset Garuda Building, Genset Parking Buildings A1 and A2, and the Genset Onkologi Building. The data for genset emission monitoring is taken from the monitoring report for the second semester of 2024.

The monitoring results for 2024 show complete adherence to national emission standards, establishing a clear baseline for controlled emissions from stationary sources at RSDK. All measured parameters were consistently under the limits established in PerMenLH No. 7/2007, demonstrating that the boilers are operating effectively and controlling emissions properly. Particulate matter (PM) levels were measured between 4.09 and 104 mg/Nm³ for boilers and between 5.49 and 34.32 mg/Nm³ for gensets, which are significantly lower than the established limits of 200 mg/Nm³ for boilers and 95 mg/Nm³ for gensets. Nitrogen dioxide (NO_2) levels were low for boilers, measuring less than 1.88 mg/Nm³, and moderate for generators, ranging from 776 to 1402 mg/Nm³. However, both measurements remained significantly below the limit of 1850 mg/Nm³. Sulfur dioxide (SO_2) levels were consistently lower than the detection limit of 2.62 mg/Nm³, and carbon monoxide (CO) emissions from generator sets ranged from 43 to 73 mg/Nm³, remaining below the threshold of 77 mg/Nm³. Opacity readings were just above the 15% standard at less than 20%, indicating a reporting

issue rather than actual violations. Meanwhile, the isokinetic sampling efficiency, which ranged from 90% to 100%, demonstrated that the measurement quality was reliable.

The monitoring results for 2025 indicate that stationary emissions at RSDK continued to meet national standards, showing consistent compliance over the years. Particulate matter (PM) concentrations were measured between 5.51 and 11.87 mg/Nm³, which is significantly lower than the 200 mg/Nm³ limit. Nitrogen dioxide (NO_2) and sulfur dioxide (SO_2) were present in very small amounts, remaining consistently below the detection limits of less than 1.88 mg/Nm³ and less than 2.62 mg/Nm³, respectively. Opacity readings of less than 20% were marginally above the 15% standard, but this indicates reporting notation rather than actual violations. The isokinetic sampling efficiency was 92%, which falls within the acceptable range of 90 to 110%, indicating that the measurement quality is reliable.

The IFC Environmental, Health, and Safety (EHS) Guidelines stipulates that stationary emission assessments should follow national regulations where they exist, therefore compliance with Indonesian standards ensures alignment with international best practice. Thus, the baseline condition for 2024–2025 stationary emissions is one of stable compliance, showing that both boilers operated within safe limits across consecutive years, with 2025 results indicating slightly improved particulate control compared to 2024.

Table 24 Gas emision monitoring of boiler chimneys in 2024 and 2025

Parameter	Standard Limit*	Boiler Miura 1 S1 2024	Boiler Miura 2 S1 2024	Boiler Miura 1 S2 2024	Boiler Miura 2 S2 2024	Boiler Miura 1 S1 2025	Boiler Miura 2 S1 2025	Boiler Miura 1 S2 2025	Boiler Miura 2 S2 2025
Opacity (%)	15	<20	<20	<20	<20	<20	<20	<20	<20
Linear Flow (m/s)	–	4.55	4.56	4.42	4.39	0.35	0.35	0.35	0.35
NO_2 (mg/Nm³)	700	<1.88	<1.88	<1.88	<1.88	<1.88	<1.88	<1.88	<1.88
Particulates (mg/Nm³)	200	4.09	12.92	104	51.93	5.51	11.87	5.51	11.87
SO_2 (mg/Nm³)	700	<2.62	<2.62	<2.62	<2.62	<2.62	<2.62	<2.62	<2.62
Isokinetic (%)	90–110	91	90	95	98	92	92	92	92

Source: RSDK (2026).

The monitoring results for generators/gensets in 2024 show that they meet national emission standards, creating a baseline for regulated emissions from auxiliary power sources at RSDK. All measured parameters remained consistently below the limits established in PerMenLH No.11/2021, indicating successful operation and control of emissions. The monitoring results indicate that the concentrations of particulate matter (PM) varied between 5.49 and 34.32 mg/Nm³, which is significantly lower than the limit of 95 mg/Nm³. Nitrogen dioxide (NO_2) levels ranged from 776 to 1402 mg/Nm³, which is moderate but remains significantly below the limit of 1850 mg/Nm³. Sulfur dioxide (SO_2) levels were consistently below the detection limit of 2.62 mg/Nm³, and carbon monoxide (CO) concentrations ranged from 43 to 73 mg/Nm³, staying below the threshold of 77 mg/Nm³. Opacity readings of less than 20% were somewhat higher than the 15% standard; however, they indicate

reporting notation rather than actual violations. The efficiency of isokinetic sampling, which ranges from 99% to 100%, verified the reliability of the measurement quality. In 2024, emissions from the generator set met all regulations, with all key pollutants kept well within the allowable limits. Table x presents the emission monitoring data for six genset units in 2024.

Table 25 Emission monitoring of the gensets in 2024

Parameter	Standard Limit (PerMenLH No.11/2021)	Genset Service 840 kW	Genset Rajawali 800 kW	Genset Garuda 800 kW	Genset Parkir A1 800 kW	Genset Parkir A2 800 kW	Genset Onkologi 824 kW
Opacity (%)	15	<20	<20	<20	<20	<20	<20
Linear Velocity (m/s)	–	6.94	7.46	8	8.34	8.1	7.7
NO_2 (mg/Nm³)	1850	776	1318	1402	1166	1313	1294
Particulates (mg/Nm³)	95	18.85	10.84	16.34	10.48	34.32	5.49
SO_2 (mg/Nm³)	160	<2.62	<2.62	<2.62	<2.62	<2.62	<2.62
CO (mg/Nm³)	77	73.2	71.47	48.73	44.29	45.81	43.63
Isokinetic (%)	90–110	100	100	99	99	100	99

Source: RSDK (2026).

4.5.3 Noise

Noise monitoring conducted around RSDK in 2024 and 2025 shows that traffic is the primary source of noise pollution, with variations in intensity occurring seasonally. Even with some occasional improvements, the majority of monitoring locations recorded noise levels at or above the national limit of 55 dB, indicating that noise continues to be a significant environmental concern in the region. The detailed data for 2024 indicates that there have already been exceedances in noise levels at several locations: Jalan Dr. Kariadi (59–60 dB), Jalan Dr. Sutomo (54–55 dB), Barusari residential area (57–59 dB), and Medika Sentral (60 dB). These values were equal to or higher than the standard, showing a general lack of compliance. In the first semester of 2025 (April), noise levels increased, with Jalan Dr. Kariadi measuring 62 dB, Jalan Sutomo at 68 dB, and Barusari at 59 dB, all above the permitted limit. Only Medika Sentral recorded a compliant level of 54 dB. By Semester 2 (November 2025), the conditions had improved, with Jalan Dr. Kariadi measuring 51 dB, Barusari at 48 dB, and Medika Sentral also at 51 dB, all of which were within acceptable limits. Jalan Dr. Sutomo continued to be an issue at 58 dB, highlighting its status as a consistent problem area. The results of the noise monitoring are summarized in Table x below.

The exceedances in relation to national standards (KepMenLH No. 48/1996) indicate a necessity for action. The World Health Organization's Environmental Noise Guidelines establish lower acceptable noise levels, which are 55 dB during the day and between 40 to 45 dB at night. This indicates that most results from 2024 and measurements taken in April 2025 would likely be harmful to community health, particularly for vulnerable individuals like RSDK's patients. The monitoring data from 2024 to 2025 indicates that noise pollution is present at RSDK area experiences traffic that varies with the seasons and often exceeds safe levels.

Table 26 Noise (in dBA) monitoring results in RSDK area in 2024 and 2025.

No	Location	March 2024 (S1)	September 2024 (S2)	April 2025 (S1)	November 2025 (S2)
1	Jl. Dr. Kariadi (in-out access road)	59	60	62	51
2	Jl. Dr. Sutomo (in-out access road)	54	55	68	58
3	Pemukiman 01/05 Kel. Barusari	57	59	59	48
4	Planned Medika Sentral Building	60	60	54	51

Source: RSDK (2026).

The 2024–2025 monitoring results confirm that ambient noise levels around the RSDK perimeter are heavily influenced by road traffic, with variations throughout the seasons dictated by localized activity and environmental factors. While the existing daytime dataset is highly representative of peak traffic conditions, it lacks critical data regarding night-time noise, acoustic variations between weekdays and weekends, and baseline background noise parameters. Therefore, to strengthen the impact assessment and establish a scientifically robust benchmark for future compliance thresholds, a targeted primary noise survey will be conducted. This primary monitoring will focus on capturing 24-hour diurnal cycles (day-time and night-time) across both weekdays and weekends at the designated receptor points. This complete baseline profile is essential to precisely calibrate and design the project's ESMP or CESMP, ensuring that specific mitigation measures (such as construction time restrictions, targeted traffic management, sound barriers, or green buffers along highly affected frontages like Jl. Dr. Sutomo) are optimally engineered to meet both national and international (IFC EHS) health standards.

4.5.4 Indoor Air and Ventilation

Indoor air quality and ventilation in the existing RSDK clinical zones are managed under Permenkes 7/2019 on Hospital Environmental Health, with HEPA filtration in critical zones and routine maintenance per the institutional SOP. The GMS-DC & SoE Smart Hospital and Green Hospital strategy (Section 2.2.5) further upgrades indoor-air-quality monitoring with continuous instrumentation in the Diagnostic Centre, ICU, NICU, ICCU and operating theatre zones.

4.6 Biodiversity and Ecology

4.6.1 Ecosystem Overview

The RSDK complex is situated within a long-established urban setting in central Kota Semarang. Originally developed in 1925, the complex has been continuously maintained in alignment with the hospital’s operations. The majority of the land has been converted to built infrastructure, with limited portions retained as open yards functioning as designated green space (Ruang Terbuka Hijau, RTH).

In accordance with IFC Performance Standard 6, the entire site complex is classified as **modified habitat with no natural vegetation**, having undergone significant alteration due to sustained human activity, including urban expansion, infrastructure development, and changes in land use.

According to the Regional Spatial Plan, the entire complex is designated as an urban and commercial area, with no nationally or internationally protected sites or ecosystems located within it.

Biodiversity screening confirmed no threatened species were found within or around the site. The project area does not intersect with any National or IUCN protected sites. Therefore, AIIB ESS1 and critical habitat threshold is not triggered.



Figure 6 Figure Vegetation inside the RSDK area in 2026

4.6.2 Biodiversity Baseline

The flora and fauna baseline within the project area was derived from the AMDAL 2020 study. The findings indicate that the species present are typical of an urban community and remain consistent with current conditions. Based on the biodiversity assessment, a total of 43 vegetation species, one mammal, two birds, two amphibia, one reptile, and four insect species, were recorded. None of these species are classified as conservation concern (Critically Endangered, Endangered, or Vulnerable under the IUCN Red List), nor are they nationally protected, endemic, or migratory species.

Table 27 The List of species recorded during the study is presented in the following table

No	Habitus	Species	Familia	IUCN	Protection	Endemic	Migratory
			Flora				
1	Herbs	*Agave gigantea*	Agavaceae	-	-	-	-

No	Habitus	Species	Familia	IUCN	Protection	Endemic	Migratory
2		*Amaranthus gangeticus*	Amaranthaceae	-	-	-	-
3		*Colocasia esculenta*	Araceae	LC	-	-	-
4		*Tridax procumbens*	Asteraceae	-	-	-	-
5		*Kalanchoe pinnata*	Crassulaceae	-	-	-	-
6		*Musa paradisiaca*	Musaceae	-	-	-	-
7		*Imperata cylindrica*	Poaceae	LC	-	-	-
8		*Pennisetum purpureum*		LC	-	-	-
9	Vine	*Epipremnun aureum*	Araceae	-	-	-	-
10	Shrubs	*Crossandra undulifolia*	Acanthaceae	-	-	-	-
11		*Ruellia simplex*		-	-	-	-
12		*Cordyline fruticosa*	Agavaceae	-	-	-	-
13		*Dracaena fragrans*		LC	-	-	-
14		*Dracaena marginata tricolor*		-	-	-	-
15		*Allamanda cathartica*	Apocynaceae	-	-	-	-
16		*Carica papaya*	Caricaceae	DD	-	-	-
17		*Ricinus communis*	Euphorbiaceae	-	-	-	-
18		*Acalypha siamensis*		-	-	-	-
19		*Calliandra calothyrsus*	Leguminosae	-	-	-	-
20		*Leucaena leucocephala*		-	-	-	-
21		*Mimosa pudica*		LC	-	-	-
22		*Syzygium oleana*	Myrtaceae	-	-	-	-
23		*Bougainvillea* sp	Nyctaginaceae	-	-	-	-
24		*Ixora javanica*	Rubiaceae	LC	-	-	-
25		*Duranta repens*	Verbenaceae	-	-	-	-
26	Trees	*Mangifera indica*	Anacardiaceae	DD	-	-	-
27		*Polyalthia longifolia*	Annonaceae	-	-	-	-
28		*Alstonia scholaris*		LC	-	-	-
29		*Cerbera manghas*	Apocynaceae	LC	-	-	-
30		*Plumeria rubra*		LC	-	-	-
31		*Cocos nucifera*	Arecaceae	-	-	-	-
32		*Livistona* sp		-	-	-	-
33		*Roystonea regia*		-	-	-	-

No	Habitus	Species	Familia	IUCN	Protection	Endemic	Migratory
34		*Handroanthus chrysotricus*	Bignoniaceae	-	-	-	-
35		*Terminalia catappa*	Combretaceae	LC	-	-	-
36		*Terminalia mantaly*		LC	-	-	-
37		*Cupressus sempervirens*	Cupressaceae	LC	-	-	-
38		*Erythrina cristagalli*	Leguminosae	LC	-	-	-
39		*Ficus benjamina*	Moraceae	LC	-	-	-
40		*Ficus benjamina variegata*		LC	-	-	-
41		*Syzygium aqueum*	Myrtaceae	-	-	-	-
42		*Averrhoa bilimbi*	Oxalidaceae	-	-	-	-
43		*Pinus mercusii*	Pinaceae	-	-	-	-
			Fauna				
44	Amphibia	*Rana cancrivora*	Ranidae	LC	-	-	-
45		*Bufo melanostictus*	Bufonidae	LC	-	-	-
46	Birds	*Passer montanus*	Passeridae	LC	-	-	-
47		*Pycnonotus aurigaster*	Pycnonotidae	LC	-	-	-
48	Mammal	*Felis catus Domestica*	Felidae	-	-	-	-
49	Reptile	*Mabuya multifasciata*	Scincidae	LC	-	-	-
50	Insects	*Oxya chinensis*	Acrididae	-	-	-	-
51		*Libellula* sp.	Libellulidae	-	-	-	-
52		*Papilio* sp.	Papilionidae	-	-	-	-
53		*Colias* sp.	Pieridae	-	-	-	-

Source: AMDAL 2020, Remarks: IUCN: Least Concern (LC), Data Deficient (DD).

Invasive species were identified by comparing the recorded species list with the national invasive species list outlined in Minister of Environmental and Forestry Regulation No. P.94 of 2016 on Invasive Species List. The assessment indicated that seven species are listed as invasive.

Table 28 List of invasive species presented in the following table

No	Habitus	Species	Familia
1	Shrub	*Leucaena leucocephala*	Leguminosae
2		*Mimosa pudica*	
3		*Ricinus communis*	Euphorbiaceae

4	Herb	*Imperata cylindrica*	Poaceae
5	Mammal	*Felis catus Domestica*	Felidae
6	Bird	*Passer montanus*	Passeridae
7	Amphibia	*Bufo melanostictus*	Bufonidae

A Critical Habitat screening was conducted by comparing the biodiversity baseline data with the Critical Habitat criteria outlined in IFC Performance Standard 6. This assessment aims to determine the presence of potential critical habitats within and around the project site. The critical habitat screening presented in the following table:

Table 29 Critical habitat screening results

Critical Habitat Criterion	Site observation	Conclusion
Criterion #1: Critically Endangered and Endangered Species (a) areas containing "globally important concentrations" of an IUCN CR or EN species, defined as at least 0.5% of the global population and reproductive units; (b) areas that support globally important concentrations of an IUCN Red-listed Vulnerable (VU) species, the loss of which would result in the change of the IUCN Red List status to EN or CR and meet the thresholds in (a); and (c) areas containing important concentrations of a nationally or regionally listed EN or CR species.	No Species threatened with global extinction and listed as Critically Endangered (CR) and Endangered (EN) on the IUCN Red List identified within the project site	Critical Habitat is not triggered
Criterion #2: Restricted-Range Species	No restricted range species identified within the project site	Critical Habitat is not triggered
Areas containing ≥10% of the global population of restricted range species, and at least 10% reproductive units		
Criterion #3: Migratory and Congregatory Species (a) areas known to sustain, on a cyclical or otherwise regular basis, ≥1% of the global population of a migratory or congregatory species at any point of the species' lifecycle; and (b) areas that predictably support ≥10% of the global population of a species during periods of environmental stress	No Migratory and Congregatory Species identified within the project site	Critical Habitat is not triggered
Criterion 4: Highly Threatened and/or Unique Ecosystems (a) Areas representing ≥5% of the global extent of an ecosystem type meeting the criteria for IUCN status of CR or EN. (b) Other areas, not yet assessed by IUCN, but determined to be of high priority for conservation by regional or national systematic conservation planning	No Highly Threatened and/or Unique Ecosystems identified within the project site	Critical Habitat is not triggered
Criterion 5: Areas Associated with Key Evolutionary Processes	No Areas Associated with Key Evolutionary Processes identified within the project site	Critical Habitat is not triggered

4.7 Land Use and Spatial Compliance

Land-use compliance is confirmed through three instruments: (i) the Sertifikat Tanah confirming RSDK's legal landholding of 188,080 m²; (ii) the PKKPR 07022210213374075 dated 28 June 2024 confirming spatial suitability per the OSS-RBA process; and (iii) the Perda Kota Semarang 5/2021

(Perubahan RTRW 14/2011) designating the area as the Pendidikan dan Kesehatan strategic area. The KRK 2018 remains the historical reference for the broader complex.

Per the FS Section 4.1.3 (Intensitas Bangunan), the RSDK site complies with the Koefisien Dasar Bangunan (KDB), Koefisien Lantai Bangunan (KLB) and Koefisien Daerah Hijau (KDH) applicable to the area. The detailed KDB/KLB/KDH calculation against the post-GMS-DC & SoE building footprint will be reproduced in Annex F.

4.8 Five-Year Operational Environmental Trend (UKL-UPL 2020–2025)

As a uniquely rich differentiator of the RSDK ESIA evidence base, the twelve semester UKL-UPL reports from 2020 Semester 1 through 2025 Semester 2 provide a continuous five-and-a-half-year operational environmental trend across the principal monitored parameters. The indicative trend table below summarises the parameter-by-parameter direction of travel, drawn from the consolidated UKL-UPL evidence base. Detailed per-semester numerical values are tabulated in Annex F and form the operational baseline against which Chapter 12 monitoring is calibrated.

Table 30 Summary of Operational Environmental Parameter

Parameter	Source / Receptor	2020-2021 Range	2024-2025 Range	Trend Direction	Compliance Status
IPAL Garuda, BOD outlet (mg/L)	IPAL Garuda outlet 6°59'24.6"S 110°24'28.0"E	Within BMAL	12 (Jan-25 sample)	Stable / improving	Compliant, well below 30 mg/L
IPAL Garuda, COD outlet (mg/L)	IPAL Garuda outlet	Within BMAL	42.1 (Jan-25 sample)	Stable	Compliant, below 100 mg/L
IPAL Garuda, TSS outlet (mg/L)	IPAL Garuda outlet	Within BMAL	<13 (Jan-25 sample)	Stable	Compliant, well below 30 mg/L
IPAL Sentral, BOD outlet (mg/L)	IPAL Sentral outlet 6°59'31.8"S 110°24'27"E	Within BMAL	15 (Jan-25 sample)	Stable	Compliant
IPAL Sentral, COD outlet (mg/L)	IPAL Sentral outlet	Within BMAL	50.6 (Jan-25 sample)	Stable	Compliant
IPAL Rajawali, BOD outlet (mg/L)	IPAL Rajawali outlet 6°59'31.9"S 110°24'31.4"E	Within BMAL	<7 (Jan-25 sample)	Stable / improving	Compliant, well below 30 mg/L
IPAL Rajawali, COD outlet (mg/L)	IPAL Rajawali outlet	Within BMAL	<14.3 (Jan-25 sample)	Stable / improving	Compliant, well below 100 mg/L
pH outlet (3 IPAL avg)	All IPAL outlets	6.5–7.5	6.6–6.8	Stable	Compliant, within 6-9
Total Coliform outlet (3 IPAL avg)	All IPAL outlets	<2–3000 MPN/100mL	<2 (Jan-25 sample)	Stable / improving	Compliant, well below 3,000 MPN/100mL
Ambient air TSP (Jl. Dr. Sutomo)	Roadside receptor	Within KGJ 8/2001	Within KGJ 8/2001	Stable	Compliant
Ambient air at Permukiman RT1/RW5	Sensitive receptor	Within KGJ 8/2001	Within KGJ 8/2001	Stable	Compliant

Stack emissions (genset cerobong)	5 cerobong + 2 boiler	Within PermenLH 15/2019	Within PermenLH 15/2019	Stable	Compliant
B3 manifest discipline (PT PRIA)	TPS Limbah B3	100% manifested	100% manifested (Q1 2026)	Stable	Compliant, Neraca Q1 2026 reconciled

The trend evidence demonstrates that RSDK's existing environmental management system delivers consistent compliance against both the BMAL effluent limits (PermenLH 68/2016, PermenLHK 5/2014 Annex XLIV) and the BMUE stack-emission limits (PermenLH 15/2019), with substantial headroom in IPAL Rajawali in particular. This headroom is operationally significant because it indicates that the existing IPAL infrastructure has capacity to absorb a moderate operational uplift from the GMS-DC & SoE subject to the renewed Pertek BMAL technical review.

5 SOCIOECONOMIC AND CULTURAL BASELINE

The socioeconomic and culture baseline describes the existing social, economic, labor, and cultural characteristics surrounding the project area and serves as the reference framework for assessing potential project-related impacts, benefits, and socioeconomic changes associated with project implementation.

The AoI for socioeconomic analysis is defined at three nested spatial scales, reflecting the hospital's multi-level service mandate:

- Provincial level (Provinsi Jawa Tengah): tertiary and supra-regional referral catchment for highly specialised services.
- Municipal level (Kota Semarang/Kedungsepur metropolitan area): primary catchment for secondary and outpatient services.
- Local level (Sub-district of Semarang Selatan, Kelurahan Randusari and immediately adjacent kelurahan): the zone of direct construction-phase impact, where effects such as dust, noise, vibration and traffic re-routing will be most acutely experienced.

5.1 Demographic Profile

5.1.1 Provinsi Jawa Tengah

Based on the 2020 census and subsequent BPS projections, Central Java's population stood at approximately 36.5 million in 2020 and is projected to grow to 38.3 million by 2026 and 43.5 million by 2037. Over the same horizon, the number of persons requiring routine or periodic healthcare (*jumlah penduduk yang sakit*) is expected to rise from 5.30 million (2026) to 6.01 million (2037), driven by both population growth and the ongoing epidemiological transition toward non-communicable diseases in an ageing population. This trajectory reinforces the strategic rationale for expanding RSDK's tertiary-referral capacity.

Table 31 Population and health-demand projections, Provinsi Jawa Tengah

Indicator	2026	2037
Total population (million)	38.3	43.5
Sick population, *jumlah penduduk yang sakit* (million)	5.30	6.01

Source: BPS Jawa Tengah (2023); FS Table 5.2.

5.1.2 Semarang City

Semarang City is the core of the rapidly urbanizing Kedungsepur metropolitan region. According to the BPS publication Strategic Data of Semarang Municipality 2025, the city's population is projected to increase from approximately 2,052,000 in 2025 to 2,091,000 in 2026, a steady growth that

underscores the need for strengthened urban health infrastructure, particularly at RSDK's level of tertiary specialization.

5.1.3 Semarang Selatan District

The project site falls within Kecamatan (District) Semarang Selatan, a centrally located district covering 6.17 km² and comprising ten *kelurahan* (urban village). According to Semarang Selatan District in Figures 2024 (BPS Kota Semarang, 2024), the district recorded a total population of 66,309, with a near-even gender split (49.0% male, 51.0% female) and a high population density of 10,756 persons per km², consistent with its dense urban character. The average household size of 2.74 people is slightly above the national urban average.

The age structure shows a broad-based pyramid, with the 15–19 years cohort being the largest single group (5,289 persons), indicating a predominantly young population with a meaningful proportion of school-age dependents. The age dependency ratio, the ratio of persons aged under 15 and 65 or older to the working-age population (15–64), stands at approximately 38.4%, a moderate level that aligns with Semarang's status as a provincial capital. The predominance of school-age residents warrants particular attention in construction traffic management plans.

Table 32 Key demographic indicators, Sub-district of Semarang Selatan (2024)

Parameter	Value
Total population	66,309
Male / Female	32,476 (49.0%) / 33,833 (51.0%)
Sex ratio (males per 100 females)	95.99
Population density (persons per km²)	10,756
Number of households (*kepala keluarga*)	24,207
Average household size	2.74 persons
Largest age cohort	15–19 years (5,289 persons)
Age dependency ratio	~38.4%

Source: BPS Kota Semarang, Semarang Selatan District in Figures 2024 (2024).

5.1.4 Kelurahan Randusari

Kelurahan Randusari is the largest kelurahan within the district, covering 0.86 km² (approximately 13.88% of the district's total land area). It constitutes the immediate neighborhood of the proposed construction works, and thus the area where community impacts, dust, noise, vibration, temporary traffic disruption, will be most directly felt.

The Regional Population and Civil Registry Data (Semester II, 2024) record a total population of 7,317 persons in Randusari (3,594 males, 49.1%; 3,723 females, 50.9%), yielding a population density of 8,548 persons per km², slightly below the district average, though still indicative of dense urban living conditions.

A particularly notable vulnerability has been identified within the Gunung Brintik sub-area of Randusari, where 28.48% of residents live below the poverty line and the prevalence of undernutrition among children reaches 60% (repository.unar.ac.id, 2025). This concentrated socioeconomic deprivation reinforces the need for targeted environmental health surveillance and community engagement during the construction phase.

5.2 Gender and Vulnerable Groups

Vulnerable groups or individuals are understood as those who, due to factors beyond their control, face two distinct disadvantages: (a) they are more likely to be adversely affected by the environmental and social impacts of the Project; and (b) they are more likely than others to be limited in their ability to access or benefit from the Project's outcomes. Such individuals or groups may also be at greater risk of exclusion from mainstream consultation processes or of being unable to participate fully in them. Accordingly, specific measures, assistance, or both may be required to enable their meaningful engagement (see ESS 1, Section 45, Vulnerable Groups and Discrimination).

Consistent with the requirements of AIIB ESS1, the following vulnerable groups have been identified within the Area of Influence (AoI). Each group requires tailored engagement, disclosure, and mitigation measures throughout the project lifecycle. The ESIA team has determined that particular attention should be given to persons with disabilities, women, children, the elderly, and low-income groups (See Annex E – Gender and Vulnerability Action APlan.

5.2.1 People with Disabilities

According to Regional Population and Civil Registry data for the second semester of 2024, 45 persons with disabilities reside in Sub-district of Semarang Selatan. All consultation processes, public information disclosure, and emergency response planning must incorporate inclusive communication methods. These include, where requested, sign language interpretation, Braille materials, as well as physically accessible pathways and facilities.

Table 33 Persons with disabilities by type, Sub-district of Semarang Selatan (2024)

Disability Type	Number of Persons
Physical disability	9
Blindness	3
Deafness	21
Mental disability	4
Other forms	5
Total	45

Source: Regional Population and Civil Registry Data, Semarang Municipality, Semester II (2024).

Further data from the Semarang City Gender Profile 2025, compiled by the Semarang City Manpower Office (Disnaker), show a steady increase in the number of workers with disabilities between 2019 and 2024.

Table 34 Number of Workers with Disabilities in Semarang City, 2019–2024

No	Description	Year 2019	Year 2020	Year 2021	Year 2022	Year 2023	Year 2024
1	Number of Workers with Disabilities	95	95	188	230	255	298

Source: Semarang City Manpower Office (Disnaker), 2025 – Semarang City Gender Profile 2025.

The upward trend in the table above suggests improving employment opportunities and greater inclusion of people with disabilities in the labor market. Nevertheless, continued efforts are required to strengthen inclusive employment policies and ensure workplace accessibility. The implementation of Universal Design at RSDK Semarang is realized through disability-friendly facilities designed to be accessible to all users without requiring special adaptation.

Key facilities include accessible entrances and pedestrian pathways equipped with wide, gentle ramps and guiding blocks to assist visually impaired users. Dedicated disability parking spaces are located close to the main entrance, and priority seating is provided in waiting areas. Disability-accessible toilets are equipped with grab bars, while elevators include Braille-labeled buttons. In addition, the Medical Rehabilitation Unit is specifically designed based on accessibility principles to ensure barrier-free access for wheelchair users.[2]



Figure 7 Parking spaces designated for people with disabilities



Figure 8 Tactile guiding blocks for the visually impaired

[2] Detail explanation is available at https://www.youtube.com/watch?v=EXIxalKBVAA- RS Kariadi Sahabat Difabel



Figure 9 Female nursing staff conducting patient care rounds in the inpatient ward



Figure 10 Seats designated for people with disabilities



Figure 11 Braille signage is available in elevators



Figure 12 Accessible toilets for persons with disabilities

5.2.2 Women and Gender-Based Violence Risk

Data from Komnas Perempuan, compiled by Databoks/Katadata (2025), indicate that reported gender-based violence (GBV) cases in Central Java reached 42,938 in 2024. This places Central Java third among all Indonesian provinces, after West Java (55,660 cases) and East Java (44,991 cases).

The Ministry of Health of the Republic of Indonesia has integrated considerations of gender-based violence, sexual exploitation and abuse (SEA), and child protection into the national health regulatory framework. These regulations guide health institutions and service providers in preventing, identifying, responding to, and referring cases of violence, particularly those affecting women and children. Relevant regulations include:

- Minister of Health Regulation No. 2 of 2025 on the Implementation of Reproductive Health Efforts, which includes promotive measures to prevent and address domestic and sexual violence.
- Minister of Health Regulation No. 68 of 2013 on the Obligation of Health Service Providers to Provide Information on Suspected Violence Against Children.
- Minister of Health Regulation No. 25 of 2014 on Child Health Efforts, which regulates child health measures, including awareness-raising on the impacts of violence, emergency medical treatment, and referral services for child victims.
- Minister of Health Decree No. 1226/Menkes/SK/XII/2009 on Guidelines for Integrated Services for Victims of Violence against Women and Children in Hospitals.

At the municipal level, Semarang City operates a Women and Children Protection Unit (Unit Pelayanan Perempuan dan Anak, UPPA) within the local police and has launched the “Semarang Zero Violence” prevention campaign. During the construction phase, specific GBV risk factors include the potential influx of temporary male workers and unsafe night-time working conditions. Mitigation measures will comprise the following: a mandatory workforce Code of Conduct explicitly prohibiting harassment; a clearly communicated referral pathway to the UPPA and LBH APIK Semarang (a local legal aid institute for women); well-lit and sex-segregated sanitary facilities on site; and grievance mechanisms accessible to female-headed households and persons with limited mobility.

Table 35 Reported GBV cases, selected provinces, Indonesia (2024)

Province	GBV Cases Reported (2024)	National Rank
West Java (Jawa Barat)	55,660	1st
East Java (Jawa Timur)	44,991	2nd
Central Java (Jawa Tengah)	42,938	3rd

Source: Komnas Perempuan, compiled by Databoks/Katadata (2025).

In addition, the City Government of Semarang publishes an annual Gender Profile to support gender-responsive planning and policymaking. This profile aims to make development in Semarang more equitable and inclusive for all citizens, both women and men. It covers key gender indicators, including

educational attainment, access to health services, labor force participation and unemployment, representation in public and political positions, and cases of gender-based violence, (see https://dp3a.semarangkota.go.id/storage/file/HUYHeQCM20260123024351.pdf).

According to the Semarang City Gender Profile 2025, DP3A Semarang City recorded a total of 335 GBV cases in 2024. Physical violence was the most frequently reported form (120 cases), followed by sexual violence (84 cases), psychological violence (73 cases), and neglect (40 cases). Cases of economic exploitation and trafficking were relatively limited. Overall, the data highlight that women continue to face significant vulnerability to physical, sexual, and psychological violence, particularly in domestic and other gender-based contexts.

Table 36 Types of Violence Experienced by Victims-Semarang City, 2024

Category	Number of Cases
Physical Violence	120
Psychological Violence	73
Sexual Violence	84
Neglect/ *penelantaran*	40
Economic Exploitation	5
Other Violence	13
Trafficking	0
Total	335

Source: DP3A Semarang City data for 2025-- Semarang City Gender Profile 2025

The distribution of GBV cases across sub-districts in Semarang City for 2024 is presented below.

Table 37 The distribution of GBV cases in Semarang City in 2024

Sub District	Male Victims	Female Victims	Total
Mijen	1	13	14
Gunungpati	3	8	11
Banyumanik	0	10	10
Gajah Mungkur	0	11	11
Semarang Selatan	1	9	10
Candisari	0	8	8
Tembalang	7	12	19
Pedurungan	5	26	31
Genuk	0	9	9
Gayamsari	0	15	15
Semarang Timur	5	45	50
Semarang Utara	3	36	39
Semarang Tengah	0	6	6
Semarang Barat	0	12	12
Tugu	1	6	7

Ngaliyan	2	19	21
No ID Card /Spesific Case	*0*	*62*	*62*
Total	28	307	335
Percentage	8%	92%	100%

Source: DP3A Semarang City data for 2025-- Semarang City Gender Profile 2025

As shown in the table, the highest number of violence cases is recorded in East Semarang (50 cases), followed by North Semarang (39 cases) and Pedurungan (31 cases). Ngaliyan (21 cases) and Tembalang (19 cases) also report relatively high figures, while Central Semarang records the lowest number (6 cases). Violence against women is significantly more prevalent than violence against men. According to the Semarang City Gender Profile 2025, the main contributing factors include low legal awareness, patriarchal norms, low economic status or poverty, infidelity, and early marriage.

Handling of GBV cases in Semarang City follows a cross-sectoral approach involving government agencies, the police, and community-based institutions. Case management adopts a victim-centerd approach, including recovery support, legal assistance, and internal investigations where incidents occur within educational institutions. The GBV response system and referral pathway in Semarang include coordinated services among relevant providers, as follows:

- Seruni Integrated Service Center (Pusat Pelayanan Terpadu PPT Seruni): The Semarang City Government operates the Seruni Center under the Women's Empowerment and Child Protection Service (DP3A). It serves as an integrated service center specifically for handling victims of gender-based violence.
- Police Rapid Response (Penanganan Cepat Kepolisian): The Women and Children Protection Unit (PPA) of the Semarang City Police carries out proactive responses and investigations, both on direct reports and on cases that go viral on social media, to prevent psychological impacts and provide initial protection.
- Non-governmental Organisations for Legal Assistance and Counselling: Organisations such as LBH APIK Semarang provide free legal aid, advocacy, and psychological assistance for women and vulnerable groups.
- Campus-Based Handling: Universities in Semarang, such as UIN Walisongo, have established PPKS (Prevention and Handling of Sexual Violence) Task Forces. These bodies handle cases of gender-based violence and sexual harassment internally and also provide assistance to complainants.
- Several emergency channels are available for GBV case handling in Semarang City as follows:
- Semarang City DP3A Services (PPT Seruni): Perlayanan Terpadu Penanganan Kekerasan Terhadap Perempuan dan Anak Berbasis Gender, Jl. Dr. Soetomo 19A Semarang. Tel: (024) 70325200, 3566517.
- LBH APIK Semarang Hotline: 085-641-180-069.

- PPKS / PSGA Task Force at each university (if the complainant is a member of the academic community).
- Channels for reporting intimidation or harassment at RSDK Semarang have been provided through the following complaint reporting link – Ethical Violation Reporting System of Pelaporan Dugaan Pelanggaran Etik RSUP Dr. Kariadi (https://petik.rskariadi.id)

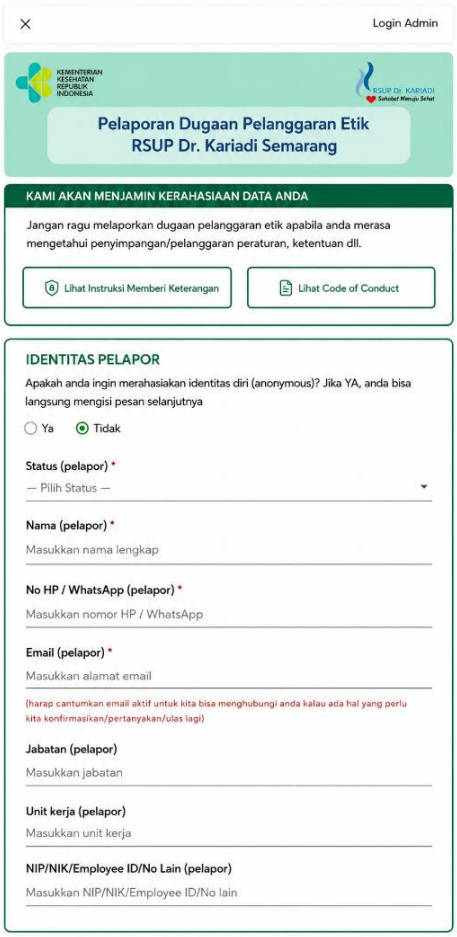


Figure 13 Channels for reporting intimidation

5.2.3 Children, Elderly and Low-Income Households

Children (0–14 years) and elderly residents (60 years and above) are physiologically more susceptible to the construction-phase stressors of air pollution, noise and temporary displacement, and must be explicitly addressed in the Community Health and Safety Management Plan. The documented pockets of poverty and childhood undernutrition in Randusari's Gunung Brintik sub-area further justify the inclusion of targeted health assistance and nutrition awareness activities within the project's community engagement program.

Table 38 Summary of vulnerable groups in the Area of Influence

Vulnerable Group	Key Risk / Exposure	Primary Mitigation Lever
Persons with disabilities (45 identified)	Exclusion from consultation; access barriers	Inclusive disclosure; accessible facilities

Women / female-headed households	GBV risk from worker influx	Code of Conduct; UPPA referral pathway
Children (0–14 years)	Air pollution, noise, traffic hazards, child laborers	Traffic management; health surveillance
Elderly (60+ years)	Air pollution, heat stress, displacement	Health monitoring; priority engagement
Low-income/undernourished households (Gunung Brintik)	Compounded deprivation during construction	Targeted health assistance; grievance access

Source: ESIA team analysis based on BPS, Komnas Perempuan, and repository.unar.ac.id (2025).

In 2024, a total of 273 cases of violence against children were recorded in Semarang City. Girls account for the majority of victims across all districts, particularly in East Semarang (50 cases), North Semarang (39 cases), and Pedurungan (31 cases). Cases involving boys are comparatively lower. These data indicate that girls remain more vulnerable to violence and underscore the need for strengthened child protection measures.

Table 39 Table Cases of Violence Against Children by Subdistrict, Semarang City 2024

Subdistrict	Male victims	Female victim	Total
Mijen	1	13	14
Gunungpati	3	8	11
Banyumanik	0	10	10
Gajah Mungkur	0	11	11
Semarang Selatan	1	9	10
Candisari	0	8	8
Tembalang	7	12	19
Pedurungan	5	26	31
Genuk	0	9	9
Gayamsari	0	15	15
Semarang Timur	5	45	50
Semarang Utara	3	36	39
Semarang Tengah	0	6	6
Semarang Barat	0	12	12
Tugu	1	6	7
Ngaliyan	2	19	21
Total	28	245	273
	0.1	90%	100%

Source: DP3A Semarang City data for 2025-- Semarang City Gender Profile 2025.

In terms of services for vulnerable groups, RSDK Semarang provides care for the elderly, children, and pregnant women as follows:

- Elderly Care (Geriatric Services) Focused on healthcare services aimed at maintaining independence and early detection of degenerative diseases in older adults.

- Geriatric Clinic & Elderly Medical Check-Up (MCU): Located on the Ground Floor of the Prof. Boedhi Darmojo Building.
- Facilities include sarcopenia screening, cognitive assessment (dementia screening), and nutritional consultation.
- Community support is provided through the Kariadi Elderly Club as a support group for older people.

- Maternal Care (Pregnant Women Services)
  - The Obstetrics Clinic provides routine antenatal care, high-risk pregnancy consultations, and family planning services.
  - Advanced technology includes a Zero Fluoroscopy facility (radiation-free), ensuring safer cardiac care for pregnant women.
- Pediatric Services (Children's Care)
  - The Pediatric Clinic provides perinatology services and pediatric inpatient care.
  - Services include nutritional and metabolic care, as well as other pediatric subspecialties.
  - Safety is ensured through low-risk, non-surgical cardiac procedures that are safe and radiation-free for children.

In addition, RS Kariadi also provides emergency services for the public through contact points for referral and transport support for patients:

- Emergency Department (IGD) Hotline & Call Center: 1500 202
- Ambulance Service: (024) 8413476

5.3 Education

The educational profile of Sub-district of Semarang Selatan is relevant to the ESIA for two reasons: first, the concentration of school-age children in the district creates specific traffic safety and noise-exposure considerations during the construction phase; and second, the level of educational attainment in the community shapes the design and accessibility of project disclosure and consultation materials. Based on the 2024 Village Potential Data (Podes), the district has well-developed and broadly distributed educational facilities, spanning early childhood through higher education.

5.3.1 Literacy Rate

Literacy is a key indicator of empowerment and access to education and information. Gender gaps in literacy reflect broader inequalities across sectors such as employment, politics, and health.

According to *Semarang Satu Data* (Education Office), the literacy rate for the population aged 15 years and above increased slightly from 99.80% in 2023 to 99.90% in 2024. Disaggregated data by sex, available from the latest published source (2022), are presented below.

Table 40 Disaggregated data of Literacy Rate by sex

Age Group	Male	Female	Total
15–24 years	100%	100%	100%
25–44 years	100%	99.77%	99.77%
45+ years	99.77%	97.00%	97.00%
Average	98.78%	98.78%	98.78%

Source: Department of Education (Disdik), Semarang One Data Portal, 2025. Semarang City Gender Profile 2025

The literacy rate in Semarang City is generally high for both males and females across all age groups. Full literacy (100%) has been achieved among the 15–24 age group for both genders, indicating equal access to basic education for younger generations. However, a slight gender gap remains among older age groups, particularly those aged 45 years and above, where female literacy rates (97.00%) are lower than male rates (99.77%). This suggests that older women had relatively more limited access to education in the past.

5.3.2 Educational Facility Coverage

All ten kelurahan in the district have at least one kindergarten (TK) and elementary school (SD), representing full spatial coverage at the foundational levels. Secondary and tertiary facilities are more concentrated: junior high schools (SMP) are present in six kelurahan, senior high schools (SMA) in four, and vocational high schools (SMK) in five. Islamic equivalents (RA, MI, MTs, MA) are distributed across one to four kelurahan depending on level. Academies and universities are present in four kelurahan, reflecting the significant higher-education presence anchored by Universitas Diponegoro and its associated institutions.

Table 41 Educational facility coverage by type, Sub-district of Semarang Selatan (2024)

Education Level	Facility Type	Kelurahan with Facility
Early childhood	Kindergarten (TK)	10 of 10 (100%)
Early childhood, Islamic	Raudatul Athfal (RA)	4 of 10
Primary	Elementary School (SD)	10 of 10 (100%)
Primary, Islamic	Madrasah Ibtidaiyah (MI)	1 of 10
Lower secondary	Junior High School (SMP)	6 of 10
Lower secondary, Islamic	Madrasah Tsanawiyah (MTs)	1 of 10
Upper secondary	Senior High School (SMA)	4 of 10
Upper secondary, vocational	Vocational High School (SMK)	5 of 10
Upper secondary, Islamic	Madrasah Aliyah (MA)	1 of 10
Tertiary	Academy / University	4 of 10

Source: BPS Kota Semarang, Village Potential Data (Podes) 2024.

5.3.3 School Enrolment and Staffing

School enrolment data for 2024/2025 confirm the district's status as a significant center of formal education. At the primary level, 29 SD schools (14 public, 15 private) serve a combined 6,594 students, supported by 387 teachers. The roughly equal split between public and private provision indicates a degree of parental choice and socioeconomic diversity in educational access. At the secondary level, student numbers are notably highest in the vocational pathway: 7 SMK schools enroll 7,984 students, the largest single secondary cohort, reflecting strong demand for technical and vocational training in the city's services economy.

The concentration of approximately 24,908 primary and secondary students in the district is directly relevant to construction traffic management. Pedestrian routes between residential areas and schools on and around Jl. Dr. Sutomo and Jl. Dr. Kariadi must be maintained safely throughout the construction period, with particular attention to school start and end times.

Table 42 School enrolment and staffing, Sub-district of Semarang Selatan (2024/2025)

Level	Total Schools	Public / Private	Total Students	Total Teachers
SD (Primary)	29	14 public / 15 private	6,594	387
SMP (Lower secondary)	10	6 public / 4 private	5,703	303
SMA (Upper secondary)	5	—	4,627	246
SMK (Vocational)	7	—	7,984	419
Total	51	—	24,908	1,355

Source: BPS Kota Semarang, Semarang Selatan District in Figures 2024/2025.

5.4 Workforce and Employment

The analysis draws on provincial labor market data from BPS and the employment profile of RSDK itself as the district's principal institutional employer.

5.4.1 Provincial Labor Market Conditions

At the provincial level, Central Java's labor market showed steady improvement in 2024–2025. The open unemployment rate (*Tingkat Pengangguran Terbuka*, TPT) declined from 4.78% in 2024 to 4.32% in 2025, while the poverty rate fell from 9.58% to 9.39% over the same period. Provincial economic growth reached 5.37% above the national average, reflecting continued momentum in the manufacturing, trade and services sectors that anchor Semarang's metropolitan economy. These conditions suggest a labor market that is moderately tight, with a skilled and semi-skilled workforce available for mobilization, though at competitive wage rates.

Table 43 Key labor market and economic indicators, Provinsi Jawa Tengah (2024–2025)

Indicator	2024	2025
Open unemployment rate (TPT)	4.78%	4.32%
Provincial poverty rate	9.58%	9.39%
Provincial economic growth	—	5.37% (above national average)

Source: BPS Provinsi Jawa Tengah (2025).

5.4.2 RSDK as a Major Local Employer

Within Sub-district of Semarang Selatan, RSDK is by far the largest single employer. The hospital employs approximately 3,000 people across clinical, administrative and support functions. The clinical workforce includes 227 medical doctors, 1,668 nurses, 83 midwives, 231 pharmacy workers and 283 technical-medical staff; academic and research personnel account for a further 247 positions. This workforce generates substantial secondary economic activity in the surrounding area, including demand for food vendors, parking services, transportation providers and small retail operators along Jl. Dr. Sutomo and Jl. Dr. Kariadi.

Beyond formal employment, the hospital complex supports a dense informal economy of street vendors, *ojek* and *becak* operators, and parking attendants whose livelihoods depend directly on the daily flow of RSDK's staff, patients, caregivers and visitors. This informal employment base is particularly sensitive to any construction-phase disruption to access routes or footfall and will be monitored through the project's Livelihood Impact Monitoring Program.

Table 44 RSDK workforce composition (2024)

Staff Category	Number of Personnel
Medical doctors	227
Nurses	1,668
Midwives	83
Pharmacy workers	231
Technical medical staff	283
Academic and research personnel	247
Other support staff	~261
Total (approximate)	~3,000

Source: RSDK Human Resources Directorate (2024).

5.4.3 The Health Sector Workforce in Semarang City

The health sector workforce in Semarang City is predominantly female, especially among midwives, nurses, nutritionists, pharmacists, and dentists. Midwifery services are entirely staffed by women, while female workers also dominate community and primary healthcare roles. Although male participation increased in several professions in 2024, gender-based occupational patterns in the health sector remain evident

Table 45 Sex-Disaggregated Health Sector Workforce in Semarang City 2025

No	Health Workers	2023			2024		
		Male	Female	Total	Male	Female	Total
1	Specialist Doctors	3	3	6	2	3	5
2	General Practitioners	26	110	136	38	145	183
3	Specialist Dentists	-	-	-	-	-	-
4	Dentists	2	28	30	4	69	73
5	Nurses	72	290	362	176	529	702
6	Midwives	0	176	176	0	371	371
7	Pharmacists	2	25	27	5	83	88
8	Pharmacy Technicians	-	-	-	-	-	-
9	Public Health Personnel	-	-	-	-	-	-
10	Sanitarians	4	25	29	9	45	54
11	Nutritionists	3	41	44	4	93	97

Source: Dinas Kesehatan Kota Semarang, 2025 - Semarang City Gender Profile 2025

The table below shows the gender-disaggregated composition of employees at Dr. Kariadi Hospital, Semarang (2025)

Table 46 The gender-disaggregated composition of employees at Dr. Kariadi Hospital-2025

Category	Female		Male		Total
	Female	%	Male	%	
Total Permanent Employees	3,864	61.83%	2,385	38.17%	6,249
Contract Staff	90	64.29%	50	35.71%	140
Total	3,954	61.88%	2,435	38.11%	6,389

Source: Dr. Kariadi Hospital, Semarang (2025)

The gender distribution of employees in RS Karyadi shows that female staff dominate the workforce, accounting for 61.83% (3,864 employees), while male staff account for 38.17% (2,385 employees). This indicates a significant representation of women in the workforce and highlights the important role of female employees across institutional functions. For contract staff, there are 90 female employees and 50 male employees out of a total of 140 employees, indicating that women represent the majority of contract staff.

5.5 Economy and Livelihoods

The local economy around the RSDK is anchored by the hospital and Universitas Diponegoro, which together sustain demand for retail, food and services along Jl. Dr. Sutomo and Jl. Dr. Kariadi. This subsection profiles that economy, identifies the food and trade vendors most closely tied to the hospital, and assesses how the demolition and construction works will affect their livelihoods.

5.5.1 Economic Structure and the Hospital Anchor

As Central Java's principal national-referral teaching hospital, RSDK functions as a significant economic hub. It operates 24 polyclinics and generates a continuous daily flow of patients, caregivers, suppliers and staff that sustains a broad secondary economy in the surrounding neighborhood. Universitas Diponegoro amplifies this effect by concentrating on a large student and faculty population nearby. The district's economic character is therefore predominantly services-oriented, combining a relatively skilled, formally employed resident population with a substantial informal sector tied to these two institutional anchors.

Real per capita expenditure in Semarang City is lower for women (IDR 15.75 million/year) than for men (IDR 18.18 million/year), reflecting lower labour-force participation and a higher share of informal-sector work. This gender pattern is relevant to the IGD-building canteen, which is operated entirely by women and represents the primary income of those households.

Table 47 Real Per Capita Expenditure by Gender- Semarang City 2024

City	Real Per Capita Expenditure (Thousand Rupiah) – Male	Real Per Capita Expenditure (Thousand Rupiah) – Female
Semarang City	18,175	15,750

Source: Semarang City Gender Profile 2025

5.5.2 Food and Street Vendors in Project Environs

The hospital's food-service landscape has two distinct components: formal tenant vendors operating inside the hospital complex, and informal street vendors (*Pedagang Kaki Lima*/PKL) on the public pavements outside the perimeter fence. Together they serve the daily needs of approximately 3,200 staff and over 2,100 outpatients and visitors. Following the public consultation of 12 June 2026, the Director's briefing of 15 July 2026, and the canteen field survey of 30 July 2026, the internal tenants affected by the project fall into two groups:

- Two canteen operators in the IGD and Elang buildings, which lie within the eventual demolition footprint of those buildings; and
- Five canteen operators in the Gedung Korpri canteen building, which the hospital now confirms as an additional affected structure to be redeveloped (and no longer used for canteens).

The Gedung Korpri canteen building, formerly managed by KORPRI and now by RSDK under a cooperation agreement, contains seven units of about 3×3 m each: six let as canteen spaces and one used as a shared public washbasin. Of the six canteen units, five are currently occupied and one is vacant and locked. Each unit is let at IDR 35 million per year under an agreement renewed every December. All six canteen units are to be relocated ahead of demolition; the five current operators are the affected persons, and the sixth (vacant) unit has no present tenant.

Together these constitute seven internal canteen tenants requiring active livelihood management under AIIB ESS2. All other internal tenants, Kantin Sehat, Indomaret Point, and the cluster of food

kiosks in the rear parking yard, lie outside the demolition and construction footprint and continue normal operation throughout the project; they require operational coordination only, not livelihood restoration. The external PKL are addressed separately in Section 5.6.6.

5.5.3 Affected-Population Scope and the ESS2 Mitigation Hierarchy

The governing objective under AIIB ESS2 is to avoid involuntary resettlement and economic displacement wherever feasible and, where displacement cannot be avoided, to restore or improve the livelihoods of affected persons. For the seven affected canteen operators, the project applies the mitigation hierarchy at the design stage: it seeks to **avoid** any trading gap or loss of livelihood by sequencing the works so that permanent replacement trading spaces are ready, and operators are relocated into them, before the buildings they currently occupy are demolished. Whether this avoidance outcome is fully realised depends, in the case of the five Gedung Korpri operators, on a management decision that RSDK has yet to take. That decision, and its safeguards consequences, are the subject of Section 5.5.5.

5.5.4 Canteen Tenants in the IGD and Elang Buildings, Phased Relocation (Avoidance Achieved)

Two canteens, one in the IGD building and one in the Elang building, fall within the demolition footprint of those structures. The project is sequenced to prevent any interruption to their operations. The Gedung Medical Sentral & Diagnostic Centre (GMS-DC) is constructed first, on the current surface parking area, without disturbing either canteen. Once GMS-DC is commissioned, both operators are relocated directly into permanent trading spaces of equivalent or improved quality within the new building. The IGD and Elang buildings are demolished only after the operators have successfully transferred.

The relocation arrangement provides for permanent replacement premises ready before the operators are required to vacate; reimbursement of any capital improvements at the original premises not replicated in the new space; reasonable transition support, including moving costs, fit-out time and wayfinding signage for hospital users; and trading terms no less favourable than those enjoyed at the original premises. Because the transfer occurs only after GMS-DC is operational, there is no temporary closure and no income loss requiring formal compensation. The IGD-building canteen is operated by three women under Dharma Wanita Persatuan RSDK and constitutes their principal source of household income; although the operator is not classified as a vulnerable affected household, the gender composition warrants priority placement and tailored relocation support under the project's Gender Action Plan. Under ESS2, this arrangement realises the Avoid step of the mitigation hierarchy at the design stage, and the impact is carried into the impact matrix as entry B.5.1a at Minor pre-mitigation significance, reducing to Negligible after mitigation.

5.5.5 Canteen Tenants in Gedung Korpri, Relocation or Non-Renewal: A Management Decision with ESS2 Consequences

Five canteen operators trade within Gedung Korpri under annual tenancy agreements running from January to December. Demolition is planned for 2027, with no firm date yet set , and the current tenancy agreements therefore fall due for a renewal decision in the ordinary course. At the time of writing, RSDK management has not yet determined whether it will (a) offer these five operators continued tenancy in replacement premises within the complex, or (b) allow their agreements to lapse without renewal ahead of demolition. Because the two courses of action carry materially different obligations under AIIB ESS2, the ESIA sets out both pathways transparently and records the project's recommendation.

The five Gedung Korpri operators differ in an important respect from the IGD and Elang canteens: they trade inside a fingerprint-access-controlled zone and can therefore serve only hospital employees, not the general patient-and-visitor public. Their customer base is effectively the hospital's [≈3,200] staff, which makes the economic value of any replacement location dependent on retaining comparable staff footfall. Their profiles are summarised in Table 48.

Table 48 Inventory of Gedung Korpri Canteen Operators (affected under Pathway B)

No.	Operator (owner, age)	Food	Reported gross turnover (30 Jul 2026)	Rent/yr	Notes
1	Kantin Sehat "Manfaat Berkah", Bu Emi (F, 57)	Padang cuisine & fish	≈ IDR 2M/day (≈ IDR 9M/week incl. online)	IDR 35M	Since 2021; Halal certificate; 3 helpers (2 women + husband); primary household income
2	Kantin Gado-Gado, Ibu Putri Hasini "Bu Yuli" (F, 61)	Gado-gado	≈ IDR 300k/day (lowest in group)	IDR 35M	Since 2009; works alone; requests lower rent / monthly payment
3	Warung Bu Ning, Ibu Supriyaningsih (F, 44)	Nasi rames; drinks & juices	≈ IDR 2M/day (net ≈ IDR 0.8M/day)	IDR 35M	Since 2023; works alone; female head of household; took over when prior tenant's lease was not renewed; reports recurrent water outages
4	Warung Bu Retno (F, 61)	[not recorded]	[not recorded]	IDR 35M	Since 2019 (paused during COVID; resumed 2023); breadwinner; husband post-stroke; child at university; requests monthly rent instalments
5	Kantin Bakso Salatiga, Bu Wuri	Bakso	[closed at survey, no data]	IDR 35M	Closed for two days on 30 Jul 2026; re-survey required
—	(vacant canteen unit)	—	—	IDR 35M	Unit let-able but currently vacant and locked; no present tenant
—	(shared washbasin unit)	—	—	—	Not a canteen; public washbasin facility

Source: RSDK tenancy records and ESIA field data [confirm dates]. Income figures are as reported and to be verified and expressed as net income during the pre-construction census.

Vulnerability and gender findings (survey)

The survey identified significant vulnerability among both operators and their employees, reinforcing the Gender Action Plan and the ESS2 requirement for special attention to vulnerable persons. Several operators are older women and sole household breadwinners: Bu Retno (61) supports a husband recovering from a stroke and a child at university; Bu Ning (44) is a female head of household with a dependent child; and Ibu Putri (61) trades alone. Manfaat Berkah additionally employs two women who are themselves vulnerable, one the breadwinner for a recently laid-off husband and a school-age child, the other a widow with a young child living in rented accommodation. The canteen's continuity therefore affects these employees' livelihoods as well. Any relocation or restoration must give priority to the women-operated stalls and to the employees dependent on them, and the pre-construction census must record employee as well as operator livelihoods.

Baseline interviews, disclosure and cut-off

The 30 July 2026 baseline interviews were conducted without disclosing the relocation proposal, because neither its timing nor its final location had been decided and premature disclosure, while replacement premises are not yet prepared, risked causing avoidable anxiety among the operators. Formal, meaningful consultation and disclosure on the relocation (timing, location and terms) will be undertaken by RSDK once these are confirmed, as required under ESS1 and ESS2. Because the tenancies are renewed each December and some 2026 operators may not continue into 2027, the cut-off date and eligibility criteria in any relocation or restoration instrument must be fixed by reference to the operators trading at the confirmed cut-off, and communicated clearly to avoid disputes.

The annual form of the tenancy does not, by itself, remove these operators from the scope of ESS2. Under the AIIB ESF, economic displacement is defined by the loss of access to a livelihood source arising from a project, not by the legal form or the duration of the occupancy right. Where the non-renewal of a lease is driven by the project's own demolition programme, rather than by a tenant's commercial decision or a pre-existing performance or compliance issue, the resulting loss of livelihood is properly characterised as project-induced and involuntary. It follows that RSDK cannot treat the natural expiry of an annual agreement as a means of placing these operators outside the standard: the timing of the demolition, not the calendar of the lease, is the operative cause of the loss. This is the central point on which the pathway analysis turns.

Pathway A, Relocation with tenancy continuity (recommended; achieves Avoidance). Under this pathway, RSDK offers each of the five operators a replacement trading space within the complex, for example, within GMS-DC or another suitable location, on terms no less favourable than their current agreements, with the transfer sequenced to occur before Gedung Korpri is demolished. Operators who accept do so voluntarily and experience no trading gap; operators who decline receive a reasonable transition allowance and adequate notice. This pathway keeps the project within the *Avoid* step of the mitigation hierarchy, mirrors the treatment of the IGD and Elang canteens, imposes no formal compensation liability, and preserves continuity of affordable food services for hospital users. It is the course the ESIA recommends. Two candidate replacement locations have been identified

within the RSDK complex, and their economic equivalence, not merely their physical adequacy, governs whether relocation truly avoids displacement:

- Option 1, the former KFC premises (ex-KFC). Located about 15 m from the canteen building and, critically, outside the fingerprint-controlled zone, no fingerprint access is required to reach it. The short distance and open access mean operators would retain their staff customers and regain access to the visitor market they currently cannot serve, so trading conditions here could improve on the present position, not merely match it, a livelihood-improvement opportunity consistent with the ESS2 objective.

- Option 2, the plot beside the Record Center building (parking area 22). About 150 m from the canteen building, at the rear of the complex, and assessed as less commercially promising: the greater distance and lower footfall would likely reduce turnover below current levels.

Because ESS2 requires terms no less favourable than at present, and because the fingerprint constraint makes proximity to, and openness of, customer traffic the decisive economic variable, the ESIA recommends Option 1 (ex-KFC) as the preferred site. If Option 2 is selected for operational reasons, the residual reduction in earnings must be assessed and addressed through additional livelihood-restoration support, so that operators' incomes are not left below their pre-relocation baseline; in that event the arrangement moves from pure Avoidance toward a partial-restoration case.

Effect on valuation (Pathway B). Should RSDK instead allow the tenancies to lapse, the transition allowance under §7–8 of the Livelihood Restoration Plan is calculated from **net** income. The reported gross figures above (IDR 2–3 million per month for four operators, ≈ IDR 500,000 for Warung Gado-Gado) are therefore starting points only; the census must establish each operator's net income after the IDR 35 million annual tenancy fee and other costs, so that entitlements reflect actual livelihood value rather than headline turnover.

Pathway B, Non-renewal ahead of demolition (triggers ESS2 economic displacement). Under this pathway, RSDK declines to renew the agreements, and the five operators must cease trading when their current agreements expire. Because the loss of livelihood is project-induced and involuntary, ESS2 is triggered and RSDK assumes a livelihood-restoration obligation. This does not require the acquisition of land, but it does require the preparation of a proportionate Livelihood Restoration Plan (LRP), prepared in the form of an abbreviated Resettlement Action Plan given the small number of affected operators, and submitted to AIIB for no-objection before any non-renewal is announced or acted upon. Such a plan would provide, at minimum: a socio-economic census and baseline for the five operators; transition assistance calibrated to documented net earnings; support in re-establishing the business elsewhere, including, where appropriate, skills training, micro-finance linkage and assistance with staff re-employment; particular attention to any women-operated or otherwise vulnerable households; and monitoring of livelihood outcomes against the baseline until restoration is verified.

The two pathways are compared below.

Table 49 Comparison of ESS2 Pathways for the Gedung Korpri Canteen Operators: Relocation (Pathway A) versus Non-Renewal (Pathway B)

Consideration	Pathway A, Relocation (recommended)	Pathway B, Non-renewal
ESS2 status	Avoidance achieved	Economic displacement triggered
Formal compensation	Not required	Required (livelihood restoration)
AIIB instrument	Documented in ESMP; no separate LRP	Abbreviated RAP / LRP requiring AIIB no-objection
Trading gap for operators	None	Yes, unless mitigated by the LRP
Continuity of hospital food service	Preserved	Interrupted
Timeline risk to project	Low	Adds an estimated 3–4 months for LRP preparation and review
Reputational exposure	Low	Elevated (project-financed displacement of small operators)

Recommendation and decision requirement.

The ESIA recommends Pathway A. It is consistent with the avoidance-first logic already applied to the IGD and Elang canteens, it avoids compensation liability and schedule risk, and it protects a food-service function on which patients' families and lower-wage staff depend. RSDK management is nonetheless free to elect Pathway B for legitimate operational reasons; if it does, the associated ESS2 obligations are mandatory and are not discharged by the expiry of the annual agreements. To keep the project's options open and its compliance intact, the ESIA sets the following requirements:

- RSDK shall record a formal decision on the treatment of the five Gedung Korpri operators by [**confirm: decision deadline, recommended Q4 2026, ahead of the January renewal cycle**], and shall disclose that decision to AIIB.
- The affected operators shall receive written notice of the decision no less than six months before they are required to vacate.
- The demolition of Gedung Korpri shall be subject to a **stop-work trigger**: no demolition works may commence until either (i) all five operators have been relocated under Pathway A and the relocation verified, or (ii) an LRP under Pathway B has received AIIB no-objection and its pre-demolition provisions have been implemented. This trigger is embedded in the C-ESMP and mirrors the demolition-clearance mechanism established for the IGD and Elang canteens.

Pending the decision, this impact is carried into the impact matrix as entry **B.5.1b**. Because the pre-mitigation significance depends on the pathway chosen, it is recorded as **Moderate–Major (pathway-dependent)** pre-mitigation, reducing to **Negligible** under Pathway A or to **Minor** under a fully

implemented Pathway B LRP. A pre-construction census covering all seven internal canteen operators, and the employees dependent on them, will document their pre-relocation baseline, confirm acceptance of replacement trading terms, flag any vulnerability requiring tailored support, and provide a verifiable record for the Grievance Redress Mechanism.The following Figures show tenant activities in the RSKD complex.



Figure 14 Existing Canteen Area inside the IGD Building of RSDK



Figure 15 A tenant at the "Warung Bu Ning" cafeteria



Figure 16 Existing Canteen Area Inside the Korpri Building



Figure 17 The canteen in the Korpri Building, as seen from the outside



Figure 18 Interview with the Cafeteria Managers on 30 July 2026



Figure 19 Unleased Canteen Unit

5.5.6 External Street Vendors (PKL)

An estimated 40–45 street vendors (or PKL) have operated semi-permanently for decades, with further vendors along Jl. Menteri Supeno to the south. They sell affordable snacks and light meals to patients' families, visitors and lower-wage staff, demand that is essentially continuous given the hospital's 24-hour operations. The cluster divides into a southern segment, further from the fence, and a northern segment directly adjacent to it.

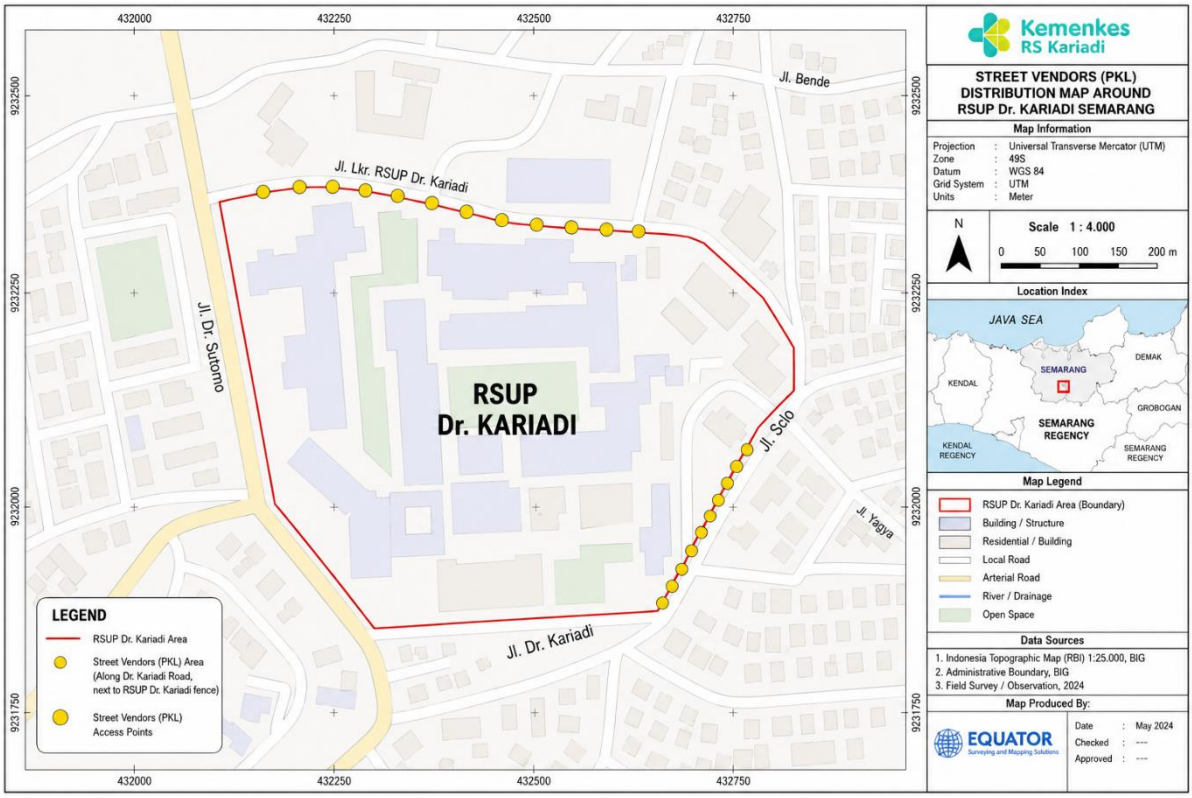


Figure 20 Location of Street Vendors (PKL) area

RSDK confirmed at the public consultation on 12 June 2026 that the project will not relocate these street vendors, either temporarily nor permanently, because they do not interfere with the preparation, construction, or operation of the project. PKL are therefore not project-affected persons under AIIB ESS2. They remain regulated by the Semarang City Government under Regional Regulation No. 3/2018, and their management lies outside RSDK's authority.

The vendors' persistence is structurally rooted in economic logic: so long as the hospital generates high visitor volumes, the pull factor for vendors will persist regardless of enforcement cycles. Indonesian research on PKL relocation consistently finds that the principal post-relocation risk is the loss of customer volume, with income, consumer relationships and poverty risk being the main dimensions of vulnerability, a pattern directly applicable to the PKL Kariadi community, whose livelihood depends on proximity to the hospital's pedestrian flows.

Because these vendors occupy municipal land rather than hospital property, their management lies outside RSDK's direct authority and requires coordination across Satpol PP, Dinas Perdagangan,

Distaru and the sub-district administration. For this ESIA, this means that any measures targeting the PKL, alternative trading locations, sanitation, or waste collection, must be developed with the Semarang City Government as the primary responsible authority, with RSDK in a supporting and advocacy role.



Figure 21 Street Vendors along the Public Sidewalk of Lingkar RSUP dr. Kariadi Street

5.5.7 Construction-Phase Impacts on Vendor Livelihoods

Following the 12 June 2026 public consultation, interview on 30 July 2026, and the project's phased construction design, the affected-population scope for this subchapter is:

- Two internal canteen tenants (IGD and Elang buildings), relocated directly into permanent trading spaces in GMS-DC at the end of Phase 1, before any demolition of the IGD or Elang buildings. No trading gap occurs. Assessed under AIIB ESS2 as a phased-relocation arrangement; avoidance step of the mitigation hierarchy is realised at the design stage.
- Five internal canteen operators in Korpri Building are affected due to the Korpri Building will be demolished. The management of RSDK still consider the alternative of relacation or Non-renewal ahead of demolition.
- All other internal tenants, not displaced; operational coordination only.
- External PKL (≈ 40–45 vendors), not displaced; residual environmental nuisance only, assessed under AIIB ESS1.

(a) Tenants (Internal Vendors), Direct Displacement (seven canteens)

Two canteens, one in the IGD building and one in the Elang building, fall within the eventual demolition footprint of the IGD and Elang buildings (Phase 3). The project is sequenced to avoid any trading gap for these operators. GMS-DC is constructed first, on the current surface parking area, without affecting either canteen. Once GMS-DC is commissioned, both canteen operators are relocated directly into permanent commercial area within the new building. The IGD and Elang buildings are

demolished only after the canteens have successfully been transferred. No other internal tenant is displaced.

The six canteens and food kiosks in the rear parking yard will continue normal operations in their current sites. While their activities require operational coordination—such as advance notice, access routing, and dust/noise control—due to the yard's use for heavy equipment staging, they do not require livelihood restoration.

The relocation arrangement provides for: (i) permanent trading spaces of equivalent or improved quality within GMS-DC, ready before the operators are required to vacate their existing premises; (ii) reimbursement of any capital improvements at the original premises that are not replicated in the new space; (iii) reasonable transition support (moving costs, fit-out time, signage and orientation for hospital users to locate the new spaces); and (iv) trading terms in GMS-DC no less favourable than at the original premises. Under AIIB ESS2, this arrangement achieves avoidance of economic displacement at the design stage: the operators move directly to permanent spaces in GMS-DC with no trading gap and no income loss, as the new space is ready and accepted before vacation occurs.

The IGD-building canteen is operated by three women under Dharma Wanita Persatuan RSDK; this canteen is their principal source of household income. The interview of 3 June 2026 indicates the operator is not classified as a vulnerable affected household; however, the gender composition warrants priority placement and tailored relocation support in the new GMS-DC space, under the project's Gender Action Plan. The Elang-building canteen operator profile is to be confirmed through the pre-construction census.

The mitigation approach follows the Avoid → Minimise → Restore → Offset hierarchy. Avoidance is achieved at the design stage through the construction sequence: GMS-DC is built first on the current parking area; both canteens are transferred to permanent spaces in GMS-DC before any demolition begins and new building is ready; and the IGD and Elang buildings are then demolished only after the relocation is complete. Minimisation is achieved by siting the new spaces for equivalent or improved footfall and by providing transition support. Restoration and Offset are not required because the design sequence ensures no trading gap or income shortfall. The impact is recorded in the impact matrix as entry B.5.1a at Minor pre-mitigation significance, reducing to Negligible post-mitigation. Monthly check-ins with both operators through the GRM verify that relocated trading is performing at the pre-relocation level; in the unlikely event of an income shortfall attributable to the relocation, the project remains responsible for a corrective response under the ESS2 monitoring obligation.

(b) External Street Vendors (or PKL) Indirect Revenue Loss

The estimated 40–45 PKL on the pavement along Jl. Dr. Sutomo and Jl. Dr. Kariadi are not subject to AIIB ESS2 on Land Acquisition and Involuntary Resettlement because: (i) their pitches lie outside the project boundary and are not physically displaced; and (ii) RSDK management confirmed during the public consultation on 12 June 2026 that no relocation of external street vendors—temporary or permanent—will occur during construction phases 1 and 2 or the operational phase. Consequently, ESS2 does not apply.

PKL operating in immediate proximity to demolition and pilling activities are, however, exposed to indirect environmental nuisance during the construction phase through three mechanisms: (i) elevated noise levels from demolition and piling activities; (ii) increased fugitive dust from earthworks and material handling; and (iii) localised traffic congestion from construction vehicle movements and temporary lane restrictions along Jl. Dr. Kariadi.

Commute access for pedestrians and vehicles is maintained throughout construction under the Hospital Operational Continuity Protocol (HOCP) and the Traffic Management Plan: lanes remain open along Jl. Dr. Kariadi and Jl. Dr. Sutomo during peak hospital operating hours, ensuring PKL and their customers can continuously reach the area. This preservation of access addresses potential ESS2 concerns related to business disruption.

Access preservation does not, however, eliminate residual noise, dust, and localised congestion—these are direct consequences of demolition and piling activities themselves, not of access restrictions, and are therefore assessed under AIIB ESS1 rather than ESS2.

These residual effects are assessed under AIIB ESS1 as entry B.5.1b at Minor pre-mitigation significance, indirect environmental pathway, low magnitude, local scale, temporary and reversible duration. Mitigation includes dust suppression, noise and vibration controls during sensitive hours, traffic coordination through the Andalalin Traffic Management Plan, advance notice of significant works, and a dedicated GRM point of contact for vendors.

(c) Positive Construction-Phase Effects

The project also generates positive effects on the local economy:

- *Phased construction sequencing*. By building GMS-DC first on the current parking area and relocating the two affected canteens to permanent spaces in the new building before any demolition begins, the project design itself avoids economic displacement of the two internal-tenant operators. This is a design-stage application of the AIIB ESS2 Avoidance principle and the strongest form of livelihood protection available for an in-situ redevelopment.
- *Local employment***.** Under the contractor's local-hiring clause, unskilled and semi-skilled positions are prioritised for residents of Semarang Selatan Sub-district and adjacent kelurahan. Indicative workforce: ≈ 200–400 persons at peak.
- *Local procurement***.** Materials and services are sourced locally under a contractor local-procurement policy, supporting suppliers and service providers in the project environs.
- *Workforce-induced demand***.** The concentrated construction workforce generates sustained daily demand for food, beverages and other low-value goods. This benefit accrues directly to the same PKL who continue trading along Jl. Dr. Kariadi and Jl. Menteri Supeno, and partly offsets any residual environmental nuisance described in subsection (b).
- *Operational-phase uplift***.** Once the GMS-DC & SoE buildings are commissioned, the additional 852 inpatient beds and expanded outpatient capacity will increase daily footfall through the complex, producing a structural, long-term increase in demand for food and retail services in the

project environs. This long-term positive effect benefits both internal tenants (in the re-allocated trading spaces) and external PKL .

Table** 50 **Summary of Construction-Phase Economic Effects on Vendors Summary of Construction-Phase Economic Effects on Vendors

Effect	Affected group	Significance	Key management measure
Phased relocation to new GMS-DC (no trading gap)	Two internal tenants (IGD; Elang)	Adverse —Minor pre-mitigation; Negligible residual (B.5.1a)	Phased construction sequence: GMS-DC built first on current parking area; canteens transferred to permanent GMS-DC trading space before any demolition; trading terms not less favourable; transition support; GRM check-ins (ESS2 Avoidance)
Operational coordination (not displacement)	Six rear-yard canteens/kiosks (continuing operation)	*Not a livelihood impact*	HOCP coordination; advance notice; access routing; dust and noise control during sensitive hours
Environmental nuisance (noise, dust, traffic congestion)	≈ 40–45 external PKL	Adverse, Minor (B.5.1b)	Dust suppression; noise management; Andalalin traffic plan; maintained pedestrian access; signage; advance notice; GRM
Phased-construction Avoidance (NEW)	Two internal canteen tenants (IGD; Elang)	Positive, design-stage	ESS2 Avoidance achieved by construction sequencing; documented in the project Construction Phasing Plan
Local labor demand	Unskilled / semi-skilled residents	Positive	Local-hiring preference clause in contractor contract
Local supply-chain demand	Material suppliers, service providers	Positive	Local procurement policy; supplier register
Workforce food demand	Vendors and micro-businesses nearby	Positive	Maintain vendor access where safe; coordinate with GRM
Operational-phase footfall uplift	Both internal tenants (re-allocated trading space) and external PKL	Positive, long-term	852 additional beds and expanded outpatient capacity increase structural daily footfall in the project environs

Source: ESIA team analysis (2026). Significance ratings cross-reference the Impact and Risk Matrix in Chapter 6.

5.5.8 Summary of ESS2 Application

The livelihood dimension of the project is fully addressed through the mitigation hierarchy. The two IGD/Elang canteen operators are relocated with no trading gap, achieving avoidance at the design stage (B.5.1a). The five Gedung Korpri operators are the subject of a pending management decision: the ESIA recommends relocation with tenancy continuity, which likewise achieves avoidance, and provides that any decision to allow the agreements to lapse ahead of demolition will trigger ESS2 economic-displacement obligations and a corresponding Livelihood Restoration Plan requiring AIIB

no-objection (B.5.1b). The external PKL are not displaced and are managed under ESS1 for environmental nuisance only. A single pre-construction census covering all seven internal operators underpins these arrangements, and the demolition of both the IGD/Elang buildings and Gedung Korpri is gated by stop-work triggers that prevent any demolition from proceeding until the operators' livelihood position has been secured.

5.6 Cultural Heritage Setting

The existing heritage setting is characterized by the juxtaposition of colonial-era architecture and contemporary medical infrastructure within a dense and continuously evolving urban hospital compound. Progressive expansion of hospital facilities over several decades has altered portions of the original historic spatial composition and reduced physical separation between historic and modern structures. Nevertheless, the heritage building remains visually distinguishable through its architectural form, roof profile, façade articulation, proportions, and surviving historic material character. Existing vegetation, internal circulation corridors, and residual open spaces within the hospital complex continue to contribute to the spatial legibility and visual prominence of the heritage structure within the broader institutional landscape.

5.6.1. National Level Heritage Building

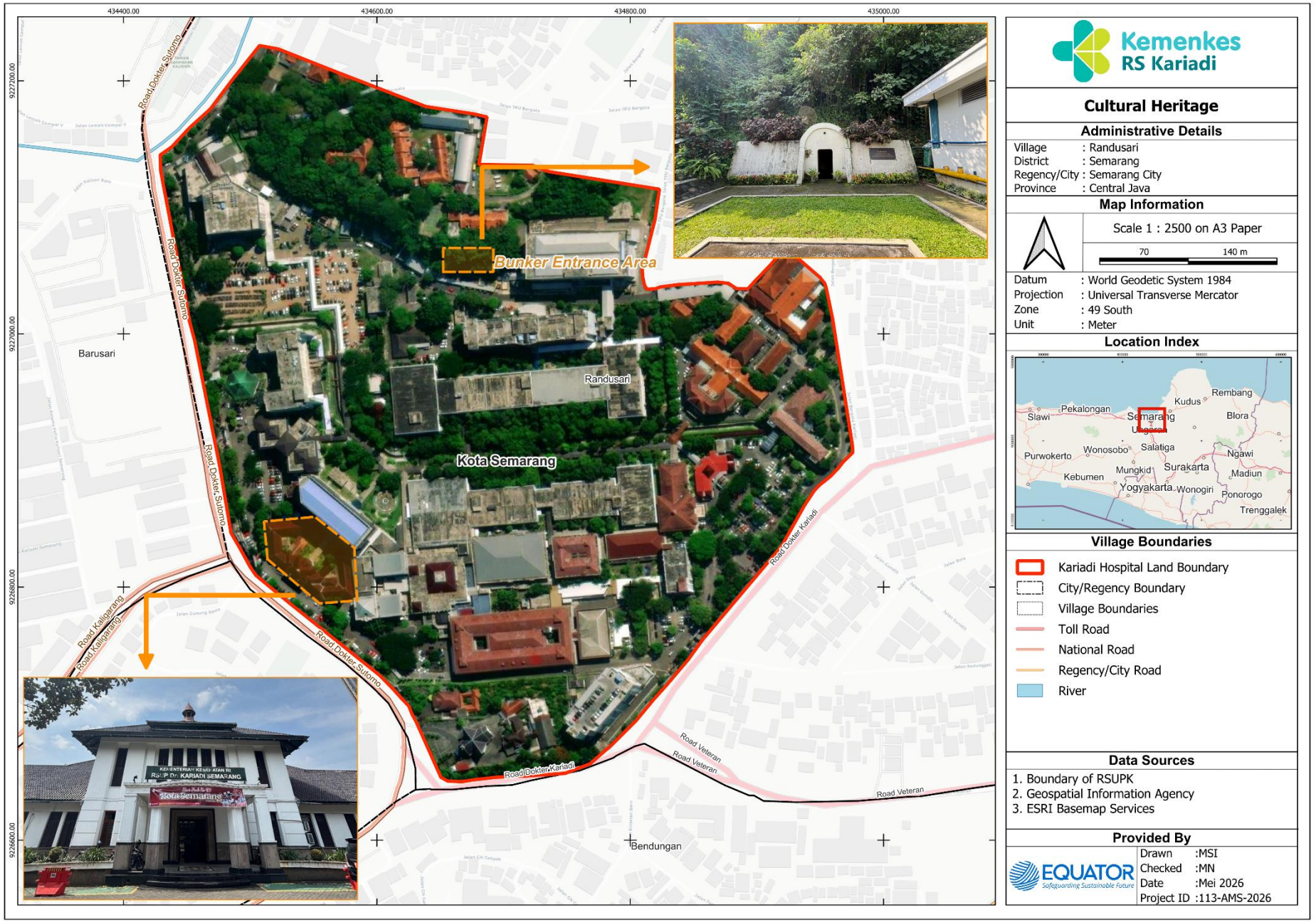
RSDK was originally established in 1925 during the Dutch colonial period as the *Centrale Burgerlijke Ziekeninrichting* (CBZ) Semarang. The historic hospital complex possesses significant historical, architectural, and social value associated with the development of modern healthcare infrastructure in colonial and post-independence Indonesia. The heritage significance of the site has been formally recognised through the Decree of the Minister of Education and Culture of the Republic of Indonesia No. 370/M/2017, which designates Rumah Sakit Dr. Kariadi as a National Level Cultural Heritage Property (*Bangunan Cagar Budaya Peringkat Nasional*) pursuant to Law No. 11 of 2010 concerning Cultural Heritage.

Based on the findings of the *Laporan Akhir Kajian Heritage RS Kariadi*, the heritage building exhibits several structural vulnerabilities relevant to the ESIA baseline assessment:

- Absence of reinforced concrete column systems, ring beams, and tie beams (sloof) with T-shaped beam sections within parts of the existing structure.
- Foundation systems consisting primarily of red brick masonry with an approximate depth of 120 cm.
- Structural characteristics considered inadequate under the applicable Seismic Design Category D criteria, where masonry load-bearing wall systems do not meet current seismic performance requirements.
- Variable reinforced concrete quality, with minimum measured compressive strength of fc' 19.03 MPa (equivalent to K-236.86 kg/cm^2) and a coefficient of variation (CV) ranging from 8.79% to 27.41%, indicating inconsistent material performance.

- Relative moisture content measurements ranging between approximately 13.517% and 15.629%, considered relatively acceptable.
- Excessive deflection in the timber roof truss system, with a measured maximum deflection of 80 mm, exceeding the allowable limit of 33 mm.
- Excessive floor slab deflection, with measured values exceeding allowable serviceability limits.
- Reinforced concrete beam analysis indicating ultimate moment values exceeding nominal structural capacity, with associated excessive deflection.

Overall, the structural assessment concludes that the existing two-stores structure no longer fully satisfies current structural safety requirements, with stress conditions exceeding allowable limits in several structural elements. Visual inspection during the heritage assessment did not identify significant ground settlement across the building footprint; however, the identified structural vulnerabilities indicate elevated sensitivity to vibration-generating activities, adjacent demolition works, bore piling, excavation, and heavy construction equipment associated with the proposed redevelopment.


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Road Dokter Sutomo
Road Kaligarang
Road Dokter Kariadi
Road Veteran
Bunker Entrance Area
Barusari
Randusari
Kota Semarang
Bendungan
Kemenkes
RS Kariadi
Cultural Heritage
Administrative Details
Village : Randusari
District : Semarang
Regency/City : Semarang City
Province : Central Java
Map Information
Scale 1 : 2500 on A3 Paper
70
140 m
Datum : World Geodetic System 1984
Projection : Universal Transverse Mercator
Zone : 49 South
Unit : Meter
Location Index
Rembang
Kudus
Pekalongan
Slawi
Semarang
Blora
Ungaran
Purwokerto
Wonosobo
Salatiga
Ngawi
Kebumen
Mungkid
Surakarta
Madiun
Yogyakarta
Wonogiri
Ponorogo
Trenggalek
Village Boundaries
Kariadi Hospital Land Boundary
City/Regency Boundary
Village Boundaries
Toll Road
National Road
Regency/City Road
River
Data Sources
1. Boundary of RSUPK
2. Geospatial Information Agency
3. ESRI Basemap Services
Provided By
EQUATOR
Safeguarding Sustainable Future
Drawn :MSI
Checked :MN
Date :Mei 2026
Project ID :113-AMS-2026

5.6.2. Wartime Bunker Structure

In addition to the nationally registered heritage building, the RSDK complex contains a wartime bunker structure located in the northern part of the hospital area. The wartime bunker is currently classified as a Potential Cultural Heritage Property (Objek Diduga Cagar Budaya) and is undergoing assessment by the Semarang City Spatial Planning Office to determine its cultural heritage significance and eligibility for formal registration as a Cultural Heritage Property. Although the bunker has not yet been formally registered as a Cultural Heritage Property, prior assessments, historical references, and media documentation indicate that it possesses cultural heritage significance associated with Dutch colonial-era and World War II defensive infrastructure. The structure reportedly exhibits characteristics consistent with Dutch defensive construction typologies, including relatively thick masonry walls, an enclosed subsurface spatial configuration, and structural detailing considered more permanent and engineered than wartime Japanese bunker typologies.

The bunker was reportedly identified during construction of the IPAL facility, indicating the possibility of additional subsurface remaining within portions of the Project area where piling and deep excavation works are planned. Although not formally designated, the structure should be treated as a potential heritage resource within the ESIA Area of Influence and remain subject to precautionary heritage management measures, including protection from accidental damage, integration within the Chance Find Procedure, and consideration within construction planning and monitoring activities.



Figure 22 Wartime Bunker Structure within RSUP Dr. Kariadi Complex

5.6.3. Construction Interface with the Heritage Building

Site observations undertaken during the ESIA baseline survey confirmed that the southern and eastern elevations of the heritage building are located directly adjacent to Gedung Elang (Cardiac Installation Building), which is planned for demolition and redevelopment into the proposed Management Unit and Service of Excellence (SoE) facility. In several locations, the separation distance between the two

structures is estimated at less than one meter, resulting in a highly constrained spatial interface with limited physical buffering, restricted inspection and maintenance access, closely aligned service infrastructure, and direct exposure of the heritage structure to adjacent demolition and construction activities.

This confined spatial relationship substantially increases the sensitivity of the heritage setting during demolition and redevelopment works, limits construction maneuverability, and reduces the remaining spatial integrity between the historic structure and surrounding modern buildings. Consequently, pre-construction structural documentation, crack mapping, vibration monitoring, and controlled demolition methodology within heritage-adjacent work areas are critical requirements. Given the registered national cultural heritage of the building and its identified structural vulnerabilities, construction activities at this interface represent a high-sensitivity zone within the ESIA Area of Influence and require heritage-sensitive construction management measures consistent with AIIB ESS1, Law No. 11 of 2010, and Permen PUPR No. 19/2021.

The main heritage building within the RSUP Dr. Kariadi complex has been registered as a cultural heritage property under the Decree of the Minister of Education and Culture of the Republic of Indonesia No. 370/M/2017 concerning Cultural Heritage designation. The building is located adjacent to the Cardiac Installation Building, which is planned to be demolished and redeveloped into the Management Unit and Service of Excellence Unit Building. The separation distance between the two structures is less than one meter, indicating their close physical proximity. The following figure presents the registered cultural heritage building, located at coordinates 49S, X: 434564, Y: 9226799.



Figure 23 Registered Cultural Heritage Building at RSUP Dr. Kariadi

A wartime bunker structure is located near the wastewater treatment plant (IPAL) area within the RSUP Kariadi complex. The structure was reportedly discovered during the construction of the IPAL facility. To date, the bunker has not been officially registered as a cultural heritage site by the relevant government authority. Nevertheless, further archaeological and heritage assessments may be

required to evaluate the potential for similar subsurface findings within the proposed development area. The bunker structure is located at coordinates 49S, X: 434618, Y: 9227068.

The nearest planned project component is the Medical Center Building, which is located approximately 50 meters from the bunker structure.

5.6.4. Potential Impacts on the Heritage Setting

The proposed redevelopment has the potential to introduce both temporary and permanent changes to the heritage setting during demolition and construction phases. Temporary impacts may include demolition vibration, scaffolding, heavy equipment movement, construction hoarding, dust generation, elevated noise, artificial lighting, and temporary obstruction of views toward portions of the heritage building. The introduction of new building massing adjacent to the heritage structure may also permanently alter natural lighting exposure, airflow, and visual openness that historically formed part of the architectural and environmental setting of the building prior to successive phases of hospital expansion.



Figure 24 The Cardiac Installation Building planned for demolition

The Cardiac Installation Building planned for demolition (left) and the eastern side of the cultural heritage building, showing the extremely close separation distance of less than one meter between the two structures

5.6.5. Heritage-Sensitive Receptors within the Area of Influence

Several additional heritage-sensitive receptors are located within the wider AoI surrounding the hospital complex and may experience indirect impacts during demolition and construction. These are summarized in Table 48 below.

Table 51 Cultural Heritage within the Area of Influence

No.	Cultural Heritage Property	Approximate Distance from Nearest Planned Demolition Area	Potential Indirect Impact
1	GKI Gereja Gereformeerd	±50 meters	Demolition vibration, dust deposition on heritage surfaces and openings, increased construction traffic along Jalan Dr. Sutomo, noise, and temporary disturbance to the historic church setting and worship environment
2	RSU William Booth	±360 meters	Increased construction traffic, temporary urban visual alteration, noise propagation, and broader changes to the surrounding historic institutional setting
3	Rumah Dinas Wakil Gubernur (eks. Rumah Tinggal Oei Tiong Ham)	±200 meters	Vibration propagation, dust generation, increased traffic movement, temporary visual intrusion, and alteration of the surrounding historic urban character

5.6.6. Intangible Cultural Heritage

In addition to tangible heritage resources, the broader AoI retains intangible cultural associations connected to community ritual practices and collective memory. The Bergota cemetery complex within the surrounding urban area continues to function as an important religious and cultural which support traditional Nyadran activities conducted prior to Ramadan, regular pilgrimage visits *(ziarah)* particularly on thursday evenings, and annual commemorative events such as the Haul of KH Sholeh Darat and Haul Mbah Wali Samud. These activities reflect the continuing relationship between historic places, religious traditions, and living cultural practices within the city of Semarang. As such, the Bergota area contributes to the broader cultural significance of the historic urban environment surrounding the Project area.

Based on stakeholder consultation and information obtained from the Semarang City Housing and Settlement Areas Office (Disperkim), which administers public cemeteries (Tempat Pemakaman Umum/TPU) in Semarang, the proposed redevelopment is not expected to adversely affect religious activities and pilgrimage traditions associated with the Bergota cemetery complex. Similar development and expansion activities previously undertaken within the RSDK complex have not resulted in disruption to the continued practice of Nyadran, pilgrimage visits, Haul KH Sholeh Darat, Haul Mbah Wali Samud, or other religious activities conducted within the cemetery area.

6 COMMUNITY HEALTH BASELINE

This section presents the baseline community health conditions in the project's immediate area of influence, covering the availability of health facilities, the health-seeking profile of the population, key nutritional indicators, and the health-system context established by RSDK's own service operations. Together, these elements characterize the health status and healthcare access of the community most likely to be affected by the project's construction and operational phases.

6.1 Maternal and child health profile

The maternal and child health profile is presented in the Semarang City Health Profile 2024. Key issues include maternal mortality, deaths among children aged 0–59 months (with 88% occurring during infancy), as well as childbirth-related risks and stunting. These findings highlight the importance of strengthening neonatal and early-life health interventions

Table 52 Profile of Maternal and Child Health, Semarang City 2025

No	Description	Male	Female	Total	Unit
1	Live births *(kelahiran bayi hidup)*	9,044	8,357	17,401	babies
2	Stillbirths *(Kelahiran bayi mati)*	69	32	101	babies
3	Maternal deaths (Kematian Ibu)				
	Pregnant mothers			2	mothers
	Mothers during childbirth *(ibu Bersalin)*			0	mothers
	Postpartum mothers (*Ibu nifas)*			12	mothers
4	Infant and under-five mortality				
	Infants	76	63	139	babies
	Under-five children (*balita)*	12	7	19	children
5	Stunted under-five children (as of Dec 2024) (stunting)			845	children

Source: Semarang City Health Profile, 2024

According to the Semarang City Health Profile (Semarang City Health Office, 2024), there were 14 maternal deaths among pregnant and postpartum women, most occurring during the postpartum period (12 cases), while no deaths occurred during childbirth. This suggests relatively good delivery care in Semarang City, although postnatal monitoring still needs strengthening. A total of 158 deaths were recorded among children aged 0–59 months, with 88% occurring among infants, highlighting the importance of neonatal and early-life interventions.

In addition, 845 under-five children were identified as stunted, indicating the need to strengthen nutrition interventions, exclusive breastfeeding, and sanitation programs.

Life expectancy is an important indicator of population health and overall human development, reflecting improvements in healthcare access, living conditions, and quality of life. In Semarang City, life expectancy shows a positive trend between 2023 and 2024 for both males and females.

Table 53 Life Expectancy (LE) – Semarang City -2025

Group	Year 2023 / Age	Year 2024/ Age
Male	76,04	76,37
Female	79,83	80,22

Source: Statistics Indonesia (BPS) Semarang City, 2025

Tabel Life Expectancy for males rose from 76.04 years (2023) to 76.37 years (2024), while females increased from 79.83 years (2023) to 80.22 years (2024). Overall, females consistently have higher life expectancy than males, and both groups show a positive upward trend.

6.2 Health Facilities in Sub-district of Semarang Selatan

Sub-district of Semarang Selatan benefits from a relatively well-developed primary and secondary healthcare infrastructure. As of 2024, hospital facilities are present in four of the ten kelurahan, and Public Health Centers without inpatient care (*Puskesmas tanpa rawat inap*) operate in two kelurahan. Pharmacy coverage (apotek) is extensive, reaching nine of ten subdistricts, a 90% coverage rate that supports access to essential medicines for most of the district's residents.

At the apex of this health system sits RSDK, which functions as Central Java's principal national-referral tertiary teaching hospital. RSDK's presence in the immediate vicinity means that specialist care is more accessible to local residents than in most comparable urban districts in the province, while simultaneously generating the high pedestrian and vehicular flows that are part of the daily traffic and safety context for surrounding communities.

Table 54 Healthcare facility coverage, Sub-district of Semarang Selatan (2024)

Facility Type	Kelurahan with Facility	Coverage
Hospitals (rumah sakit)	4 of 10	40%
Puskesmas (without inpatient care)	2 of 10	20%
Pharmacies (apotek)	9 of 10	90%

Source: BPS Kota Semarang, Semarang Selatan District in Figures 2024 (2024).

6.3 RSDK Service Utilization and Patient Profile

RSDK's 2024 service statistics illustrate both the scale of the hospital's role as a regional health anchor and the socioeconomic profile of its patient population. With 1,054 beds and approximately 2,000 outpatient visits and 150 inpatient admissions per day, RSDK generates a continuous and substantial flow of patients, caregivers and visitors through the surrounding street network, a baseline condition that must be carefully managed during construction to preserve unimpeded access to emergency and critical care services.

Approximately 86% of patients are covered under the national health insurance scheme (JKN/BPJS), confirming that the large majority of RSDK's users are from low- to middle-income households who depend on public financing for access to specialist care. The leading inpatient diagnosis is atherosclerotic heart disease (1,598 cases in 2024), consistent with the national epidemiological transition toward non-communicable cardiovascular diseases. Patients are drawn from across Central Java, with the highest concentrations originating from Kota Semarang, Kabupaten Kendal, Kabupaten Semarang, Kabupaten Demak, and Kabupaten Pati.

Table 55 RSDK key service statistics (2024)

Indicator	Value
Total bed capacity	1,054 beds
Outpatient visits (annual)	551,445
Inpatient admissions (annual)	~108,141
Daily average outpatient visits	~2,000
Daily average inpatient admissions	~150
JKN/BPJS patient share	~86%
Leading inpatient diagnosis	Atherosclerotic heart disease (1,598 cases)
Primary catchment areas	Kota Semarang, Kab. Kendal, Kab. Semarang, Kab. Demak, Kab. Pati

Source: RSDK internal service statistics (2024).

6.4 Vulnerable Patient Groups and Continuity-of-Care Obligations

Given RSDK's mandate as a national referral center for complex and emergency care, the hospital serves patient cohorts with elevated clinical vulnerability. These groups require particular protection during the construction phase to ensure uninterrupted access to emergency services, maintained infection prevention protocols, and continuity of care. Key vulnerable patient groups are summarized in Table 53.

A substantial share of patients is accompanied by caregivers or family members, particularly children, elderly patients and those undergoing long-term hospitalization. Staff dynamics encompass a workforce of approximately 3,000 employees, including health workers, administrative staff and support personnel, all of whom will be affected by any construction-related disruption to site access or clinical operations. Consultation and disclosure processes must therefore engage not only community receptors but also caregivers, patient representatives and hospital staff, while fully protecting patient privacy and care continuity.

Table 56 Vulnerable patient groups, RSDK

Vulnerable Group	Primary Construction-Phase Risk
Patients with limited mobility / physical disabilities	Access disruption; emergency evacuation barriers
Paediatric patients (children)	Noise, dust and infection risk; family separation during access disruption
Elderly patients	Heat stress, mobility barriers, psychological stress from noise
Pregnant women and postpartum patients	Vibration, dust and noise exposure; labor-ward access disruption
Intensive / continuous care patients (oncology, cardiology, transplant)	Equipment disruption, infection prevention compromise, power reliability
Low-income patients (86% JKN/BPJS covered)	Financial and logistical burden if access routes are disrupted

Source: ESIA team analysis based on RSDK service data and AIIB ESS1 vulnerability criteria.

6.5 Community Health Indicators

Beyond the hospital service profile, available community-level health data reveal important baseline vulnerabilities in the immediate project environs. As noted in Section 5.2.4, the Gunung Brintik sub-area of Kelurahan Randusari presents a concentration of extreme poverty (28.48% below the poverty line) and childhood undernutrition (60% prevalence). Stunting data for December 2024, the most sensitive indicator of chronic malnutrition at the population level, corroborate this picture at the district scale.

Sub-district of Semarang Selatan recorded 48 stunted toddlers in December 2024. Kelurahan Randusari accounts for 11 of these cases, the second highest count in the district after Kelurahan Lamper Tengah. This figure is particularly significant for the ESIA because stunting reflects not only inadequate nutrition but also cumulative exposure to poor sanitation, recurrent infection and household-level deprivation, all conditions that can be aggravated by construction-phase disruption to water supply, sanitation access or ambient air quality.

Table 57 Stunting cases among toddlers, Sub-district of Semarang Selatan (December 2024)

Kelurahan	Stunted Toddlers (cases)	Note
Lamper Tengah	9	Highest in district
Randusari	11	Second highest; immediate project environs
Other kelurahan (8)	28	Combined remainder
Total, Sub-district of Semarang Selatan	48	

Source: Dinas Kesehatan Kota Semarang / District health records, December 2024.

6.6 Community Perception and Anticipated Concerns

Community receptors in Kelurahan Randusari and surrounding subdistricts are expected to raise concerns across several domains during the construction phase. These anticipated concerns, identified through preliminary stakeholder analysis, will be addressed in the Community Engagement Plan and the Community Health and Safety Management Plan. They are summarized in Table 55 alongside the primary management measure applicable to each.

Table 58 Anticipated community concerns and primary management responses

Anticipated Community Concern	Primary Management Response
Construction disturbances: noise, dust, vibration	Dust suppression; noise barriers; vibration monitoring; restricted working hours
Traffic congestion and parking disruption	Traffic Management Plan; designated contractor vehicle routes and hours
Emergency vehicle access	Permanently maintained emergency corridors; coordination with Dinas Perhubungan
Construction waste management	Waste Management Plan; licensed disposal contractors; daily site cleaning

Anticipated Community Concern	Primary Management Response
Employment opportunities for community women's groups and RS Kariadi street vendors assoociation in meal and catering services	Engagement of PKK women's groups RS Kariadi street vendors association in catering services; fair compensation
Traffic safety management; dust suppression measures; noise control and monitoring	Traffic management plan; watering to reduce dust; restriction of noisy activities to daytime.

Source: ESIA team preliminary stakeholder analysis (2025).

Table 59 Environmental and Social Risks and Impacts Matrix

Pre-Construction Phase

No / Ref	Project Activities causing Risks / Impacts	Triggering Activities	Nature & Duration	Receptors (Location)	Likelihood	Magnitude	Spatial Scale	Receptor Sensitivity	Severity	Risk / Impact Significance
A. ENVIRONMENTAL RISKS AND IMPACTS										
A.3.1	Asbestos-containing material (ACM) release during demolition	Demolition of Gedung Elang and any pre-1990 structures; cutting, breaking, or disturbance of ceiling boards, pipe insulation, floor tiles, or roof sheets that may contain chrysotile or other ACM; inadequate pre-demolition survey	Adverse; Short-term, confined to demolition and enabling-works phase; irreversible if fibers are inhaled before controls are in place	Workers conducting demolition without confirmed ACM clearance; patients in immediately adjacent wards if fibers migrate through HVAC; RSDK clinical and ancillary staff passing through demolition zones	Unlikely	High	Site-specific	Critical	Very High	**Major**
A.6.1	Vegetation and urban habitat loss from site clearance	Removal of trees, shrubs, and ground cover within the GMS-DC construction footprint; soil compaction from heavy equipment; introduction of ornamental species during post-construction landscaping	Adverse; Permanent for cleared mature trees; restorable through compensatory planting in post-construction landscaping	Urban tree canopy and microhabitat within the RSDK compound; bird species using hospital grounds as urban refugia; thermal comfort of patients, visitors, and staff in outdoor areas	Likely	Low	Local	Low	Low	**Minor**
B. SOCIAL RISKS AND IMPACTS										
B.4.2	Child labor risk in the construction workforce	Engagement of subcontractors or labor suppliers without age-verification procedures; informal recruitment through social networks without formal HR screening; inadequate contract provisions requiring SMK3-compliant labor practices	Adverse; Temporary, risk present throughout workforce engagement; preventable through upfront controls	Children under 18 who may be engaged informally through labor supply chains; construction workforce welfare generally	Likely	Low	Local	Medium	Medium	**Minor**
B.4.3	Inadequate worker grievance redress mechanism	Absence of a formal, accessible worker GRM before site mobilization; lack of confidential reporting channels; fear of retaliation suppressing safety and wage-dispute complaints; GRM not communicated in Bahasa Indonesia	Adverse; Temporary, risk is highest during the early construction phase before GRM is established and understood	All construction workers, particularly migrant workers, informal laborers, and female workers who may face additional barriers to formal complaint channels	Likely	Low	Local	Medium	Low	**Minor**
C. LEGAL AND PROCEDURAL RISKS										
C.1.1	Displacement of street vendors (PKL) from the project perimeter	Construction hoarding installation, lane closures, and site perimeter fencing reducing available public pavement space for informal trading; project communications that do not comply with prior-consultation requirements of AIIB ESS2 and UU 20/2008	Adverse; Temporary, displacement risk during construction phase; residual risk if post-construction circulation design permanently reduces trading frontage	Approximately 40 informal pavement traders (PKL) on Jl. Dr. Sutomo and Jl. Dr. Kariadi; female PKL operators and those without alternative trading locations or formal business registration	Likely	Medium	Local	Medium	Medium	**Moderate**

Construction Phase

No / Ref	Project Activities causing Risks / Impacts	Triggering Activities	Nature & Duration	Receptors (Location)	Likelihood	Magnitude	Spatial Scale	Receptor Sensitivity	Severity	Risk / Impact Significance
A. ENVIRONMENTAL RISKS AND IMPACTS										
A.1.1	Fugitive dust and PM_{10} from earthworks, foundation, structural works, and site traffic	Excavation and bulk earthworks; pile boring and spoil removal; demolition of Gedung Elang; movement of construction vehicles on unpaved haul roads; material stockpiling and loading activities	Adverse; Temporary, active during earthworks, foundation, and structural phases; intermittent during fit-out and commissioning	Patients in Cendrawasih A/B inpatient blocks and Onkologi block (adjacent buildings); ICU/ICCU/NICU wards; residents of Kelurahan Barusari RT 1/RW 5; construction workers; hospital visitors and caregivers	Likely	High	Local	High	High	**Major**
A.1.2	Exhaust emissions from diesel-powered machinery and vehicles	Operation of diesel excavators, dump trucks, cranes, and on-site generators throughout construction; idling of delivery vehicles at site access points	Adverse; Temporary, continuous at low intensity throughout the construction period; peaks during earthworks and concrete pours	Construction workers on-site; patients and staff in downwind wards; residents of Kelurahan Barusari	Likely	Low	Local	Medium	Low	**Minor**
A.2.1	Construction noise from heavy equipment, piling, and structural works	Impact and vibratory piling for deep foundations; hydraulic demolition of Gedung Elang; concrete breaking, steel erection, and formwork stripping; heavy equipment movement on site	Adverse; Temporary, significant during piling and demolition phases; sustained at moderate levels throughout structural works	Patients in ICU (BOR 84.58%), ICCU (BOR 98.85%), and NICU (35 beds); Cendrawasih and Merpati inpatient block patients and staff; residents of Kelurahan Barusari RT 1/RW 5	Likely	High	Local	High	High	**Major**
A.2.2	Ground vibration from piling and foundation works (heritage- and equipment-sensitive)	Impact piling and hydraulic hammer operations; controlled demolition vibration; deep excavation adjacent to heritage	Adverse; Temporary, concentrated during piling phase; intermittent during demolition; largely absent during fit-out	Nationally registered heritage building (CBZ/RSDK colonial complex); MRI, CT, and Cathlab diagnostic equipment in Elang	Likely	Medium	Local	Critical	High	**Moderate**

No / Ref	Project Activities causing Risks / Impacts	Triggering Activities	Nature & Duration	Receptors (Location)	Likelihood	Magnitude	Spatial Scale	Receptor Sensitivity	Severity	Risk / Impact Significance
		structures; heavy compaction equipment near existing buildings		Jantung and Diagnostic Center blocks; structural fabric of adjacent hospital wings						
A.4.1	Construction and demolition waste generation	Demolition of Gedung Elang generating concrete rubble, brick, and ceramic waste; construction packaging, timber formwork, steel offcuts; hazardous waste from paint, solvents, and petroleum-contaminated soil	Adverse; Temporary, generated throughout the construction phase; managed progressively through waste manifests and off-site disposal	Construction workers (exposure risk from unmanaged hazardous streams); municipal waste infrastructure of Kota Semarang; soil and drainage channels if uncontained	Likely	Low	Local	Medium	Low	**Minor**
A.5.1	Natural hazard exposure (flood, seismic) affecting works and site	Semarang's location in a seismically active zone and on subsiding coastal plain; extreme rainfall events causing surface flooding and drainage overload; land subsidence from groundwater abstraction; design non-compliance with SNI 1726:2019	Adverse; Permanent, hazard exposure is inherent to the site location throughout both construction and operation; risk magnitude varies with design decisions	Construction workforce and active hospital operations during the construction phase; patients, staff, and hospital infrastructure during operation; surrounding community in the event of structural failure or utility disruption	Unlikely	High	Local	High	High	**Major**
B. SOCIAL RISKS AND IMPACTS										
B.1.1	Disruption to hospital service continuity during construction and demolition	Simultaneous shutdown of redundant of WWTP, **Hazardous and Toxic Waste** utility systems (power, water, medical gases); HVAC reconfiguration affecting pressure zones in clinical areas; temporary road and corridor closures for material delivery or demolition hoarding	Adverse; Temporary, intermittent disruption events during transition phases and planned service switchovers; highest risk during phased commissioning	Inpatients in ICU, ICCU, NICU, and Cendrawasih/Merpati wards dependent on uninterrupted clinical utilities; patients requiring emergency access through IGD; RSDK clinical and nursing staff	Likely	Medium	Local	High	High	**Moderate**
B.2.1	Hospital-acquired infection (HAI) risk from construction dust and disturbance	Demolition and structural works generating Aspergillus-spore-laden dust that penetrates HVAC systems or breaches ICRA hoarding; pressure-zone disruption drawing contaminated air into sterile clinical zones; inadequate ICRA hoarding or daily inspection	Adverse; Temporary, construction phase only; potentially irreversible consequence if immunocompromised patients are infected with Aspergillus or other opportunistic pathogens	Immunocompromised patients in haemato-oncology, ICU, ICCU, NICU, and transplant units, the highest-risk receptor group in the entire project AoI; RSDK infection control staff responsible for managing outbreak response	Likely	High	Local	Critical	Very High	**Critical**
B.3.1	Traffic safety risk on Jl. Dr. Sutomo and Jl. Dr. Kariadi	Heavy construction vehicle movements entering and exiting the site across existing pedestrian routes and active traffic lanes; lane restrictions and temporary access closures during demolition hoarding installation and material delivery	Adverse; Temporary, concentrated during peak construction delivery phases; manageable through a Construction Traffic Management Plan	Pedestrians and schoolchildren using Jl. Dr. Sutomo and Jl. Dr. Kariadi; patients and visitors arriving by private vehicle or on foot; ambulances requiring unobstructed access to IGD	Likely	Low	Local	Medium	Low	**Minor**
B.4.1	Occupational health and safety (OHS) incidents during works	Falls from height during multi-storey structural works; struck-by hazards from cranes and material handling; electrical hazards during fit-out and testing; heat stress under tropical conditions; noise-induced hearing loss from prolonged piling exposure	Adverse; Temporary, throughout the construction phase; risk profile varies by trade activity and phase	Construction workers across all trades and phases; subcontractor employees; site visitors and inspection personnel	Likely	Medium	Local	Medium	High	**Moderate**
B.4.2	Child labor risk in the construction workforce	Engagement of subcontractors or labor suppliers without age-verification procedures; informal recruitment through social networks without formal HR screening; inadequate contract provisions requiring SMK3-compliant labor practices	Adverse; Temporary, risk present throughout workforce engagement; preventable through upfront controls	Children under 18 who may be engaged informally through labor supply chains; construction workforce welfare generally	Likely	Low	Local	Medium	Medium	**Minor**
B.4.3	Inadequate worker grievance redress mechanism	Absence of a formal, accessible worker GRM before site mobilization; lack of confidential reporting channels; fear of retaliation suppressing safety and wage-dispute complaints; GRM not communicated in Bahasa Indonesia	Adverse; Temporary, risk is highest during the early construction phase before GRM is established and understood	All construction workers, particularly migrant workers, informal laborers, and female workers who may face additional barriers to formal complaint channels	Likely	Low	Local	Medium	Low	**Minor**
B.5.1a	Livelihood impact on internal canteen tenants, IGD & Elang (phased relocation; ESS2 Avoidance)	Demolition of the IGD and Elang buildings within their footprint. Mitigated by design: GMS-DC built first; both canteens transferred to permanent, equivalent-or-improved trading space in GMS-DC before demolition, so no trading gap arises.	Adverse; Temporary and avoided at the design stage; reversible, no closure and no income loss (ESS2 Avoidance).	Two canteen operators. The IGD canteen is operated by three women under Dharma Wanita Persatuan RSDK (primary household income); the Elang operator profile is to be confirmed in the census.	Likely	Low	Local	Medium	Low	**Minor** *(pre-mitigation)* *→ Negligible post*
B.5.1b	Livelihood impact on internal canteen tenants, Gedung Korpri (relocation or non-renewal; pending RSDK decision)	Redevelopment/demolition of the Gedung Korpri canteen building (formerly KORPRI-managed, now RSDK). Five operators trade under annual (Jan–Dec) tenancies at IDR 35M/unit/yr inside a	Adverse; pathway-dependent, Temporary if relocated (Pathway A) or Permanent if non-renewed (Pathway B).	Five operators in six canteen units (five occupied, one vacant; plus one washbasin unit). Several women-operated stalls and older sole breadwinners (e.g. Bu Retno 61, Bu Ning 44, Ibu	Likely	Medium–High *(pathway-dep.)*	Local	High	Moderate–Major *(pathway-dep.)*	**Moderate–Major** *(pathway-dependent) pre-mitigation → Negligible (Pathway A: ex-KFC, ~15 m, no fingerprint, may improve trade) → Minor (Pathway B LRP)*

No / Ref	Project Activities causing Risks / Impacts	Triggering Activities	Nature & Duration	Receptors (Location)	Likelihood	Magnitude	Spatial Scale	Receptor Sensitivity	Severity	Risk / Impact Significance
		fingerprint-access zone (staff-only customers). Outcome depends on whether RSDK relocates the operators (Pathway A) or does not renew ahead of demolition (Pathway B).		Putri 61); two vulnerable women employed at Manfaat Berkah.						
B.5.1c	Environmental nuisance to external street vendors (PKL), not displacement (ESS1)	Construction hoarding, lane restrictions and noise/dust/traffic from demolition and piling near ≈ 40–45 PKL on Jl. Dr. Sutomo and Jl. Dr. Kariadi. PKL are outside the project boundary and are not physically displaced; RSDK confirmed no relocation. Access maintained under the HOCP and Traffic Management Plan.	Adverse; Temporary and reversible; indirect environmental pathway (ESS1). Not economic displacement, ESS2 does not apply.	≈ 40–45 external PKL (indirect nuisance only), including some female-headed and elderly vendors reliant on hospital footfall.	Likely	Low	Local	Medium	Low	**Minor**
B.5.2	Vendor income increases from higher hospital throughput (beneficial)	Concentrated construction workforce generating sustained food and goods demand at the site perimeter; expanded hospital service capacity at GMS-DC commissioning increasing patient, visitor, and staff customer volumes	Positive; Temporary (construction workforce demand) and Permanent (operational throughput increase)	Food and goods vendors within and immediately adjacent to the RSDK complex; micro-enterprises in Sub-district of Semarang Selatan supplying construction consumables	Likely	Medium	Local	Medium	—	**Positive**
B.5.3	Local employment generation during construction (beneficial)	Labor demand for construction trades, logistics, and ancillary services preferentially drawing from the Kota Semarang and Jawa Tengah labor market	Positive; Temporary, construction phase only; with lasting skills development benefit for workers who gain certified training	Unskilled and semi-skilled residents of Sub-district of Semarang Selatan and adjacent kelurahan; local construction trades supply chain	Likely	Medium	Local	Medium	—	**Positive**
B.6.1	Sexual exploitation, abuse, and harassment (SEA/SH) risk from labor influx	Arrival of a construction workforce, potentially including workers from outside the local community, into an urban area already recording elevated GBV incidence (42,938 cases in Central Java, 2024); 335 cases of violence against women were recorded in Semarang City and 10 GBV Case in South Semarang Subdistrict, where Dr. Kariadi Hospital is located; inadequate Code of Conduct, lighting, or GBV referral mechanisms	Adverse; Temporary, concentrated during the construction phase; residual risk during operational phase if workforce accommodation and community interfaces are not managed	Women and girls in surrounding communities, particularly Kelurahan Barusari and Randusari; female hospital staff, nurses, and caregivers; female construction workers	Unlikely	Medium	Local	High	High	**Moderate**
B.6.2	Marginalisation of vulnerable groups in access and consultation	Consultation processes held at inaccessible times or venues; information disclosure only in written Bahasa Indonesia excluding low-literacy, elderly, or disabled participants; GRM channels requiring phone or internet access excluding those without devices	Adverse; Temporary during construction; partially persistent into operation if hospital design fails to accommodate accessibility standards	Elderly patients and caregivers; persons with disabilities (mobility, visual, and hearing impairments); low-income households in Gunung Brintik poverty pocket; female-headed households; patients with mental health conditions	Likely	Medium	Local	High	Medium	**Moderate**
B.7.1	Physical damage to nationally registered heritage structures	Demolition of Gedung Elang at separation distances of less than one metre from the CBZ/RSDK heritage building; deep excavation and piling inducing ground settlement and differential movement; accidental physical contact or falling debris during demolition	Adverse; Permanent if structural damage occurs, pre-existing micro-cracking and differential settlement increase sensitivity; partially restorable through conservation repair but irreversible for historic fabric	Nationally registered CBZ/RSDK heritage building (Bangunan Cagar Budaya Peringkat Nasional under Ministerial Decree No. 370/M/2017); adjacent colonial-era wings within the RSDK complex; heritage fabric within 1 m of demolition works	Likely	Med–High	Site-specific	Critical	Very High	**Major**
B.7.3	Disturbance to the wartime bunker structure	Excavation, piling, and utility trenching in the GMS-DC Medical Center development area located approximately 50 metres from the wartime bunker near the IPAL area; ground movement from heavy compaction equipment	Adverse; Potentially permanent, unrecorded bunker may be damaged or destroyed if not mapped and buffered before works	Undesignated colonial-era wartime bunker structure reportedly dating from approximately 1939; potential additional subsurface archaeological remains in the surrounding soil; BPK Jawa Tengah as statutory heritage authority	Unlikely	Low–Med	Area of Influence	Medium	Medium	**Minor**
B.7.4	Damage to subsurface archaeological remains (chance finds)	Deep excavation for foundations and basement works; pile boring penetrating undisturbed archaeological strata; utility trenching across the full construction footprint; absence of archaeological watching brief or Chance Find Procedure	Adverse; Permanent, subsurface archaeological context is irreversibly destroyed if disturbed without recording	Unknown subsurface archaeological deposits within the historic RSDK compound; BPK Jawa Tengah and the national archaeological record	Possible	Medium	Site-specific	High	Medium	**Moderate**

Operation Phase

No / Ref	Project Activities causing Risks / Impacts	Triggering Activities	Nature & Duration	Receptors (Location)	Likelihood	Magnitude	Spatial Scale	Receptor Sensitivity	Severity	Risk / Impact Significance
A. ENVIRONMENTAL RISKS AND IMPACTS										

No / Ref	Project Activities causing Risks / Impacts	Triggering Activities	Nature & Duration	Receptors (Location)	Likelihood	Magnitude	Spatial Scale	Receptor Sensitivity	Severity	Risk / Impact Significance
A.4.2	Operational medical and domestic waste load increase	Expanded inpatient, outpatient, and diagnostic service capacity following GMS-DC commissioning; increased Cathlab (9,846→16,001 procedures/yr), laboratory (1.95M→3.16M tests/yr), and inpatient bed throughput	Adverse; Permanent, sustained throughout the operational life of the facility; incrementally increasing with service growth	Three RSDK IPAL units and their receiving drainage network; contracted B3 waste transporter and final disposal facilities; regional waste management system of Kota Semarang	Likely	Medium	Regional	Medium	Medium	**Moderate**
A.5.1	Natural hazard exposure (flood, seismic) affecting works and site	Semarang's location in a seismically active zone and on subsiding coastal plain; extreme rainfall events causing surface flooding and drainage overload; land subsidence from groundwater abstraction; design non-compliance with SNI 1726:2019	Adverse; Permanent, hazard exposure is inherent to the site location throughout both construction and operation; risk magnitude varies with design decisions	Construction workforce and active hospital operations during the construction phase; patients, staff, and hospital infrastructure during operation; surrounding community in the event of structural failure or utility disruption	Unlikely	High	Local	High	High	**Major**
B. SOCIAL RISKS AND IMPACTS										
B.5.2	Vendor income increases from higher hospital throughput (beneficial)	Concentrated construction workforce generating sustained food and goods demand at the site perimeter; expanded hospital service capacity at GMS-DC commissioning increasing patient, visitor and staff customer volumes.	Positive; Temporary (construction workforce demand) and Permanent (operational throughput increase).	Food and goods vendors within and immediately adjacent to the RSDK complex; micro-enterprises in Sub-district of Semarang Selatan supplying construction consumables.	Likely	Medium	Local	Medium	—	**Positive**
B.6.1	Sexual exploitation, abuse, and harassment (SEA/SH) risk from labor influx	Arrival of a construction workforce, potentially including workers from outside the local community, into an urban area already recording elevated GBV incidence (42,938 cases in Central Java, 2024); 335 cases of violence against women were recorded in Semarang City and 10 GBV Case in South Semarang Subdistrict, where Dr. Kariadi Hospital is located; inadequate Code of Conduct, lighting, or GBV referral mechanisms	Adverse; Temporary, concentrated during the construction phase; residual risk during operational phase if workforce accommodation and community interfaces are not managed	Women and girls in surrounding communities, particularly Kelurahan Barusari and Randusari; female hospital staff, nurses, and caregivers; female construction workers	Unlikely	Medium	Local	High	High	**Moderate**
B.6.2	Marginalisation of vulnerable groups in access and consultation	Consultation processes held at inaccessible times or venues; information disclosure only in written Bahasa Indonesia excluding low-literacy, elderly, or disabled participants; GRM channels requiring phone or internet access excluding those without devices	Adverse; Temporary during construction; partially persistent into operation if hospital design fails to accommodate accessibility standards	Elderly patients and caregivers; persons with disabilities (mobility, visual, and hearing impairments); low-income households in Gunung Brintik poverty pocket; female-headed households; patients with mental health conditions	Likely	Medium	Local	High	Medium	**Moderate**
B.7.2	Adverse change to the heritage visual setting	Construction of the new GMS-DC building with a scale or massing that overwhelms or obscures the heritage building; loss of open space and sightlines that define the historic spatial character of the RSDK complex	Adverse; Permanent, the completed built form is fixed for the operational lifetime of the facility	Heritage setting and visual catchment of the CBZ/RSDK complex; observers and users of the surrounding historic urban landscape; BPK Jawa Tengah and Disbudpar Kota Semarang as regulatory custodians	Likely	Medium	Local	High	Medium	**Moderate**

Significance legend

Minor	Negligible change; confined to footprint; manageable through standard good practice. No regulatory breach anticipated.
Moderate	Noticeable but limited change; extends beyond site boundary; reversible with targeted mitigation; requires specific CESMP measures.
Major	Significant change affecting sensitive receptors over a broad area or extended period; requires dedicated sub-plans and monitoring.
Critical	Severe, potentially irreversible impact on the most sensitive receptors; requires avoidance or highest-tier engineering controls before works proceed.
Positive	Beneficial impact; significance expressed as the magnitude of the benefit.

Note: Significance ratings are pre-mitigation. Residual significance ratings, assuming full implementation of measures in Table 7-7, are provided in Table 7-5. PRIORITY items (B.2.1 and B.7.1) require monthly reporting to the RSDK Director and the AIIB safeguards team throughout the construction phase.

7 ENVIRONMENTAL AND SOCIAL RISKS AND IMPACTS ASSESSMENT

This chapter presents a systematic assessment of the environmental and social risks and impacts associated with the GMS-DC & SoE redevelopment at RSDK Semarang. The assessment draws on the baseline characterization in Chapters 4 and 5 and is structured to satisfy the AIIB Environmental and Social Framework (ESF, 2024. It also fulfils the analytical requirements of the AMDAL Addendum process under Government Regulation 22/2021. Where national standards and AIIB ESF requirements diverge, the more stringent standard applies throughout.

7.1. Assessment Methodology

The methodology applied in this ESIA is designed to produce a transparent, evidence-based, and proportionate characterization of impacts. It integrates four interlocking analytical frames: the Modified Leopold Matrix scoring approach; Cumulative Impact Assessment per the IFC Good Practice Handbook (2013); the AIIB ESF Gap Analysis; and a Living Document monthly update cadence aligned with the Detailed Engineering Design and regulatory milestone calendar.

7.1.1. Scope and Boundaries of the Assessment

- The assessment covers three project phases. The preparation phase encompasses site demarcation, pre-demolition surveys, stakeholder notification, and contractor mobilization. The construction phase covers demolition, earthworks, deep foundation and piling, building works, fit-out, and commissioning. The operational phase addresses expanded clinical services, increased medical waste and wastewater generation, and the long-term interface between the new built form and the heritage setting.
- The Area of Influence (AoI) defines the geographic extent within which the Project's direct, indirect, cumulative, and induced impacts are anticipated, consistent with AIIB ESS1 and IFC Performance Standard 1. It is characterized across five thematic dimensions:
- Environment (a 100 m buffer for air quality and noise, extending to the nearest receiving drainage channel and surface water body for water, and to the construction footprint and transport corridors for land and soil).
- Biodiversity (modified urban habitat under IFC PS6, with no critical habitat or protected species identified).
- Socioeconomic and Culture (three nested scales, local Kelurahan Randusari and adjacent kelurahan, municipal Kota Semarang and the Kedungsepur area, and provincial Jawa Tengah).

- Community Health (residents, patients, and workers within and surrounding the active complex, with particular attention to vulnerable groups and immunocompromised patients).

Cultural Heritage (structures within vibrational, dust, and visual-impact range, including the colonial-era RSDK heritage building and three additional heritage-sensitive receptors within approximately 360 meters of the project boundary).

7.1.2. Analytical Framework, Modified Leopold Matrix

The assessment applies a Modified Leopold Matrix scoring methodology, adapted from the original Leopold et al. (1971) framework and calibrated to the specific receptor profile of an active tertiary teaching hospital and nationally registered heritage site. Each identified impact is characterised across nine dimensions before an overall significance rating is assigned, as set out in Table 60 Impact characterisation dimensions, definitions and levels applied in this ESIA below.

Table 60 Impact characterisation dimensions, definitions and levels applied in this ESIA

Dimension	Description	Levels applied in this ESIA
Nature of Risks & Impacts	Whether the impact is adverse (negative) or beneficial (positive) to the receiving environment or community.	Adverse / Positive
Duration of Risks & Impacts	Temporal extent and persistence of the impact, from episodic events during construction to permanent changes extending into the operational phase.	Temporary / Short-term / Long-term / Permanent
Risks & Impacts Likelihood	Probability of the impact occurring given baseline conditions and project activities. Based on professional judgment, analogous project data, and baseline conditions.	Unlikely / Possible / Likely
Risks & Impacts Magnitude	Degree of change relative to baseline, assessed against absolute thresholds (regulatory/physical) and relative thresholds (proportionate change from baseline conditions at RSDK).	Low / Low–Med / Medium / Med–High / High
Spatial Scale	Geographic extent of the impact boundary, from the immediate construction footprint to the broader metropolitan region.	Site-specific / Local (kelurahan–kecamatan) / Area of Influence / Regional (kota–provinsi)
Receptor Sensitivity	Vulnerability of the receiving entity to the impact in question. Sensitivity is elevated for clinical, heritage, and community-vulnerable receptors throughout the RSDK project area.	Low (commercial/industrial) / Medium (residential, general staff) / High (hospital wards, community vulnerable groups) / Critical (ICU/NICU/PICU, heritage fabric, immunocompromised patients)
Severity	Consequence intensity if the impact materialises, assessed independently of its probability of occurrence. Captures the intrinsic harm potential of the impact pathway, particularly relevant for low-likelihood but high-consequence risks such as ACM release or heritage damage, and informs the ambition of engineering controls and contingency plans.	Low / Medium / High / Very High

It is noted that the definitions are consistent with AIIB ESF ESS1, IFC Performance Standard 1, and WHO Environmental Health Impact Assessment guidance.

7.1.3. Significance Rating Derivation

A four-level significance rating, Minor, Moderate, Major, or Critical, is assigned to each impact from the combined weight of its Likelihood, Magnitude, and Receptor Sensitivity ratings. Spatial Scale and Duration serve as modifying factors: an impact rated Moderate on the three primary dimensions may be escalated to Major where it is permanent or extends to a regional or national scale. A separate Severity rating is recorded for each entry independently of the significance derivation; it measures the intrinsic consequence intensity of the pathway if it materializes and is used in the CESMP to calibrate contingency-plan depth and residual-risk acceptance thresholds. The derivation logic is presented in Table 57 (the Impact Significance Interaction Matrix).

Table 61 Pre-mitigation significance rating matrix, derivation logic

Magnitude (pre-mitigation)	Likelihood: Unlikely		Likelihood: Likely / Possible	
	Receptor: Low–Medium	Receptor: High–Critical	Receptor: Low–Medium	Receptor: High–Critical
Low	Minor	Minor	Minor	Moderate
Low–Med	Minor	Minor	Moderate	Moderate
Medium	Minor	Moderate	Moderate	Major
Med–High	Moderate	Major	Major	Major
High	Moderate	Major	Major	Critical

Note: Spatial Scale and Duration act as modifiers, an entry may be escalated to one level where the impact is permanent or extends to regional/national scale. For positive impacts, significance is expressed as the magnitude of the benefit rather than a harm rating.

Significance level definitions

Minor	Negligible change from baseline; confined to the immediate footprint; easily reversible; manageable through standard good practice. No regulatory breach anticipated.
Moderate	Noticeable but limited change; extends beyond the site boundary; may affect sensitive receptors; reversible with targeted mitigation; requires specific CESMP measures.
Major	Significant change affecting sensitive receptors over a broad area or extended period; partially reversible with substantial mitigation; requires dedicated sub-plans and monitoring.
Critical	Severe, potentially irreversible impact on the most sensitive receptors; may trigger regulatory non-compliance; requires avoidance or the highest tier of engineering controls before works proceed.

7.1.4. AIIB ESS1 Mitigation Hierarchy

Following AIIB ESS1, the mitigation hierarchy, Avoid → Minimize → Restore/Rehabilitate → Offset, is applied in strict sequence to each impact entry and determines both the ambition of the mitigation

measures and the resulting residual significance. Avoidance is considered first and applied wherever technically and economically feasible. Where avoidance is not feasible, minimization reduces the magnitude, extent, or duration of the unavoidable impact through best-practice engineering and management controls. Where residual impacts persist, restoration or rehabilitation recovers the affected environment or community to baseline or better. Offset, the last resort, is triggered only where residual significance remains after the preceding steps and requires formal documentation and AIIB ESS1 disclosure.

No impact with a pre-mitigation significance of Major or Critical is accepted without a demonstrated mitigation pathway that reduces residual significance to Moderate or below. The two priority management items, B.2.1 (Hospital-Acquired Infection risk, Critical pre-mitigation) and B.7.1 (Heritage structure physical damage, Major pre-mitigation), are both reduced to Moderate through the ICRA protocol and the Heritage Management Program respectively and receive dedicated management attention and monthly reporting to the RSDK Director and the AIIB safeguards team throughout construction. Table illustrates the hierarchy as applied, with representative examples drawn from the matrix.

Table 62 AIIB ESS1 mitigation hierarchy, definition and application in this ESIA

Step	Definition	Examples from This ESIA (Matrix Reference)	Application Principle
1. Avoid	Eliminating the impact entirely by design, do not undertake the activity that causes it.	Retain all mature trees outside the direct construction footprint (A.6.1) Non-impact piling methods preferred within heritage exclusion zones (B.7.1) No simultaneous shutdown of redundant utility systems (B.1.1)	Preferred, highest in hierarchy; applied where technically and economically feasible
2. Minimize	Reduce the magnitude, extent, or duration of an unavoidable impact through best-practice technical measures.	Water-spray dust suppression and ICRA hoarding for air quality (A.1.1) Acoustic barriers and restricted working hours for noise (A.2.1) HEPA-filtered negative-pressure enclosures for ACM removal (A.3.1) SEA/SH Code of Conduct and GRM for gender risk (B.6.1, B.6.2)	Core instrument for construction-phase impacts, applied to all Moderate and above ratings
3. Restore / Rehabilitate	Restore affected environment or community to baseline or better after the impact occurs.	Compensatory tree-planting post-construction (A.6.1) Vendor livelihood baseline census and income monitoring (B.5.1) Structural repair of any heritage damage identified post-works (B.7.1)	Applied where Minimize measures are insufficient; documented in CESMP monitoring plans
4. Offset	Where residual significance remains after Avoid → Minimize → Restore, provide compensation or equivalent benefit to the affected receptor.	Livelihood compensation for PKL formally displaced (C.1.1) Heritage offset measures if visual setting is permanently affected (B.7.2) BPJS coordination for patients who experience delayed access to care (B.1.1)	Last resort, triggers formal documentation and AIIB ESS1 disclosure obligations

7.1.5. Pre-mitigation and Residual Significance, Summary for All Matrix Entries

Error! Reference source not found. below consolidates the significance ratings, pre-mitigation and residual (post-mitigation) for all 25 entries in the Impact and Risk Matrix. The table confirms that, with the full application of the mitigation measures set out in Section 6.2, all impacts are reduced to a residual significance of Moderate or below. Two entries, B.2.1 (Hospital-Acquired Infection risk) and B.7.1 (Heritage structure physical damage) are rated Critical and Major respectively at pre-mitigation stage; both are reduced to Moderate through the ICRA protocol and the Heritage Management Plan respectively. These two entries require the highest level of management attention and are designated *priority management items* in the CESMP.

Table 63 Summary of pre-mitigation and residual significance, all matrix entries

Ref.	Impact / Risk	Likelihood	Type	Magnitude	Spatial	Pre-mitigation Significance	Residual Significance
A.1.1	Dust / PM_{10}	Likely	Direct	High	Local	Major	Moderate
A.1.2	Exhaust emissions	Likely	Direct	Low	Local	Minor	Minor
A.2.1	Construction noise	Likely	Direct	High	Local	Major	Moderate
A.2.2	Vibration	Likely	Direct	Medium	Local	Moderate	Minor
A.3.1	ACM / asbestos	Unlikely	Direct	High	Site-specific	Major	Minor
A.4.1	Construction waste	Likely	Direct	Low	Local	Minor	Minor
A.4.2	Operational waste	Likely	Direct	Medium	Regional	Moderate	Minor
A.5.1	Natural hazards	Unlikely	Direct	High	Local	Major	Moderate
A.6.1	Vegetation/habitat loss	Likely	Direct	Low	Local	Minor	Minor
B.1.1	Service continuity	Likely	Direct	Medium	Local	Moderate	Minor
B.2.1	HAI / IPC	Likely	Direct	High	Local	Critical	Moderate
B.3.1	Traffic safety	Likely	Direct	Low	Local	Minor	Minor
B.4.1	Safety risks to visitors, staff, patients, and the public	Likely	Direct	High	Local	Major	Moderate
B.4.1	OHS incidents	Likely	Direct & Indirect	Medium	Local	Moderate	Minor
B.4.2	Child labor	Likely	Direct	Low	Local	Minor	Minor
B.4.3	Worker GRM	Likely	Direct & Indirect	Low	Local	Minor	Minor
B.5.1a	Vendor livelihood loss, IGD & Elang canteens (phased relocation; ESS2 Avoidance)	Likely	Direct	Low	Local	Minor	Negligible
B.5.1b	Vendor livelihood loss, Gedung Korpri (5 operators; relocation or non-	Likely	Direct	Medium–High *(pathway-dep.)*	Local	Moderate–Major	Negligible (Pathway A)

Ref.	Impact / Risk	Likelihood	Type	Magnitude	Spatial	Pre-mitigation Significance	Residual Significance
	renewal, pending RSDK decision)					(pathway-dependent)	/ Minor (Pathway B LRP)
B.5.1c	Environmental nuisance to external PKL, not displacement (ESS1)	Likely	Indirect	Low	Local	Minor	Minor
B.5.2	Vendor income increase	Likely	Positive	Medium	Local	Positive	Positive
B.5.3	Local employment	Likely	Positive	Medium	Local	Positive	Positive
B.6.1	SEA/SH risk	Unlikely	Induced	Medium	Local	Moderate	Minor
B.6.2	Vulnerable group excl.	Likely	Direct & Indirect	Medium	Local	Moderate	Minor
B.7.1	Heritage structure dmg	Likely	Direct	Med–High	Site-specific	Major	Moderate
B.7.2	Heritage visual setting	Likely	Indirect	Medium	Local	Moderate	Minor
B.7.3	Bunker disturbance	Unlikely	Indirect	Low–Med	Area of Influence	Minor	Minor
B.7.4	Subsurface archaeology	Possible	Direct	Medium	Site-specific	Moderate	Minor

It is noted that residual significance ratings assume full and effective implementation of the mitigation measures listed in the Impact and Risk Matrix (Section 6.2) and detailed in the CESMP, LMP, HMP, CHSMP, and VGAP. Ratings will be reviewed at the six-month ESMP monitoring milestone.

7.2. Construction Phase Impacts

The construction phase encompasses three sequential activities: preparation (site demarcation, pre-demolition surveys, contractor mobilization); demolition and earthworks (demolition of Gedung Elang, bulk excavation, deep foundation and piling); and building works, fit-out, and commissioning. The phase takes place entirely within an actively operating Class A tertiary referral hospital, which fundamentally shapes the significance of every impact described below. A construction site elsewhere in Kota Semarang would generate similar noise, dust, and traffic loads, but at RSDK, those same loads act on ICUs running at 84.58–98.85% bed occupancy, on a nationally registered heritage building with documented structural vulnerabilities, and on a community that depends on uninterrupted hospital access for life-critical care. That context is what drives the elevated pre-mitigation significance ratings throughout this section.

7.2.1. Air Quality and Dust (A.1.1, A.1.2)

Baseline context. The five-and-a-half-year UKL-UPL monitoring record (2020 Semester 1 through 2025 Semester 2) confirms that ambient air quality at the four designated monitoring points, Permukiman Barusari, Jl. Dr. Sutomo, Jl. Dr. Kariadi, and Gedung Medika Sentral, consistently meets PP 22/2021

standards. TSP readings ranged from 4.63 to 80 µg/m³ (limit: 230 µg/m³); NO_2 from 6.16 to 22.43 µg/m³ (limit: 200 µg/m³); SO_2 from 33.38 to 45.03 µg/m³ (limit: 150 µg/m³). The existing baseline is therefore one of compliance, providing a clean reference against which construction-phase deterioration can be measured.

Impact mechanism. Fugitive dust (A.1.1) arises from bulk earthworks, pile boring and spoil removal, demolition of Gedung Elang, vehicle movement on unpaved haul roads, and material stockpiling. Within the confined RSDK compound, these sources generate a sustained PM_{10} and TSP plume in immediate proximity to active clinical buildings. The principal receptors are patients in the Cendrawasih A/B inpatient blocks and Onkologi block, which are directly adjacent to the GMS-DC & SoE footprint, and residents of Kelurahan Barusari RT 1/RW 5, whose homes lie immediately to the south of the complex boundary. Exhaust emissions from diesel plants and generators (A.1.2) present a lower magnitude because their NOx and CO contribution is modest relative to fugitive dust, and because simple operational controls, Euro III+ equipment, no-idling requirements, and downwind positioning of generators, are effective and readily enforceable.

Significance basis. A.1.1 is rated Major pre-mitigation. The combination of High magnitude (excavation-scale earthworks in a confined urban site) and High receptor sensitivity (clinical wards immediately adjacent, immunocompromised patients among them) drive this rating. The Receptor Sensitivity is not merely “residential”, it is clinical, and the consequences of sustained PM_{10} exposure for oncology or ICU patients are qualitatively different from those for the public. A.1.2 is rated Minor, reflecting its Low magnitude and the availability of standard controls. Mitigation measures are detailed in Section 8 and Table 7-7, including continuous real-time boundary PM_{10} monitoring with stop-work triggers, water-spray dust suppression, wheel-wash stations, ICRA hoarding, and HEPA protection for clinical HVAC intakes.

7.2.2. Construction Noise and Vibration (A.2.1, A.2.2)

Baseline context. Noise monitoring across the 2024–2025 UKL-UPL period at Permukiman RT 1/RW 5 and the three institutional monitoring points shows stable readings within PermenLH 48/1996 limits, with traffic on Jl. Dr. Sutomo identified as the dominant noise source. The baseline is therefore one of elevated urban background noise, not a quiet residential setting, but one where clinical ward has been designed and managed to function within the existing acoustic environment.

Impact mechanism. Construction noise (A.2.1) arises from impact piling, hydraulic demolition of Gedung Elang, concrete breaking, steel erection, and heavy equipment movement. Unlike traffic noise, construction noise is episodic, directional, and can penetrate building envelopes at frequencies that interfere with patient recovery and clinical monitoring equipment. The principal receptors are patients in ICU (BOR 84.58%, 46 occupied beds), ICCU (BOR 98.85%), NICU (35 beds), and the Cendrawasih and Merpati inpatient blocks, as well as residents of Kelurahan Barusari RT 1/RW 5.

Ground vibration (A.2.2) introduces a qualitatively distinct risk that noise monitoring alone cannot capture. The nationally registered CBZ/RSDK heritage building, established in 1925 as the Centrale Burgerlijke Ziekeninrichting Semarang and formally registered under Ministerial Decree No.

370/M/2017, exhibits documented structural vulnerabilities. The heritage condition assessment records the absence of reinforced concrete ring beams and tie beams in parts of the structure, brick masonry foundations approximately 120 cm deep, reinforced concrete quality with measured compressive strength as low as fc' 19.03 MPa, and timber roof truss deflections of 80 mm against an allowable limit of 33 mm. These characteristics place the heritage building in a category of elevated vibration sensitivity that is entirely distinct from modern structures. Simultaneously, vibration-sensitive diagnostic equipment, MRI, CT, and Cathlab units in the Elang Jantung and Diagnostic Center blocks, can be rendered non-functional by peak particle velocities below the levels that would damage structures.

Significance basis. A.2.1 is rated Major pre-mitigation, driven by High magnitude piling and demolition works and the Critical sensitivity of ICU/ICCU/NICU receptors within the project AoI. A.2.2 is rated Moderate, with its significance elevated by the Critical heritage receptor sensitivity and the Very High severity of potential irreversible damage. The distinction between the two ratings reflects that vibration magnitude from construction is Medium, manageable through method selection and monitoring, whereas noise magnitude is High and harder to suppress at source. Mitigation includes working-hour restrictions (08:00–17:00, Monday–Saturday), acoustic barriers, non-impact piling preference, continuous PPV monitoring at heritage walls with a 2 mm/s trigger level, and coordination of piling schedules with MRI/CT operational windows.

7.2.3. Asbestos-Containing Materials (A.3.1)

Baseline context. A targeted asbestos audit of representative structures within the RSDK complex was completed in July 2026, comprising visual inspection, bulk sampling and laboratory analysis (SEM, SEM-EDS, elemental mapping and XRD). Of the three samples collected from the demolition footprint, two were classified as suspect ACM (Selasar Pav. Merak and Eks Garasi) and one as a low-indication calcium-based material (Selasar Gedung Heritage). Because the available XRD data do not explicitly identify any regulated asbestos phase, confirmatory PLM/TEM analysis is still required. For the remaining pre-1990 structures within the complex, including Gedung Elang and the ancillary support buildings that were not sampled, no confirmed clearance exists, and the assessment remains precautionary, consistent with the WHO/IARC position and Indonesian regulations.

Impact mechanism. Demolition without prior ACM identification and controlled removal creates the pathway for asbestos fiber release into the air. Within the RSDK compound, those fibers can migrate through HVAC systems, open windows, or inadequate hoarding into active clinical zones. Asbestos fiber inhalation is irreversible in its consequences: mesothelioma, asbestosis, and lung cancer are recognized occupational diseases under Presidential Regulation No. 7/2019, with latency periods of 10–40 years. The receptor profile, construction workers without confirmed respiratory protection, and potentially immunocompromised patients in adjacent wards, makes this a site-specific risk of Very High severity despite its Unlikely likelihood (because it is preventable through a pre-demolition survey).

Significance basis. A.3.1 is rated **Major** pre-mitigation. The Unlikely likelihood prevents a Critical rating, but the Very High severity and Critical receptor sensitivity place it firmly in the Major category.

The assessment is confirmed by the July 2026 targeted asbestos audit, in which two of three bulk samples from the demolition footprint (Selasar Pav. Merak and Eks Garasi) were classified as suspect ACM pending confirmatory PLM/TEM analysis, while the third (Selasar Gedung Heritage) showed a low asbestos indication. Because no sample can yet be declared definitively asbestos-positive or asbestos-free, the precautionary principle continues to apply. The primary avoidance measure is the outstanding confirmatory PLM/TEM analysis and pre-demolition inspection by a licensed occupational hygienist, both of which must be completed and approved before any demolition activity commences. The downstream minimisation measures, licensed B3 abatement, HEPA-filtered negative-pressure enclosures, fit-tested P3 respirators and independent post-abatement air clearance, together with the ongoing personal, area and boundary air monitoring, B3 waste manifest-tracking, Chance Find Procedure and role-specific training, remain unchanged. Full mitigation detail is in Table 7-7.

7.2.4. Surface Water, Groundwater, and Drainage (A.4.1, construction runoff)

Baseline context. RSDK's existing three IPAL units (Garuda, Sentral, Rajawali) demonstrate robust treatment performance. The January 2025 outlet readings for IPAL Garuda show BOD 12 mg/L (limit: 30 mg/L), COD 42.1 mg/L (limit: 100 mg/L), TSS <13 mg/L (limit: 30 mg/L), and total coliform <2 MPN/100 mL (limit: 3,000 MPN/100 mL), removal efficiencies of 96–97% against high inlet loadings (inlet BOD 345, COD 1,262 mg/L). The receiving drainage network therefore starts from a position of robust management.

Impact mechanism. Construction-phase runoff risks arise from sediment-laden stormwater during earthworks, accidental fuel and chemical spills from construction plants, and hydrocarbon wash-off from access roads. These are channeled into the RSDK institutional drainage network and ultimately into the Kota Semarang stormwater system. Given the robust baseline IPAL performance and the relatively confined nature of the construction footprint, pre-mitigation significance is rated Moderate. The principal risk is sediment loading during the rainy season construction window and point-source spills, both of which are manageable through silt fencing, sediment traps, bunded fuel and chemical storage, spill-response kits, and weekly stormwater discharge sampling.

7.2.5. Construction Waste Management (A.4.1)

Baseline context. The Q1 2026 Neraca Limbah B3 confirms compliant manifest discipline for the existing RSDK B3 waste streams under the service contract with PT PRIA. Monthly logbook entries for January through March 2026 cover all principal B3 categories (A337-1 through B337-5), and the TPS Limbah B3 operates under SOP Pengelolaan B3 Rev.5. This demonstrates an institutional waste management competence that can be extended to cover construction-derived B3 streams.

Impact mechanism. Construction waste arises in three streams: inert demolition and construction material (concrete rubble, brick, ceramic, soil); general non-hazardous construction waste (packaging, timber formwork, metal offcuts); and construction-derived B3 waste (paint, solvents, contaminated PPE, petroleum-contaminated soil, used oil). Pre-mitigation significance is rated Minor, reflecting the Low magnitude of the construction waste load relative to the hospital's existing operational waste generation and the availability of a functioning institutional waste management system. Mitigation

includes segregated on-site containers, manifest discipline for B3 streams, routing of inert and non-hazardous streams to TPA Kota Semarang, and monthly reconciliation against CESMP commitments.

7.2.6. Radioactive Waste Management

Construction activities associated with demolition, excavation, utility relocation, and structural modification within and adjacent to the Nuclear Medicine complex may create localised radiological and contamination risks if radioactive materials, shielded delay-decay cabinets, isolation-room fittings, wastewater lines, drainage systems, ventilation ducts, storage-room surfaces, or any residual contamination are inadvertently disturbed. The temporary storage facilities for radioactive waste generated at RSUP Dr. Kariadi are located within the construction footprint, comprising the Unit Kedokteran Nuklir & Teranostik Molekuler (PET/SPECT operations under KTUN No. 06875.351.5.090724, F-18, Ga-68, I-131) and the Ruang Hot-Lab Unit Kedokteran Nuklir Instalasi Radiologi (therapeutic operations under KTUN No. 03939.347.3.260424, I-131, Sm-153).

Potential construction-phase impacts include: limited occupational radiation exposure to construction workers and adjacent hospital staff; accidental spread of low-level surface contamination to adjacent corridors, service areas or the wider public zone; generation of minor quantities of radioactive, mixed (radioactive + B3 hazardous) or radiologically contaminated construction waste; damage to shielding integrity of delay-decay storage; release of residual activity in patient wastewater lines or septic/delay tanks serving the therapy isolation rooms; and temporary interruption of nuclear medicine diagnostic and therapeutic services. A cross-cutting risk is the inadvertent mixing of radioactive or radiologically contaminated debris with the asbestos waste stream and the general non-hazardous demolition waste stream, which would create a secondary contamination issue and a downstream B3 management problem.

The likelihood of significant off-site radiological impact during the construction phase is however considered unlikely because all radioactive materials at RSUP Dr. Kariadi are managed under valid BAPETEN operating licences and operational controls; the radionuclides authorised at the facility (F-18, Ga-68, I-131, Sm-153) are predominantly short-lived diagnostic and therapeutic isotopes with half-lives of minutes to days, and decay rapidly to activity levels below the BAPETEN clearance limit under the existing delay-decay protocol; shielded delay-decay storage, isolation rooms and segregated wastewater tanks are engineered to contain activity under both normal and abnormal conditions; and the engineering baseline for shielding adequacy is documented in the Dokumen Rencana Teknis Bangunan Gedung Penahan Radiasi No. PR.05.01/D.X/3047/2024 (26 March 2024) referenced in the BAPETEN licences.

Construction-phase impacts are therefore expected to remain temporary, localised and manageable through the following measures, which are required to be in place throughout demolition, excavation, utility relocation and structural modification within or adjacent to the Nuclear Medicine complex: controlled demolition procedures using wet methods and segregated containers labelled in accordance with BAPETEN and PP No. 61 of 2013; physical separation of the demolition zone from operational areas of the hospital, including corridors, ventilation intakes, the inpatient zone and any continuing nuclear medicine services; segregation of radioactive or radiologically contaminated

material from the asbestos waste stream, from general B3 hazardous waste and from inert construction waste, with each stream managed through its own licensed pathway; worker protection comprising fit-tested respiratory protection, personal dosimetry, controlled-access enclosures and entry/exit supervised by the designated *Petugas Proteksi Radiasi* (PPR) Medik Tk. 1 in their capacity as the hospital's Radiation Protection Officer (RPO/PPR); and compliance with hospital radiation-protection requirements and BAPETEN regulations throughout the works, including immediate reporting to BAPETEN if any unplanned contamination or exposure event occurs. With these measures in place, no significant off-site radiological impact is anticipated during the construction phase, and the residual impact is assessed as Minor pre-mitigation and Negligible post-mitigation.

7.2.7. Natural Hazard Exposure (A.5.1)

Baseline context. RSDK is located in Sub-district of Semarang Selatan, which the city's RTRW classified within a low-to-moderate flood hazard zone. The site is not in the heavy-flood zone affecting Semarang Utara but is exposed to localized surface flooding during extreme rainfall events and to ground subsidence that affects much of Kota Semarang due to groundwater extraction. Seismically, Semarang falls within a zone requiring design compliance with SNI 1726:2019 Seismic Design Category D.

Impact mechanism. During construction, natural hazard exposure manifests as flood inundation of open excavations, structural instability in temporary works during seismic events, and slope failure in stockpiled spoil during heavy rainfall. During operation, the risks shift to structural performance of the completed building under design-level seismic loading and drainage capacity under extreme-rainfall scenarios projected under climate change (see Chapter 9). Pre-mitigation significance is rated **Major**, driven by High magnitude (structural failure scenarios have Very High consequences) and High receptor sensitivity (an operational hospital cannot simply be evacuated). Mitigation is primarily through design: SNI 1726:2019 compliance, zero-run-off SUDS drainage, Smart Hospital BMS monitoring, and a hazard-specific Business Continuity Plan approved before commissioning.

7.2.8. Vegetation and Habitat Loss (A.6.1)

Baseline context. The RSDK complex is classified as modified urban habitat under IFC Performance Standard 6, with no critical habitat, protected species, or conservation-significant biodiversity identified in the 2020 ANDAL survey. The 43 vegetation species and 10 fauna species recorded are all common urban taxa with no IUCN Red List or national protection status.

Impact mechanism. Site clearance will remove trees, shrubs, and ground cover within the GMS-DC & SoE construction footprint. The loss of mature trees reduces urban canopy cover, affecting thermal comfort for patients and visitors in outdoor areas and providing minor urban refugia for common bird species. Pre-mitigation significance is rated Minor, consistent with the Low receptor sensitivity and the absence of irreplaceable biodiversity values. Compensatory tree planting during post-construction landscaping, using native and endemic species at a ratio of at least 70% of planted area, is the primary mitigation measure.

7.2.9. Hospital Service Continuity (B.1.1)

Baseline context. RSDK operates with ICU BOR of 84.58% (46 occupied beds), ICCU BOR of 98.85%, and NICU capacity of 35 beds, occupancy rates that leave minimal buffer for service disruption. The hospital provides tertiary and supra-regional referral services for a catchment population projected to include 5.30 to 6.01 million persons requiring healthcare in Central Java by 2026–2037.

Impact mechanism. Construction within an actively operating hospital creates service continuity risks through four pathways: accidental utility interruptions (power, water, medical gases) during construction interface works; HVAC reconfiguration that temporarily disrupts pressure zones in sterile clinical areas; construction noise and vibration penetrating active wards and interfering with clinical monitoring; and temporary road and corridor closures blocking emergency vehicle access to IGD. Each of these is Likely during a multi-year construction program. Pre-mitigation significance is rated Moderate, with the Severity rated High given the potential consequence of utility failure for patients on life support or in surgical theatres. The Hospital Operational Continuity Plan (HOCP), approved by the RSDK Director before mobilization as a condition precedent to works, is the primary mitigation instrument. Redundant power and water provision, 72-hour advance notice before planned utility shutdowns, and a preserved emergency-access lane maintained and inspected daily are the key operational safeguards.

7.2.10. Hospital-Acquired Infection and Infection Prevention Control (B.2.1)

Baseline context. RSDK's infection control baseline, managed under the institutional IPC framework consistent with Permenkes 27/2017, provides the reference condition against which construction-induced HAI risk is assessed. The baseline HAI surveillance rate, maintained and reported through the IPC Committee's monthly monitoring, is the comparator against which any construction-phase elevation would be detected.

Impact mechanism. This is the single Critical pre-mitigation impact in the entire matrix, and it warrants detailed explanation. Demolition and structural works generate Aspergillus-spore-laden dust as a specific and documented byproduct of construction in healthcare settings. Aspergillus fumigatus spores are released from disturbed soil, ceiling voids, wall cavities, and HVAC ducts during demolition and drilling. In a standard community setting, healthy individuals encounter and clear these spores without consequence. In an active oncology ward, haemato-oncology unit, ICU, or transplant unit, the same spores can cause invasive pulmonary aspergillosis, a condition with mortality rates of 30–90% in severely immunocompromised patients. The critical pathway is breach of ICRA hoarding or HVAC pressure-zone reversal during demolition, which allows spore-laden air to enter sterile clinical zones.

The Likely likelihood (construction dust is an inevitable product of demolition; HVAC interactions in a complex multi-building hospital are difficult to fully control), combined with the Very High severity and Critical receptor sensitivity, makes this a justified Critical pre-mitigation rating. The ICRA (Infection Control Risk Assessment) protocol is the primary mitigation instrument: each work package in proximity to clinical zones requires an ICRA classification, sealed floor-to-ceiling hoarding maintained under negative pressure relative to adjacent wards, HEPA filtration in adjacent sterile zones, daily IPC

inspections with authority to halt works on any breach, and monthly correlation of HAI surveillance data with construction activity phases. With full implementation of these measures, residual significance is assessed at Moderate, the risk is managed to an acceptable level but not eliminated, and it requires sustained institutional vigilance throughout the construction period.

7.2.11. Traffic and Access (B.3.1)

Baseline context. The traffic count on Jl. Dr. Sutomo and Jl. Dr. Kariadi, the two principal hospital approach roads, documents peak-hour congestion consistent with a major urban hospital serving a metropolitan catchment. Both roads carry a mix of private vehicles, ambulances, pedestrians, and informal pavement traders.

Impact mechanism. Construction-phase traffic adds heavy construction vehicles (excavators, dump trucks, concrete mixers, cranes) to an already congested network, creates temporary lane restrictions during hoarding installation and material delivery, and generates pedestrian-vehicle conflict at site access points. The principal life-safety concern is unobstructed ambulance access to IGD, a risk that is manageable through lane designation and daily inspection, but not trivial in a hospital where critical patients arrive by emergency vehicle. Pre-mitigation significance is rated Minor, reflecting the Low magnitude of the additional traffic load relative to existing volumes and the availability of a Construction Traffic Management Plan coordinated with the Andalalin refresh. Prohibited heavy-vehicle movements during school hours, on-site parking for construction workers, and stationed marshals at site exits are the core operational measures.

7.2.12. Occupational Health and Safety (B.4.1, B.4.2, B.4.3)

Baseline context. The applicable Indonesian OHS framework is PP 50/2012 on SMK3. The existing RSDK institutional OHS system, evidenced by K3 NIDI Genset records (11 units), Riksa Uji Petir 2024 reports for 18 buildings, and the SMK3 Safety Officer regime, provides the institutional baseline from which contractor OHS obligations are set.

Impact mechanism. Construction OHS risks (B.4.1) include falls from height during multi-store structural works, falls from scaffolding due to failure of the scaffolding, struck-by hazards from crane operations, electrical hazards during fit-out, heat stress under Central Java's tropical climate, and noise-induced hearing loss from sustained piling exposure. The Moderate pre-mitigation significance reflects the routine nature of these risks in construction, they are Likely and the magnitude is Medium, combined with the availability of effective SMK3-based controls. Child labor risk (B.4.2) is assessed at Minor: the Kota Semarang construction labor market is adult-dominated, but formal age verification for all workers and explicit child-labor prohibition clauses in all subcontracts are non-negotiable. Worker GRM adequacy (B.4.3) is also rated Minor, with the risk being that without a functional reporting channel, safety and wage disputes are suppressed rather than resolved, an institutional failure that can escalate quietly. A multi-channel GRM (hotline, suggestion box, focal person), communicated in Bahasa Indonesia at induction and posted visibly on site, is the primary control.

7.2.13. Community Health and Safety (B.6.1, B.6.2, B.3.1)

Baseline context. Central Java recorded 42,938 GBV cases in 2024, establishing a pre-existing elevated GBV environment against which the labor-influx risk must be assessed. The social baseline in Kelurahan Randusari and adjacent kelurahan includes 45 registered persons with disabilities in Sub-district of Semarang Selatan, a significant elderly population dependent on RSDK for ongoing care, and the Gunung Brintik pocket of poverty in Randusari, a community with limited economic resources and high vulnerability to project disruption.

Impact mechanism. SEA/SH risk (B.6.1) arises from the arrival of a construction workforce, even a locally recruited one, into communities where GBV is already prevalent, combined with inadequate Code of Conduct, lighting deficiencies, and weak reporting mechanisms. The Unlikely likelihood reflects the predominantly local labor pool in Kota Semarang, which reduces the cultural-friction component of labor-influx risk; the Moderate magnitude reflects the elevated baseline GBV environment that amplifies even modest workforce-community interactions. Vulnerable group marginalization risk (B.6.2) is Likely because standard consultation processes, held during business hours, requiring smartphone access for GRM, conducted in written Bahasa Indonesia only, systematically exclude elderly, disabled, low-literacy, and low-income community members. Both B.6.1 and B.6.2 are rated Moderate pre-mitigation, reduced to Minor through a signed Code of Conduct with explicit SEA/SH prohibitions, referral MoUs with PPT Seruni and LBH APIK, a Vulnerable Groups Action Plan (VGAP) annexed to the CESMP, and consultation adaptations (Bahasa Jawa facilitation, sign-language interpretation, accessible venues, gender-disaggregated GRM).

7.2.14. Labor Influx and Working Conditions (B.4.1–B.4.3, B.5.2, B.5.3)

Baseline context. The Kota Semarang labor market has a substantial construction-trades supply chain, reducing the likelihood of significant out-of-province workforce migration for this project. The provincial labor baseline shows a large informal workforce, with garment and trade sectors dominant alongside construction.

Impact mechanism. The construction workforce demand creates two distinct positive impacts: increased vendor income from the concentrated workforce's food and goods purchases (B.5.2, rated Positive) and local employment and wage income for unskilled and semi-skilled residents of Sub-district of Semarang Selatan (B.5.3, rated Positive). These are genuine and material benefits that CESMP is required to enhance, not merely note. The contractor is required to designate a vendor zone at the site perimeter, communicate worker meal-break schedules to nearby vendors, and report the local-to-non-local worker ratio monthly against a minimum 40% local share target.

7.2.15. Livelihoods, Internal Vendors and External PKL (B.5.1, C.1.1)

Baseline context. The socioeconomic baseline (Section 5.6.2) documents two distinct vendor populations: tenant food-stall operators and small retailers inside Gedung Elang with formal tenancy arrangements, and approximately 40 informal PKL on the public pavement along Jl. Dr. Sutomo and Jl. Dr. Kariadi with no formal relationship with RSDK. Both groups derive significant income from the

hospital's patient, visitor, and staff footfall. For internal tenants, the RSDK trading space is often the primary or sole source of household income; for external PKL, hospital-dependent foot traffic is the dominant revenue driver. The baseline census, to be completed before any displacement or access restriction, will quantify the income dependency of each affected household, disaggregated by gender, age, and vulnerability status.

Impact mechanism. Internal tenants will experience direct and total loss of their trading premises for the full duration of demolition and reconstruction, a physical displacement under AIIB ESS2 regardless of its temporary nature. External PKL faces indirect revenue loss from reduced pedestrian and vehicular throughflow caused by construction hoarding and lane restrictions. The pre-mitigation significance of B.5.1 is rated Minor in the matrix, but this rating incorporates the assumption that early engagement and transitional support are in place. Without them, the internal tenant impact should properly be rated Moderate. C.1.1 (PKL procedural displacement) is rated Moderate, reflecting the legal and reputational risk of managing displacement without documented prior consultation.

The mitigation sequence follows the AIIB ESS2 hierarchy strictly: early individual consultation and income census (minimum 60-day notice for tenants, 30-day for PKL); temporary trading location secured before demolition commences; at least one unobstructed pedestrian access route maintained along the commercial frontage throughout construction; monthly income monitoring through the GRM; and priority re-allocation of equivalent or improved trading space in the completed new building on terms no less favourable than pre-displacement arrangements.

7.2.16. Cultural Heritage and Archaeological Resources (B.7.1–B.7.4)

Baseline context. RSDK was established in 1925 as the *Centrale Burgerlijke Ziekeninrichting* Semarang and is formally registered as a National Level Cultural Heritage Property (Bangunan Cagar Budaya Peringkat Nasional) under Ministerial Decree No. 370/M/2017. The heritage condition assessment documents structural vulnerabilities that are directly relevant to construction-phase risk: brick masonry foundations at approximately 120 cm depth, reinforced concrete quality as low as fc' 19.03 MPa, timber roof truss deflection of 80 mm (allowable: 33 mm), and an absence of ring beams and tie beams in parts of the structure. The heritage building's proximity to the GMS-DC & SoE demolition works especially for SoE (Gedung Elang)— with parts of the structure at separation distances of less than two meter from Gedung Elang, creates a direct physical interface between demolition activity and protected heritage fabric. A wartime bunker structure dating from approximately 1939, discovered during previous IPAL excavation works, is located approximately 50 meters from the proposed Medical Center development area and may indicate the presence of additional subsurface archaeological remains. Three heritage-sensitive receptors in the wider AoI, GKI Gereja Gereformeerd, RSU William Booth, and Rumah Dinas Wakil Gubernur (eks. Rumah Tinggal Oei Tiong Ham) are exposed to indirect construction vibration and dust impacts.

The identified structural vulnerabilities, combined with the extremely close proximity between the heritage building and the proposed demolition and redevelopment works, indicate a heightened sensitivity to vibration, ground movement, and other construction-related disturbances. Accordingly, prior to any demolition, excavation, piling, or major construction activities, an independent pre-

construction condition survey should be undertaken by a heritage-qualified structural engineer. The survey should include detailed crack mapping, roof truss deflection measurements, and comprehensive photographic documentation of both exterior and interior heritage elements to establish a baseline condition against which any construction-related deterioration or damage can be assessed and monitored.

Impact mechanism. B.7.1 (physical damage to heritage structures) is rated Major pre-mitigation. The combination of Likely likelihood (demolition at less than one meter separation is inherently high-risk), Med–High magnitude (heritage fabric damage from vibration, settlement, or accidental contact), and Critical receptor sensitivity (nationally registered, irreplaceable heritage) justifies this rating. The Very High severity, irreversible loss of 100-year-old heritage fabric, means this impact receives priority management status alongside B.2.1. B.7.2 (visual setting degradation) is rated Moderate; the risk is real but manageable through Heritage Impact Assessment (HIA) and architectural design review before permits are issued. B.7.3 (bunker disturbance) is rated Minor given its Unlikely likelihood and the availability of a construction exclusion buffer; B.7.4 (subsurface archaeology) is rated Moderate, reflecting the Possible likelihood of unrecorded archaeological remains and the irreversible consequence of their destruction without recording.

The primary mitigation instrument for B.7.1 is the pre-construction engagement of a qualified structural heritage conservation specialist, continuous ISO 4866 vibration monitoring at heritage fabric with a 2 mm/s PPV trigger and 5 mm/s action level, pre- and post-works structural condition surveys for each construction sub-phase, and BPK Jawa Tengah notification and written approval before any work within the heritage buffer. For B.7.4, the Chance Find Procedure applies to all below-grade excavation works, with mandatory stop-work and 24-hour notification protocol to BPK Jawa Tengah upon any find.

7.3. Operational Phase Impacts

The operational phase begins at GMS-DC & SoE commissioning and extends across the facility's service lifetime. The overarching character of this phase is one of managed uplifts in environmental loading, wastewater, B3 waste, air emissions, and traffic, from an already well-managed baseline, combined with net beneficial improvements in service quality, climate resilience, and infection control capacity. The five-and-a-half-year UKL-UPL compliance record (2020–2025) demonstrates that RSDK has the institutional systems to manage these uplifts; the question for this assessment is whether those systems have the capacity to absorb the GMS-DC increment, and whether any gaps need to be closed before commissioning.

Several quantitative estimates in this section remain provisional pending the completion of the Pertek BMAL renewal, Pertek Emisi renewal, Rintek Limbah B3 update, and Andalalin refresh, all commissioned and underway at the time of this ESIA version. These are identified explicitly below and will be updated in Living Document v1.0.

7.3.1. Wastewater and Effluent Management (A.4.2)

Baseline. RSDK operates three wastewater treatment plants (Instalasi Pengelolaan Air Limbah – IPAL) with a combined capacity of 1,546 m^3/day. These facilities consist of:

- IPAL 1 Sentral – total capacity of 1,200 m^3/day
- IPAL 2 Garuda II – total capacity of 96 m^3/day
- IPAL 3 Rajawali – total capacity of 250 m^3/day

All IPAL facilities are operated under a permit issued by the Directorate of Water Pollution Control, No. S.399/PPA/P3A/PKL.2/8/2021. The three IPAL units (Garuda, Sentral, Rajawali) achieve 96–97% BOD and COD removal efficiency against high inlet loadings (inlet BOD 345, COD 1,262 mg/L at Inlet IPAL Garuda), producing January 2025 outlet readings of BOD 12 mg/L, COD 42.1 mg/L, and TSS <13 mg/L, all well within PermenLH 68/2016 limits with substantial headroom. Total coliform at outlet is <2 MPN/100 mL against a limit of 3,000 MPN/100 mL.

Impact mechanism. GMS-DC & SoE commissioning will increase wastewater generation in proportion to the expanded inpatient bed number, outpatient throughput, Cathlab volume (9,846 to 16,001 procedures per year), and laboratory test volume (1.95 million to 3.16 million tests per year). The incremental flow and organic load will be absorbed by the existing three IPAL units, but only if their hydraulic and treatment capacity is confirmed as sufficient for the post-GMS-DC & SoE load. The Pertek BMAL renewal, commissioned under contract 113-AMS-2026, will provide this confirmation through a formal water balance (*Neraca Air*) and treatment-capacity calculation. Increasing wastewater load due to this expansion should be a basis for the DED document, therefore information on this should be confirmed by the time of the DED development. Until those results are available, the assessment is that the existing IPAL headroom, particularly the substantial headroom at IPAL Rajawali (BOD outlet <7 mg/L, COD <14.3 mg/L) suggests sufficient capacity for a moderate uplift, but this cannot be confirmed quantitatively at this version. Pre-mitigation significance is rated Moderate, with residual significance Minor following Pertek BMAL renewal and IPAL capacity verification.

In addition, the existing SOP of WWTP shall be reviewed and updated prior to the hospital expansion to reflect both the increased operational scope and compliance with Permen LH/BPLH No. 11/2025, which establishes new wastewater quality standards and requires adoption within a 2-year transition period ending September 2027. The updated SOP will cover expanded monitoring parameters (BOD, COD, TSS, NH3-N, fecal coliform, and microbiological pathogens), revised sampling procedures, grease trap and B3 waste management, and updated reporting requirements, with full implementation prior to expanded hospital operations.

7.3.2. (Hazardous) Waste Management (A.4.2)

Baseline. The Q1 2026 Neraca Limbah B3 confirms compliant manifest discipline across all seven B3 waste streams (A337-1 infectious, A337-2 pathological, A337-3 sharps, B337-1 pharmaceutical, B337-2 laboratory chemicals, B337-4 WWTP sludge, B337-5 incinerator ash) under the PT PRIA service

contract. TPS Limbah B3 operates under SOP Pengelolaan B3 Rev.5 and SOP Tanggap Darurat TPS B3 Rev.3.

Impact mechanism. Expanded clinical capacity will proportionally increase generation across all B3 categories, particularly infectious waste (A337-1) from additional procedure volumes and pharmaceutical waste (B337-1) from an expanded formulary. The hazardous wastes temporary storage (TPS Limbah B3) physical capacity and the PT PRIA transporter contract volume will need to be reviewed against the post-GMS-DC & SoE generation projections in the Technical Detailed of Hazardous Wastes document (Rintek Limbah B3) renewal. Segregation training for clinical staff in the new GMS-DC & SoE building is a specific action required before commissioning. Pre-mitigation significance is Moderate; residual significance is Minor following Rintek Limbah B3 renewal, expanded TPS capacity if required, and refreshed training.

7.3.3. Radiation Safety and Radioactive Materials

Operation of the redeveloped nuclear medicine service RSDK, including Tier-1 medical equipment such as PET/CT (F-18 as FDG and PSMA; Ga-68 as DOTATATE), SPECT/CT (I-131 diagnostic) and nuclear medicine therapy facilities (I-131 and Sm-153), introduces operational radiation exposure risks to workers, patients, maintenance personnel and waste handlers, and to the controlled hospital environment. The radioactive materials concerned are those authorised under the hospital's two BAPETEN operating licences, namely KTUN No. 06875.351.5.090724 (in vivo diagnostic nuclear medicine) and KTUN No. 03939.347.3.260424 (therapeutic nuclear medicine), which together cover F-18, Ga-68, I-131 and Sm-153 in open, liquid form. Potential operational impacts include occupational exposure to ionising radiation during preparation, administration and imaging of radiopharmaceuticals; accidental contamination events during dispensing, patient handling, dose administration or waste transfer; radioactive material handling risks associated with receipt, storage, dispensing and administration of unsealed sources; and radioactive wastewater generation from patients receiving I-131 and Sm-153 therapy, with the corresponding requirements for engineered isolation, delay-decay storage and RPO-evaluated release as set out in Section 7.2.6.

Operational controls are anchored in the conditions of the BAPETEN operating licences and in the requirements of PP No. 61 of 2013 on Radioactive Waste Management, PerKa BAPETEN No. 8 of 2016, and, insofar as overlapping hazardous-waste provisions apply, PP No. 22 of 2021 and PermenLHK No. 9 of 2024. International practice is anchored to IAEA GSR Part 3 (International Basic Safety Standards for Radiation Protection and Safety of Radiation Sources) and to the WHO position on radiation safety in health-care facilities. Specific operational measures comprise: shielding design of the nuclear medicine building in accordance with *the Dokumen Rencana Teknis Bangunan Gedung Penahan Radiasi* No. PR.05.01/D.X/3047/2024 (26 March 2024); controlled-access zoning of the hot-lab, isolation rooms, imaging suites and radioactive-waste storage areas; routine radiation monitoring using calibrated contamination monitors, dose calibrators and survey meters; personnel dosimetry for all named workers; radioactive-material inventory management from receipt to release, including formal decommissioning of any source no longer in use; segregation, labelling, delay-decay storage and RPO-supervised release of radioactive solid waste, wastewater and contaminated linen, as set out

in Section 7.2.6; and emergency response procedures covering spill, contamination, loss of source and unplanned exposure events, with mandatory reporting to BAPETEN.

Licensing of all radiation sources through BAPETEN, appointment of the designated Radiation Protection Officer (RPO/PPR) and verification of radiation-protection programmes and commissioning are mandatory prior to operation of the redeveloped radiological and nuclear medicine services. With these controls in place, and subject to ongoing compliance with the BAPETEN licence conditions, the residual impact is assessed as Minor during normal operation and Moderate in the event of an unplanned contamination or exposure event, reducing to Minor with the emergency response procedures described above fully implemented.

7.3.4. Air Emissions (stack and operational) (A.4.2, Scope 1)

Baseline. The 2024–2025 Hasil Uji Emisi Cerobong records confirm that all five operational genset stacks (Rajawali, Garuda 2, Irja, Fasum, Kasuari) and the two Miura boiler stacks are compliant with PermenLH 15/2019 Annex IX under their current duty cycles. Generator runtime is predominantly associated with monthly scheduled testing rather than continuous emergency operation, keeping the steady-state emission burden modest.

Impact mechanism. GMS-DC & SoE commissioning increases the installed generator and boiler capacity to serve the expanded facility. If operational demands increase generator runtime, for example, through more frequent grid-supply interruptions during peak hospital loads, the corresponding NOx, CO, and PM emission burden will rise. The Pertek Emisi renewal will quantify the post-GMS-DC & SoE stack emission profile and confirm compliance with PermenLH 15/2019 at the higher load. Scope 1 GHG emissions from boiler and generator combustion are addressed in Chapter 9. Pre-mitigation significance is Minor for routine operational emissions; Scope 1 GHG significance is addressed separately in the climate chapter.

7.3.5. Operational Traffic (B.3.1 operational)

Baseline. SUP Dr. Kariadi is the dominant traffic generator in the surrounding road network, operating 24 hours per day from Jl. Dr. Sutomo No. 16, Semarang. The existing Andalalin baseline (approval No. KP.3986/LT.408/DRJD/2020) documents peak-hour congestion on Jl. Dr. Sutomo and Jl. Dr. Kariadi at or near capacity, with volume-to-capacity (V/C) ratios approaching or exceeding 0.85 during the morning (07:00–09:00) and evening (16:00–18:00) peak periods. On-street parking by visitors, patient drop-off and pick-up activity, and the BRT Trans Semarang stop at Halte BRT Kariadi, less than 100 metres from the main entrance, further compound peak-hour congestion. The M1 baseline traffic survey (May 2026) has been conducted to provide quantitative inputs for the Andalalin refresh.

Impact mechanism. The GMS-DC & SoE redevelopment will substantially increase hospital capacity across all service lines: inpatient beds from 543 to 852 (+57%), outpatient visits from 591,165 to 885,950 per year (+50%), inpatient admissions from 55,401 to 82,986 per year (+50%), surgical procedures from 44,151 to 59,882 per year (+36%), operating rooms from 20 to 39 (+95%), Cathlab suites from 4 to 6 (+50%), and total workforce from 1,321 to 1,539 (+218 staff). These capacity

increases will generate a substantial additional trip volume on the two principal approach roads through four compounding mechanisms: (i) patient and visitor trips driven by the 50 per cent increase in outpatient and inpatient throughput, with each inpatient admission generating multiple associated visitor trips over the duration of stay at the projected BOR of 80 per cent; (ii) staff commuting trips from the additional 218 personnel, predominantly during the morning and evening peaks, with shift-change patterns for the 24-hour clinical operation creating secondary peak-hour loading; (iii) service and supply vehicle trips from increased logistics movements including medical supplies, pharmaceutical and blood-product transport, laundry, catering, and B3 waste collection; and (iv) ambulance and emergency vehicle trips from the expanded IGD (58 to 80 beds) and additional Cathlab suites, which require unimpeded corridor access on Jl. Dr. Sutomo at all times. This is the most significant operational environmental loading increase in purely physical terms, and it acts on a receiving road network that has no spare capacity under current conditions.

*Significance and mitigation***.** The refreshed Andalalin will quantify the additional trip generation, model intersection-level performance under post-GMS-DC & SoE loading, and determine whether capacity improvements, public transport enhancements, or demand-side parking management are required. Until the Andalalin results are available, the operational traffic impact is assessed as Moderate pre-mitigation (likely probability, medium magnitude, local extent, permanent duration, high receptor sensitivity), with residual significance Minor contingent on implementation of the refreshed Andalalin recommendations. Until it's finalised, RSDK should require the contractor to provide and implement an interim Construction Transportation Management Plan (TMP), covering heavy vehicle routing away from the main road (Jl. Dr. Sutomo) during peak hours, emergency vehicle priority corridor, community notification for major deliveries, etc. Mitigation follows the AIIB ESS 1 hierarchy and centres on three categories: (i) supply-side capacity improvements, intersection-level upgrades as recommended by the refreshed Andalalin, internalisation of patient drop-off/pick-up and ambulance staging within the GMS-DC and SoE basements, and a dedicated emergency vehicle priority corridor on Jl. Dr. Sutomo; (ii) demand-side management, tiered parking tariffs, subsidised BRT passes for staff in coordination with Trans Semarang, staggered shift schedules for non-clinical staff, and a telemedicine programme for follow-up consultations consistent with the Smart Hospital strategy; and (iii) operational traffic management, off-peak scheduling of supply deliveries (10:00–15:00), real-time traffic monitoring at the Jl. Dr. Sutomo / Jl. Dr. Kariadi junction linked to Dishub's adaptive signal control, and clear wayfinding signage directing patients, visitors, ambulances, and service vehicles to the correct entrance. Pre-mitigation significance would escalate to Major if the refreshed Andalalin identifies intersection-level failure conditions (level of service F), in which case additional capital-intensive interventions (road widening, grade-separated access, or mandatory parking caps) may be required and the ESMP updated accordingly.

*Monitoring***.** Annual traffic counts and intersection performance surveys benchmarked against the Andalalin refresh baseline, with results reported to RSDK Director, Dishub, and AIIB safeguards team within 30 days of completion; quarterly parking utilisation and staff transport mode-share review; continuous emergency vehicle access monitoring (target: zero obstruction incidents, with 24-hour reporting and 48-hour corrective action); and community grievances tracked through the project GRM and reported in the semi-annual AIIB safeguards report. The Andalalin refresh, once finalised and approved by Dishub, will supersede the interim assessment in this sub-section and its

recommendations will be incorporated into the ESMP matrix (Chapter 8) as binding operational-phase commitments.

7.3.6. Public Health and Infection Control (B.2.1 operational)

Baseline. RSDK's IPC framework, managed under Permenkes 27/2017, provides the institutional reference. The HAI surveillance system maintained by the IPC Committee provides the baseline infection rate against which operational-phase changes can be measured.

Impact mechanism. GMS-DC & SoE's architectural design incorporates ICRA zoning and infection-control features from the outset, a significant improvement over the existing built environment in Gedung Elang, which was not designed to current IPC standards. The expanded service capacity and higher patient throughput in the new building will increase the total volume of high-risk clinical procedures (Cathlab, oncology, transplant), which increases the absolute number of patients at elevated HAI risk. However, the improved physical infrastructure, upgraded HVAC design, and modern clinical workflow are expected to maintain or reduce the HAI rate per admission relative to the pre-GMS-DC & SoE baseline. Operational IPC is therefore assessed as stable relative to baseline, with net beneficial improvement expected from the upgraded built environment. Mitigation focuses on commissioning-phase ICRA verification and infection control training for clinical staff in the new facility before occupancy.

7.3.7. Hospital Service Quality and Continuity (beneficial)

GMS-DC & SoE commissioning delivers net beneficial impacts on hospital service quality that are assessed as Positive in the matrix. The expanded capacity reduces IGD stagnation, a documented problem in the existing configuration, improves clinical pathway integration between diagnostics and inpatient services and increases the tertiary referral capacity available to the 36.5 million population of Central Java. The FS projections of Cathlab volume growth and laboratory test volume growth are the quantitative expression of this benefit. These positive impacts require active management through phased commissioning protocols and RSDK clinical governance review, but they do not require mitigation in the conventional sense.

7.3.8. Climate Adaptation Resilience (beneficial, Chapter 9)

The Smart Hospital and Green Hospital design strategies embedded in GMS-DC & SoE, drainage capacity upgraded to a 1-in-50-year standard, heat-resilient building envelope, PLN priority restoration partnership, solar PV installation, and GBCI Greenship compliance, improve RSDK's operational resilience to the climate projections for Kota Semarang through 2050 (increasing extreme rainfall intensity, urban heat island amplification, and grid-supply disruption risk). These are assessed as **Positive** operational impacts and are elaborated in Chapter 9.

7.3.9. Vendor Re-integration and External PKL (B.5.1 operational, C.1.1 operational)

The operational phase transforms the temporary livelihood displacement of the construction phase into either a genuine improvement or a permanent deterioration, depending entirely on how RSDK manages the re-allocation process. For internal vendor tenants, the completion of GMS-DC creates a new spatial configuration with redesigned food and retail service zones. The FS throughput projections (Cathlab 16,001 procedures/year, laboratory 3.16 million tests/year) translate directly into a larger and more stable customer base, meaning that well-managed re-integration produces materially better trading conditions than the pre-displacement baseline. The risk is institutional failure: re-allocation on materially worse terms, without transparency or documented criteria, would constitute a permanent adverse livelihood impact that was not compensated during the construction phase.

For external PKL, the permanent reconfiguration of pedestrian and vehicular circulation around Jl. Dr. Sutomo and Jl. Dr. Kariadi determines whether the net effect is neutral-to-positive (higher hospital throughput generating more foot traffic past trader pitches) or adverse (new security perimeters or landscaping eliminating access to trading frontage). This assessment remains provisional until the Andalalin refresh quantifies operational pedestrian flow distribution. Both groups require a post-construction livelihood monitoring program for a minimum of 12 months after operational handover, reported through the GRM, to confirm whether residual adverse impacts materialize and, if so, to trigger AIIB ESS2 compensation procedures. Pre-mitigation significance for the re-integration risk is assessed as Minor adverse with a Positive dimension; the PKL operational impact remains Minor, consistent with the construction-phase rating.

7.4. Environmental and Social Risk and Impact Matrix

Table 6-6 below presents the complete Environmental and Social Risk and Impact Matrix for all 26 identified impacts across three categories: Environmental Risks and Impacts (A.1–A.6), Social Risks and Impacts (B.1–B.7), and Legal and Procedural Risks (C.1). The matrix is the primary analytical instrument of this ESIA and serves as the principal reference for the Mitigation Hierarchy and ESMP in Chapter 7. It is not to be modified without a documented update to this ESIA version record.

Table 64 Environmental and Social Risks and Impacts Matrix

No / Ref	Project Activities causing Risks / Impacts	Triggering Activities	Nature & Duration	Receptors (Location)	Likelihood	Magnitude	Spatial Scale	Receptor Sensitivity	Severity	Risk / Impact Significance
A. ENVIRONMENTAL IMPACTS AND RISKS										
A.1.1	IMPACT, Dust and particulate emissions (PM_{10}/$PM_{2.5}$) from demolition, earthworks and material handling	Demolition of IGD & Elang buildings; earthworks; concrete cutting; material stockpiling; haul truck movements on unpaved surfaces	Adverse / Temporary (18–24 months, construction phase only)	Hospital patients and staff within 100 m of construction zone; tenants; residents of Kel. Randusari and adjacent kelurahan; immunocompromised patients in NICU/PICU/oncology wards	Certain	Medium	Local (100 m buffer zone)	High (active hospital with immunocompromised patients)	Substantial	**Moderate**
A.1.2	IMPACT, Vehicle and plant exhaust emissions (NOx, CO, SO_2)	Heavy plant operation; haul truck idling; generator use during utility changeover; workforce transport vehicles	Adverse / Temporary (construction phase only)	Hospital compound occupants; tenants; roadside communities along Jl. Dr. Kariadi and Jl. Dr. Sutomo	Certain	Low	Local (site boundary + 50 m)	Medium	Limited	**Minor**
A.2.1	IMPACT, Construction and demolition noise exceeding permissible thresholds	Demolition breaking; piling; concrete cutting; heavy vehicle movements; generator operation	Adverse / Temporary (intermittent over 18–24 months)	Nearest hospital wards (~30 m from construction boundary); tenants; residential properties along Jl. Dr. Kariadi; outpatient waiting areas	Certain	Medium	Local (extends to ~200 m from source)	High (patients requiring rest; night-time ward occupancy)	Substantial	**Moderate**
A.2.2	IMPACT, Ground-borne vibration from piling and mechanical demolition	Impact/driven piling; mechanical demolition of IGD & Elang multi-storey structures; compaction of backfill	Adverse / Temporary (piling: 3–6 months; demolition: 2–4 months)	Nationally designated heritage building (Cagar Budaya, <50 m); adjacent clinical structures with sensitive medical equipment (MRI, CT); underground utilities	Likely	High	Site-level (vibration propagation up to 100 m, structure-dependent)	Very High (irreplaceable heritage structure; precision medical equipment)	Major	**Major**
A.3.1	RISK, Asbestos-containing material (ACM) exposure during demolition of pre-2000 structures	Pre-demolition ACM survey; stripping of roofing, floor tiles and pipe lagging; demolition of structures with confirmed or suspected ACM in IGD & Elang buildings	Adverse / Temporary (ACM removal phase, typically 2–8 weeks per structure)	Demolition workers in direct contact with ACM; hospital staff and patients in adjacent buildings (airborne fibre pathway); neighbouring community (wind-dispersed fibres)	Possible (contingent on ACM survey results and demolition method controls; reduced by RSDK's existing institutional asbestos SOP, which provides a baseline procedural framework but requires verification and upgrade for full-building demolition scale per PermenLHK P.56/2015 and WBG EHS Guidelines)	High (carcinogenic; long-latency health effects)	Local to Site-level (fibre dispersion dependent on wind and enclosure integrity)	Very High (occupational health; irreversible health outcomes)	Substantial	**Moderate**
A.4.1	IMPACT, Construction and demolition waste generation; augmented medical waste during expanded operations	Demolition of IGD & Elang buildings (concrete rubble, rebar, ceiling/wall materials); fit-out packaging; expanded clinical throughput post-commissioning (B3 medical waste)	Adverse / Temporary (construction) and Permanent (operational waste increase)	On-site waste storage areas; licensed disposal facilities; hospital waste management system; stormwater drains at risk of contamination from unsegregated waste	Certain	Medium	Site-level (waste management within compound); off-site disposal chain	Medium (existing hospital waste management infrastructure in place)	Moderate	**Moderate**
A.4.2	IMPACT, Sediment-laden construction runoff and increased clinical wastewater volumes	Earthworks dewatering; concrete washout; expanded bed capacity post-commissioning increasing IPAL Sentral loading	Adverse / Temporary (construction) and Permanent (increased wastewater loading)	IPAL Sentral (on-site wastewater treatment); stormwater drainage channels; downstream surface water bodies	Likely	Medium	Local to Regional (downstream receiving waters)	Medium (urban drainage system with existing capacity constraints)	Moderate	**Moderate**
A.5.1	IMPACT, Potential soil contamination from fuel/lubricant spills and legacy fill disturbance	Fuel storage and refuelling; hydraulic equipment operation; excavation of foundation pits within 188,080 m² BMN site	Adverse / Temporary (construction phase; remediable)	Subsoil and groundwater beneath construction footprint; adjacent building foundations	Possible	Low	Site-level (within construction footprint)	Low (urban modified land; no sensitive aquifer identified)	Limited	**Minor**
A.6.1	IMPACT, Loss of mature trees and modified urban habitat within construction footprint	Site clearance for GMS-DC footprint; temporary laydown area preparation; landscaping redesign	Adverse / Permanent (tree removal) with partial reversibility through compensatory planting	Existing mature tree canopy within RSDK compound; urban greenery corridor; avian habitat (common urban species only, no critical habitat per IFC PS6 screening)	Certain	Low	Site-level	Low (modified urban habitat; no protected species)	Limited	**Minor**
A.7.1	IMPACT, Physical hazards and environmental consequences of controlled demolition of IGD and Elang buildings	Mechanical demolition (hydraulic breakers, long-reach excavators); structural weakening during progressive dismantlement; rubble loading and haulage; temporary structural instability during partial demolition	Adverse / Temporary (demolition phase: estimated 2–4 months per building)	Adjacent occupied hospital buildings and heritage structure (structural integrity); on-site workers (falling debris, crush hazard); ambient air quality (fugitive dust plumes); ground stability beneath adjacent structures; site access routes (rubble haulage)	Likely	High (multi-storey reinforced-concrete demolition within operational hospital compound)	Site-level (debris fall zone, vibration propagation, dust plume)	Very High (operational hospital; heritage building; patients and staff in adjacent structures)	Major	**Major**
B. SOCIAL IMPACTS AND RISKS										
B.1.1	RISK, Disruption to clinical services from construction and demolition activities within an operational tertiary hospital	Utility tie-ins and switchovers; access route diversions; dust/noise from demolition affecting wards; crane operations over occupied buildings	Adverse / Temporary (construction phase; intermittent disruptions)	Emergency department (IGD); inpatient wards; outpatient clinics; diagnostic services; patients requiring continuous care (ICU, NICU, PICU); ambulance access routes	Likely	High	Site-level (hospital-wide services)	Very High (tertiary referral hospital; life-critical services cannot tolerate interruption)	Major	**Major**
B.2.1	RISK, PRIORITY ITEM, Healthcare-associated infection (HAI) transmission to immunocompromised patients from demolition/construction-generated airborne particulates and water-system disturbance	Demolition dust from IGD & Elang; plumbing modifications; HVAC disruption; water-system shutdowns; barrier breaches between construction/demolition zones and clinical areas	Adverse / Temporary (construction phase; acute infection episodes may have long-term consequences)	Immunocompromised patients (oncology, transplant); neonates (NICU); ICU/PICU patients; surgical patients (post-operative infection risk); healthcare workers	Possible (contingent on IPC barrier integrity and ICRA compliance)	Very High (potentially fatal nosocomial infections; Aspergillus, Legionella pathways)	Site-level (airborne and waterborne pathways within hospital complex)	Very High (immunocompromised and neonatal populations; zero-tolerance clinical environment)	Critical	**Critical**

No / Ref	Project Activities causing Risks / Impacts	Triggering Activities	Nature & Duration	Receptors (Location)	Likelihood	Magnitude	Spatial Scale	Receptor Sensitivity	Severity	Risk / Impact Significance
B.3.1	IMPACT, Increased heavy vehicle traffic from demolition rubble haulage and construction material deliveries	Demolition rubble trucks (est. 20–40 movements/day peak); concrete mixer deliveries; crane mobilisation; workforce commuting	Adverse / Temporary (construction phase; peak during demolition and piling)	Jl. Dr. Kariadi and Jl. Dr. Sutomo (existing congestion); hospital emergency access; pedestrians including patients, visitors, elderly and disabled persons; external PKL (≈40–45 vendors) on Jl. Dr. Sutomo	Certain	Medium	Local (primary haul routes and hospital access points)	High (emergency vehicle access; vulnerable pedestrians; active hospital entrance)	Substantial	**Moderate**
B.4.1	RISK, Workplace accidents, falls from height, struck-by incidents and occupational illness among construction and demolition workers	Demolition at height; working at height during structural works; heavy lifting; confined-space work; exposure to dust, noise, ACM and hazardous materials	Adverse / Temporary (construction phase; acute injury events)	Construction and demolition workers (direct); subcontractor workforce; hospital staff in adjacent areas (indirect, if exclusion zone is breached)	Likely (inherent to demolition and construction of this scale)	High (fatality or permanent disability potential)	Site-level (construction and demolition zones)	High (manual labour workforce; multi-tier subcontracting increases supervision gaps)	Major	**Major**
B.4.2	RISK, Child labour or exploitative labour practices in the construction and demolition supply chain	Subcontractor workforce mobilisation; informal labour recruitment for manual demolition and unskilled tasks	Adverse / Temporary (construction phase)	Minors and vulnerable workers potentially recruited through informal subcontracting chains	Possible	High (violation of fundamental labour rights; reputational and legal consequences)	Site-level and supply chain	High (informal labour market; multi-tier subcontracting common in Indonesian construction sector)	Substantial	**Moderate**
B.4.3	RISK, Absence of accessible, confidential and effective worker grievance channels	Multi-tier subcontracting; language/literacy barriers among workers; power asymmetry between workers and supervisors	Adverse / Temporary (construction phase; systemic risk if not addressed at mobilisation)	Construction and demolition workers, particularly lower-tier subcontractor employees and migrant workers	Possible	Medium (unresolved OHS hazards; potential labour violations; worker disempowerment)	Site-level	High (vulnerable workforce; limited existing grievance infrastructure in Indonesian construction sector)	Moderate	**Moderate**
B.5.1a	IMPACT, Temporary relocation of two internal canteen operators (IGD and Elang buildings) under phased construction sequence (ESS2 Avoidance)	Phased relocation: GMS-DC constructed first on the current parking area; the two canteen operators relocate directly into permanent GMS-DC trading spaces; the IGD & Elang buildings are demolished only after relocation is complete. No trading gap occurs.	Adverse / Temporary (relocation transition period only; no cessation of trading).	Two internal canteen operators (IGD and Elang) and their employees and dependants. The IGD canteen is operated by three women under Dharma Wanita Persatuan RSDK (primary household income). Six rear-yard canteens/kiosks are NOT displaced (operational coordination only).	Certain (relocation occurs, but Avoidance of economic displacement is achieved at the design stage)	Low	Site-level (within RSDK compound)	Medium (small-scale operators; limited capital; women-operated)	Limited	**Minor** *(pre-mitigation)* *→ Negligible residual*
B.5.1b	IMPACT, Potential economic displacement of five Gedung Korpri canteen operators (relocation or non-renewal; pending RSDK decision)	Redevelopment/demolition of the Gedung Korpri canteen building (formerly KORPRI-managed, now RSDK). Five operators trade under annual (Jan–Dec) tenancies at IDR 35M/unit/yr inside a fingerprint-access zone (staff-only customers). Building holds six canteen units (five occupied, one vacant) plus one washbasin. Outcome depends on Pathway A (relocation, ex-KFC ~15 m, no fingerprint; or Record Center ~150 m) or Pathway B (non-renewal).	Adverse / pathway-dependent, Temporary if relocated (Pathway A) or Permanent economic displacement if non-renewed (Pathway B, ESS2).	Five operators and their employees and dependants. Several women-operated stalls and older sole breadwinners (Bu Retno 61; Bu Ning 44; Ibu Putri 61); two vulnerable women employed at Manfaat Berkah.	Certain (demolition occurs; livelihood outcome depends on the pending decision)	Medium–High (pathway-dep.)	Site-level (within RSDK compound)	High (women-headed; elderly; sole-income; vulnerable employees)	Moderate–Major (pathway-dep.)	**Moderate–Major** *(pathway-dependent) pre-mitigation* *→ Negligible (Pathway A)* *→ Minor (Pathway B LRP)*
B.5.1c	IMPACT, Indirect environmental nuisance to external street vendors (PKL), not displacement (ESS1)	Construction hoarding, lane restrictions and noise/dust/traffic from demolition and piling near ≈ 40–45 PKL on Jl. Dr. Sutomo / Jl. Dr. Kariadi. PKL are outside RSDK property, not physically displaced; RSDK confirmed no relocation. Access maintained under the HOCP and Traffic Management Plan.	Adverse / Temporary and reversible; indirect environmental pathway (ESS1). Not economic displacement, ESS2 does not apply.	≈ 40–45 external PKL (indirect nuisance only), including some female-headed and elderly vendors reliant on hospital footfall.	Likely (during active demolition/piling)	Low	Local (adjacent public streets)	Medium	Limited	**Minor**
B.5.2	IMPACT, Positive economic effects from expanded hospital capacity and services	Commissioning of GMS-DC; expanded clinical services; increased patient referral volumes; new employment opportunities	Beneficial / Permanent	Hospital staff (new positions); local businesses and services; patients and families (improved healthcare access); Kota Semarang economy (multiplier effects)	Certain	Medium	Municipal (Kota Semarang and Kedungsepur area)	Positive receptor	Positive	**Positive**
B.5.3	IMPACT, Temporary positive economic contribution from construction and demolition employment	Contractor workforce mobilisation (est. 200–400 workers at peak including demolition crews); associated local spending on accommodation, food, transport	Beneficial / Temporary (construction phase, 3–4 years)	Local labour market; accommodation and food-service providers in Kec. Semarang Selatan; small-scale material suppliers	Certain	Medium	Local to Municipal	Positive receptor	Positive	**Positive**
B.6.1	RISK, Sexual exploitation, abuse and sexual harassment (SEA/SH) associated with construction/demolition workforce influx	Construction/demolition workforce presence in hospital compound; proximity to clinical and patient areas; power asymmetry; isolated work zones during demolition	Adverse / Temporary (construction phase; long-term trauma for survivors)	Female hospital staff; female patients and visitors; vulnerable community members; construction workers subjected to workplace harassment	Possible (inherent risk with large male workforce influx into healthcare setting)	Very High (severe personal harm; institutional and reputational consequences)	Site-level (hospital compound and immediate surroundings)	Very High (hospital environment; vulnerable patient populations; predominantly female clinical workforce)	Substantial	**Moderate**
B.6.2	RISK, Disproportionate impact of demolition-phase nuisance on vulnerable groups	Demolition nuisance (dust, noise, falling debris risk); construction disruption; changes to pedestrian access; relocation of services	Adverse / Temporary (construction phase; exacerbation of pre-existing vulnerabilities)	Elderly patients; persons with disabilities; pregnant women; children; immunocompromised patients; economically disadvantaged communities adjacent to the site (Kel. Randusari)	Likely	Medium	Local (hospital compound and adjacent kelurahan)	Very High (multiple overlapping vulnerability factors in hospital patient population)	Substantial	**Moderate**
B.7.1	RISK, PRIORITY ITEM, Structural vibration damage to nationally designated cultural heritage building from piling and demolition	Piling operations; mechanical demolition of IGD & Elang buildings; heavy compaction; crane operations near heritage structure	Adverse / Potentially Permanent (structural cracking or settlement may be irreversible)	Heritage building (Cagar Budaya under UU 11/2010; colonial-era RSDK main building); its architectural and historical significance; three additional heritage-sensitive receptors within ~360 m	Possible (contingent on piling method, demolition technique, and vibration monitoring effectiveness)	Very High (irreplaceable nationally designated cultural heritage asset; irreversible structural damage)	Site-level (vibration propagation dependent on geology and structural coupling)	Very High (irreplaceable heritage asset; protected under national law; high public and institutional significance)	Major	**Major**
B.7.2	IMPACT, Alteration of visual setting between heritage building and new GMS-DC structure	Construction of multi-storey GMS-DC; demolition altering existing spatial context; changes to sightlines; new building massing and height	Adverse / Permanent (irreversible change to visual relationship)	Colonial-era heritage building and its architectural setting; visual amenity of hospital compound; heritage conservation stakeholders (BPK Jawa Tengah Wilayah X)	Certain	Medium	Site-level (visual envelope within hospital compound and immediate surroundings)	High (heritage setting contributes to cultural significance under UU 11/2010)	Moderate	**Moderate**
B.7.3	IMPACT, Surface deterioration of heritage building from demolition dust and chemical deposition	Demolition dust from adjacent IGD & Elang buildings; concrete cutting; chemical cleaning agents; paint spray during fit-out of GMS-DC	Adverse / Temporary (construction phase; reversible with cleaning)	Heritage building facades and decorative elements; original surface finishes and patina	Likely	Low	Site-level (deposition limited to adjacent surfaces)	High (original heritage fabric; restoration may alter patina)	Limited	**Minor**

No / Ref	Project Activities causing Risks / Impacts	Triggering Activities	Nature & Duration	Receptors (Location)	Likelihood	Magnitude	Spatial Scale	Receptor Sensitivity	Severity	Risk / Impact Significance
B.7.4	RISK, Discovery of previously unrecorded archaeological or cultural heritage artefacts during excavation and demolition	Deep excavation for GMS-DC foundations; trenching for utilities; demolition revealing concealed structural elements or artefacts within the historic compound (est. 1920s)	Adverse / Temporary (discovery event; management response determines outcome)	Potential subsurface archaeological resources; historical artefacts embedded in building fabric of IGD/Elang structures	Unlikely (urban modified land; previous construction disturbance; but compound dates to 1920s)	Medium (significance dependent on nature of find; potential national heritage value)	Site-level	High (any find within a heritage compound warrants immediate professional assessment)	Limited	**Minor**
B.8.1	RISK, Community safety hazards from demolition of multi-storey buildings within operational hospital compound	Mechanical demolition of IGD & Elang buildings; use of hydraulic breakers and long-reach excavators; rubble loading; temporary structural instability during progressive dismantlement	Adverse / Temporary (demolition phase: 2–4 months per building; acute injury events)	Patients in adjacent wards; hospital staff; visitors; ambulance and emergency vehicle occupants; pedestrians on Jl. Dr. Kariadi; adjacent community residents (Kel. Randusari)	Possible (contingent on demolition method controls, exclusion zone enforcement, and structural monitoring)	Very High (potential for fatality or serious injury from falling debris, uncontrolled structural failure, or projectile fragments)	Site-level (exclusion zone and debris fall trajectory)	Very High (patients, including bed-bound and mobility-impaired, in adjacent occupied wards; public access hospital compound)	Major	**Major**

Significance legend

Minor	Negligible change; confined to footprint; manageable through standard good practice. No regulatory breach anticipated.
Moderate	Noticeable but limited change; extends beyond site boundary; reversible with targeted mitigation; requires specific CESMP measures.
Major	Significant change affecting sensitive receptors over a broad area or extended period; requires dedicated sub-plans and monitoring.
Critical	Severe, potentially irreversible impact on the most sensitive receptors; requires avoidance or highest-tier engineering controls before works proceed.
Positive	Beneficial impact; significance expressed as the magnitude of the benefit.

Note: Significance ratings are pre-mitigation. Residual significance ratings, assuming full implementation of measures in Table 7-7, are provided in Table 7-5. PRIORITY items (B.2.1 and B.7.1) require monthly reporting to the RSDK

7.5. Cumulative Impact Assessment

The Cumulative Impact Assessment (CIA) was conducted in accordance with the IFC Good Practice Handbook on Cumulative Impact Assessment and Management (2013). Its purpose is to evaluate whether the GMS-DC & SoE redevelopment, when considered alongside other past, present, and reasonably foreseeable activities in the Area of Influence, produces combined environmental and social effects that exceed what the project alone would generate, and whether those combined effects require a higher level of management response than the standalone impact ratings in Section 7.6 would otherwise indicate.

The CIA applies a stressor-pathway-receptor framework. Stressors from the GMS-DC & SoE redevelopment are mapped against stressors from other identified activities in the AoI, and their combined loading on shared receptors is assessed qualitatively and, where data permit, semi-quantitatively. The spatial boundary for the CIA extends beyond the project-level AoI defined in Section 7.1.2: it encompasses the broader Kota Semarang urban environment for city-scale stressors (GHG, wastewater, traffic) and focuses on a 500-metre receptor zone for local stressors (noise, PM_{10}, vibration). The temporal boundary spans the full construction period (estimated 2026–2029) and the first ten operational years (2029–2039), consistent with the climate risk horizon in Chapter 9.

7.5.1. Other Projects and Activities Considered

The following past, present, and reasonably foreseeable activities were considered in the CIA alongside the GMS-DC & SoE redevelopment:

- *Past and baseline conditions.* RSDK has operated as a Class A tertiary referral hospital since 1925. Background urban noise levels along Jl. Dr. Sutomo and Jl. Dr. Kariadi are elevated by continuous vehicular traffic. Ambient PM_{10} concentrations in central Kota Semarang reflect the combined contribution of the urban traffic network, industrial activity in the northern coastal zone, and seasonal biomass burning. The existing RSDK complex already generates significant wastewater, B3 waste, and energy demand loads that are managed under current regulatory permits.
- *Present activities.* Routine facility maintenance and minor capital works within the RSDK complex are ongoing and will continue in parallel with GMS-DC construction. Background construction activity in Sub-district of Semarang Selatan, including residential and commercial development, contributes to the cumulative noise and dust environment. Urban traffic on Jl. Dr. Sutomo and Jl. Dr. Kariadi operates at or near capacity during peak hours, as documented in the existing baseline traffic count.
- *Reasonably foreseeable activities***.** The broader TRUST Project includes parallel hospital redevelopment programs at other national referral hospitals in Indonesia, but these are geographically remote and carry no shared receptor interactions with RSDK. Within Kota Semarang, the Semarang City spatial plan (RTRW 2011–2031, as amended) designates the surrounding area as a Strategic Zone for Education and Health; no major competing

infrastructure projects within the immediate AoI have been identified at the time of writing, though this will be confirmed through the Andalalin refresh.

7.5.2. Construction-Phase Cumulative Impacts

Noise and air quality (A.1.1, A.2.1, elevated by cumulative loading)

The combination of GMS-DC & SoE construction activity, parallel RSDK maintenance works, and background urban construction in central Kota Semarang creates a cumulative noise and PM_{10} loading on the primary sensitive receptor, residents of Kelurahan Barusari RT 1/RW 5 and tenants inside the RSDK area, that is materially higher than the GMS-DC & SoE contribution alone. Background PM_{10} concentrations in central Semarang are estimated at *[to be confirmed from baseline monitoring campaign M1/M2]* µg/m³ against a national ambient standard of 75 µg/m³ (PP 22/2021). Construction-phase fugitive dust from GMS-DC earthworks and demolition will add an incremental load whose peak magnitude depends on construction sequencing and meteorological conditions.

For this reason, the fenceline PM_{10} and noise monitoring program specified in the ESMP applies cumulative trigger levels rather than project-contribution-only thresholds: the stop-work trigger is set against the ambient standard, not against a net-increment calculation. This is the operationally conservative and practically enforceable approach, and it reflects the cumulative loading reality at the receptor.

The effective pre-mitigation significance of A.1.1 and A.2.1, when assessed cumulatively, is considered one level higher than their standalone ratings for the residential receptor in Kelurahan Barusari, that is, approaching Critical for short peak-construction windows if background levels are already elevated. This does not change the residual significance ratings in Table 7-5, as the ESMP mitigation measures (water suppression, acoustic barriers, restricted hours, real-time monitoring) are designed to manage the cumulative load. It does, however, reinforce the non-negotiable nature of the stop-work trigger protocol.

Vibration (A.2.2, cumulative heritage sensitivity)

Ground vibration from GMS-DC piling and deep foundation works interacts with the pre-existing structural vulnerability of the nationally registered heritage building. No other current construction activity in the immediate vicinity generates significant ground-borne vibration; this pathway is therefore not amplified by external cumulative stressors. However, the baseline structural condition of the heritage building, assessed as exhibiting existing micro-cracking and differential settlement, means the receptor's sensitivity to any vibration source is already elevated before GMS-DC works commence. The Heritage Management Program's crack-mapping baseline survey and PPV monitoring program must therefore be interpreted against this pre-existing vulnerability, not against a notional undamaged-building standard.

7.5.3. Operational-Phase Cumulative Impacts

Wastewater and receiving water quality

The three IPAL units at RSDK (Garuda, Sentral, Rajawali) discharge treated effluent into the Kota Semarang municipal drainage network. The receiving network also accepts discharge from other institutional and residential users in Sub-district of Semarang Selatan. GMS-DC & SoE's operational uplift will increase RSDK's treated effluent volume in proportion to the expanded bed and service capacity. The Pertek BMAL renewal currently underway will quantify this incremental contribution within the context of the receiving network's cumulative hydraulic and water quality loading. Until that analysis is complete, it is not possible to determine whether the combined discharge, from RSDK and other users, approaches or exceeds the receiving water quality standard for the relevant drainage channel. This is identified as a data gap requiring resolution in Living Document v1.0.

Traffic

The Andalalin baseline traffic count documents that Jl. Dr. Sutomo and Jl. Dr. Kariadi are already operating at or near capacity during morning and evening peak hours. GMS-DC& SoE's operational traffic generation, projected against the FS service growth figures (Cathlab: 9,846 to 16,001 procedures per year; laboratory tests: 1.95 million to 3.16 million per year), will add a measurable increment to an already constrained network. The cumulative effect of this increment, combined with background city traffic growth under the Semarang RTRW projections, is the primary concern addressed by the Andalalin refresh. The refreshed Andalalin will determine whether intersection-level improvements, public transport enhancements, or demand-side parking management are required as cumulative mitigation, beyond the project-level Traffic Management Plan.

GHG emissions

GMS-DC & SoE's operational energy demand will contribute an incremental Scope 1, 2, and 3 GHG load to Kota Semarang's cumulative emissions profile and, at national scale, to Indonesia's NDC trajectory. The absolute magnitude of this contribution is quantified in Chapter 9. In cumulative terms, the relevant context is Indonesia's NDC commitment to a 31.89% unconditional emissions reduction by 2030. The Smart Hospital BMS, low-GWP refrigerant specification, solar PV installation, and GBCI Greenship envelope standard are the project's proportionate response to this cumulative obligation. They are not merely best-practice add-ons; they are the mechanism by which the project demonstrates NDC alignment at the facility level.

7.5.4. Cumulative Impacts on Priority Receptors

Two receptors warrant specific attention at the cumulative level.

- *Patients in ICU, ICCU, and NICU and tenants.* These patients and tenants are the most vulnerable receptor group in the entire project AoI. They are exposed to the cumulative effect of construction dust penetrating HVAC intakes, construction noise transmitted through building fabric, and potential infection-pathway interactions between construction activity and clinical zones. The standalone ratings for A.1.1 (Major), A.2.1 (Major), and B.2.1 (Critical) already reflect their High-to-Critical receptor sensitivity. At the cumulative level, the simultaneous occurrence of peak dust, noise, and IPC-breach risk, even if each individual pathway is managed to below its

trigger threshold, creates a combined stress on vulnerable patients that the HOCP and ICRA protocols must be designed to address as an integrated system, not as separate line items. The ESMP therefore requires a joint daily interface checklist between the construction site supervisor and the RSDK infection control team, with a single escalation pathway to the RSDK Director.

- *Residents of Kelurahan Barusari RT 1/RW 5***.** This community is exposed to the cumulative combination of background urban noise and pollution from Jl. Dr. Sutomo traffic, GMS-DC & SoE construction noise and dust, and any parallel maintenance works within the RSDK complex. Their cumulative exposure during peak construction windows is the primary driver of the fenceline monitoring protocol and the community grievance mechanism's noise and dust response commitment.

7.5.5. Management Implications and Monitoring Requirements

The CIA produces four specific management implications that supplement the standalone impact mitigation measures in Section 7.6:

- *Cumulative trigger levels in the ESMP*. Fenceline PM_{10} and noise monitors must be set against ambient standards, not project-increment calculations, to capture the cumulative loading experienced by receptors. Stop-work triggers apply regardless of whether the GMS-DC & SoE contribution alone would breach the threshold.

- *Joint construction-clinical interface protocol.* Given the cumulative stress on ICU/ICCU/NICU patients from simultaneous construction-phase stressors, the HOCP must include a daily cross-functional check between the site supervisor and the RSDK infection control officer, with authority to suspend works at any time.

- *Andalalin and Pertek BMAL as cumulative instruments.* The Andalalin refresh and Pertek BMAL renewal are not merely regulatory compliance exercises, they are the primary quantitative tools for characterising the cumulative operational traffic and wastewater impacts. Their outputs will determine whether additional city-level mitigation is required and must be incorporated into Living Document v1.0 upon completion.

- *Living Document update cadence.* The monthly Living Document update cycle maintains ongoing visibility of cumulative interactions as the project moves through construction and commissioning. Any new project or activity identified within the AoI during the construction period that may affect cumulative loading on the priority receptors identified above will be assessed and reported to the AIIB safeguards team within 30 days of identification.

8 MITIGATION MEASURES

This Environmental and Social Management Plan (ESMP) Impact-Mitigation Matrix has been prepared to systematically identify, assess, and manage the environmental and social risks and impacts associated with the construction and operation of RSDK Hospital. The matrix serves as the primary operational instrument for ensuring that all project activities are carried out in accordance with applicable Indonesian regulations, including PermenLHK environmental standards, PP 50/2012 on occupational safety management (SMK3), and relevant heritage protection legislation, as well as the Asian Infrastructure Investment Bank (AIIB) Environmental and Social Standards (ESS).

The matrix is structured across three principal domains: (A) Environmental Risks and Impacts, (B) Social Risks and Impacts, and (C) Legal and Procedural Risks. Within each domain, impacts are further organised by thematic sub-category, including air quality, noise and vibration, hazardous materials, waste management, climate resilience, biodiversity, healthcare service continuity, infection prevention and control (IPC), traffic management, labor rights, community livelihoods, gender-based violence and vulnerable groups, cultural heritage, and street vendor rights.

For each identified impact, the matrix presents: the project phase in which it arises; a pre-mitigation significance rating; the applicable mitigation hierarchy (Avoid, Minimize, or Restore); specific mitigation measures with assigned responsibilities and implementation timelines; measurable Key Performance Indicators (KPIs); and a residual significance rating following mitigation. Pre-mitigation significance is rated on a four-tier scale, Minor, Moderate, Major, and Critical, reflecting the combined assessment of likelihood and consequence. Residual significance reflects the expected level of risk remaining after all prescribed mitigation measures have been fully and effectively implemented.

Two impacts are designated as priority risks requiring the most stringent controls. First, the risk of elevated hospital-acquired infection (HAI) attributable to construction dust and disrupted HVAC pressure zones is rated Critical in view of the life-threatening consequences for immunocompromised patients in active clinical areas. Second, the risk of irreversible physical damage to nationally registered heritage structures from construction-induced vibration and differential settlement is rated Major, given the irreversible nature of potential harm. Both priority risks are subject to condition-precedent requirements that must be satisfied before site mobilization.

The matrix also identifies three positive social impacts, increased demand for local food and services, expanded local employment and wage income, and enhanced economic activity among community micro-enterprises, for which enhancement measures have been prescribed to maximise community benefit.

All mitigation measures identified herein shall be incorporated into the ESMP prior to mobilization. Implementation shall be monitored by the designated Responsible Parties identified in each row, with findings reported to the Environmental and Social Safeguards Officer and RSDK Project Implementation Unit (PIU) at the frequencies specified. The matrix shall be treated as a living document, subject to revision whenever project scope, site conditions, or the regulatory context materially changes

Table 65 Environmental and Social Impact-Mitigation Matrix

No.	Impact / Risk	Phase	Pre-Mit. Significance	Mitigation Step	Mitigation Measures	Responsible Party	Timing / Frequency	KPI / Success Indicator	Cost Estimation (IDR)	Residual Significance
A. ENVIRONMENTAL RISKS AND IMPACTS										
A.1 Air Quality										
A.1.1	Elevated dust / PM_{10} / $PM_{2.5}$ from earthworks, demolition, and vehicle movement	Construction	Major	Minimize	• Install wheel-wash stations at all site exits. • Apply continuous water-spray suppression on haul roads; prohibit dry sweeping • Enclose active demolition zones; halt high-dust works when wind exceeds 5 m/s. • Deploy real-time boundary PM_{10} monitors with trigger/action levels. • Erect solid ICRA hoarding between works and clinical areas. • Fit HEPA filters on downwind clinical-building air intakes. • Maintain negative pressure within enclosed zones; provide enclosed transfer walkways.	Main Contractor / RSDK IPC Team	Throughout construction; daily suppression; continuous monitoring	Boundary PM_{10} ≤80% of PermenLHK limit. Zero dust-attributable clinical complaints per month. Daily ICRA hoarding integrity check passed.	Rp 450 – Rp 600 M (wheel-wash & spray Rp 150-300 M; PM monitors Rp 80-160 M; ICRA hoarding Rp 100-200 M; HEPA filters Rp 120-250 M)	Moderate
A.1.2	Exhaust emissions (NOx, CO, particulates) from machinery and generators	Construction	Minor	Minimize	• Require Euro III+ machinery; verify certificates pre-mobilization. • Prohibit idling beyond 3 minutes; use low-sulphur diesel. • Position generators downwind of clinical zones.	Main Contractor	Throughout construction; monthly inspection	100% equipment Euro III+ certified pre-mobilization. No chronic idling in daily log. Monthly inspection record on file.	Rp 15 – Rp 25 M (administrative controls & inspection; equipment costs absorbed by contractor)	Minor
A.2 Noise and Vibration										
A.2.1	Construction noise from piling, demolition, and heavy equipment exceeding hospital/residential standards	Construction	Major	Minimize	• Restrict high-noise works to 08:00–17:00, Mon–Sat. • Prohibit impact piling near clinical zones after 15:00. • Deploy acoustic barriers (min SRI 25 dB) at rigs and demolition areas. • Prefer auger/vibratory over impact piling where feasible. • Monitor noise continuously at ward façades; 45 dBA triggers near ICU. • Issue 48-hour advance notice to ward managers.	Main Contractor / RSDK Facility Manager	Throughout construction; daily log; per high-noise event	Zero 45 dBA exceedance without corrective action within 2 hours. 100% high-noise events preceded by 48-hour notice. Monthly summary to Social Safeguards Officer.	Rp 250 – Rp 350 M (acoustic barriers Rp 160-300 M; noise monitoring system Rp 60-120 M; piling method premium Rp 30-100 M)	Moderate
A.2.2	Ground vibration from piling/demolition risking heritage damage and sensitive-equipment malfunction (MRI, CT, lab analysers)	Construction	Moderate	Minimize → Restore	• Conduct pre-construction structural survey of heritage buildings and equipment vibration-tolerance audit. • Monitor vibration continuously per ISO 4866 at heritage and imaging walls. • Apply PPV trigger (2 mm/s) and action (5 mm/s) levels; halt on exceedance. • Mandate non-impact methods within 20 m of heritage fabric. • Coordinate piling with imaging schedules.	Main Contractor / Structural Engineer / Heritage Specialist	Piling/demolition phases; continuous PPV monitoring	PPV within trigger levels throughout works. Zero vibration-attributable heritage or MRI/CT escalations. Pre/post condition surveys on file.	Rp 175 – Rp 280 M (vibration monitoring Rp 100-200 M; structural & equipment surveys Rp 75-150 M)	Minor
A.3 Hazardous Materials, Asbestos (ACM)										

A.3.1	Release of asbestos fibers during demolition of structures with potential ACM, irreversible inhalation risk	Preparation & Construction	Major	Avoid → Minimize	• Conduct pre-demolition inspection by a licensed occupational hygienist, both of which must be completed and approved before any demolition activity commences and implement management framework as attached in Annex B • Engage a licensed abatement contractor exclusively for ACM removal. • Use HEPA-filtered negative-pressure enclosures with sealed penetrations. • Require P3 respirators, coveralls, and decontamination chambers. • Dispose of ACM via licensed hazardous-waste transporter. • Conduct post-abatement air clearance before re-occupancy.	Main Contractor (Licensed ACM Subcontractor) / RSDK HSE	Survey pre-works; abatement before demolition; clearance per zone	Phase 1 & 2 survey reports approved pre-mobilization. Licensed contractor certificates on file. Post-abatement clearance below action levels; 100% waste manifests filed.	Rp 500– Rp 2 B (survey Rp 75-150 M; licensed abatement Rp 300-1.500 M; disposal & clearance Rp 125-350 M, scale depends on ACM volume found)	Minor
A.4 Waste Management										
A.4.1	Construction waste, demolition debris, packaging, and spoil	Construction	Minor	Minimize → Restore	• Prepare a Construction Waste Management Plan (CWMP) pre-mobilization. • Segregate at source: inert, recyclable metals, general, and hazardous waste. • Maximise recovery of concrete, steel, and timber via certified vendors. • Prohibit open burning; maintain a monthly waste register.	Main Contractor / RSDK HSE	CWMP pre-mobilization; monthly register	Approved CWMP on file before construction. Monthly register reviewed; zero open-burning. Inert-waste recycling ≥30% by weight (target).	Rp 50 – Rp 80 M (CWMP preparation Rp 15-30 M; segregation infrastructure & signage Rp 20-40 M; licensed disposal Rp 15-30 M)	Minor
A.4.2	Operational waste, domestic wastewater, medical liquid and solid hazardous waste	Operation	Moderate	Minimize → Restore	• Operate an integrated WWTP meeting PermenLHK standards; separate domestic and medical streams. • Pre-treat wastewater with detergents, disinfectants, and heavy metals. • Disinfect via chlorinator/UV; test monthly (internal) and quarterly (accredited lab). • Segregate solid medical waste by colour-coded bags. • Contract an MOEF-licensed vendor; manifest every shipment. • Provide a secured, leak-proof TPS LB3. • Update the existing SOP on hospital wastewater treatment and SOP on hazardous wastes management (see Annex XX) to include above points and according to the hospital expansion, including change type and number of wastes, monitoring sampling points, human resources, monitored parameter according to the latest national regulation and the updated Pertek BMAL and Rintek of TPS LB3	RSDK Technical Manager / Sanitation Unit / HSE	Operation; daily segregation; monthly/quarterly testing	Effluent within PermenLHK limits at all quarterly tests. Zero shipments without manifest. Zero non-compliance notices from MOEF/DINAS LH.	Rp 2 – Rp 4 B (WWTP upgrade/ commissioning Rp 1.500-4.000 M; TPS LB3 facility Rp 150-300 M; annual testing & manifests Rp 100-200 M/yr; licensed vendor contract Rp 250-500 M/yr)	Minor
A.5 Natural Hazards and Climate Resilience										
A.5.1	Structural vulnerability to seismic activity, flooding, and extreme rainfall threatening building integrity and operations	Prep, Construction & Operation	Major	Avoid → Minimize	• Design to SNI 1726:2019 seismic standards for the Semarang zone. • Target disaster-shelter (megathrust-resistant) certification. • Incorporate zero-run-off SUDS drainage. • Install a Smart Hospital BMS monitoring structural, MEP, and flood parameters. • Maintain a hazard-specific Business Continuity Plan (BCP).	Architect / Structural Engineer / Facility Manager / PIU	Design (standards); pre-commissioning (BCP); ongoing BMS	SNI 1726:2019 certification before permit issuance. BCP approved before commissioning. Monthly BMS monitoring reports in operation.	Rp 1.5 – Rp 2.8 B (seismic design premium ~2-3% of structure cost; SUDS drainage Rp 200-500 M; Smart BMS Rp 1.000-3.000 M; BCP development Rp 50-100 M)	Moderate

					• Integrate climate projections into envelope and MEP design.					
A.6 Mercury										
A.6.1	Mercury exposure to patients, staff, and environment from continued use of mercury-containing equipment and improper waste handling	Operation	Moderate	Avoid	• Ban procurement of mercury-containing medical devices, electrical/building equipment, and laboratory reagents in all new hospital facilities; • Conduct comprehensive mercury inventory within 6 months of operational commencement to identify and register all existing mercury-containing items • Implement phased phase-out schedule • Decommissioned mercury-containing items shall be managed through the B3 waste stream (segregated, sealed, transported, and disposed at licensed facility)	RSDK HSE	Effective from project operational commencement; applied to all new procurements	100% of procurement specifications require mercury-free alternatives by Year 1; Zero new mercury-containing items introduced.	Rp 150 – Rp 280 M (audit and safe handling operations); 1,500 M (procurement of mercury-free replacement)	Minor
A.7 Biodiversity and Ecology										
A.7.1	Vegetation clearance and potential introduction of invasive species via landscaping	Construction & Operation	Minor	Minimize	• Establish an invasive-species SOP prioritising native and endemic planting. • Apply controls during site preparation to prevent spread. • Conduct manual removal and integrated pest control where detected. • Maintain a green-area inventory updated biannually.	RSDK HSE / Facilities Team	Construction landscaping; biannual inspection in operation	Native species ≥70% of planted area. Zero invasive establishment at biannual inspection. Pest-control records maintained.	Rp 100 – Rp 160 M (native-species landscaping Rp 75-150 M; SOP/inventory management Rp 10-20 M; biannual pest control Rp 15-30 M/yr)	Minor
B. SOCIAL RISKS AND IMPACTS										
B.1 Healthcare Service Continuity and Patient Safety										
B.1.1	Disrupted access to medical care, emergency services, and clinical utilities during construction	Construction	Moderate	Avoid → Minimize	• Obtain RSDK Director approval of a Hospital Operational Continuity Plan (HOCP) before mobilization (condition precedent). • Subject every work package to ICRA review and clearance. • Prohibit simultaneous shutdown of redundant utilities; give 72-hour notice before planned shutdowns. • Maintain and inspect a marked emergency vehicle corridor daily. • Hold a daily construction–hospital interface meeting.	RSDK Director / Project Manager / ICRA Team / Clinical Liaison	HOCP pre-mobilization; daily meetings/inspections; monthly reporting	HOCP and per-package ICRA clearances on file. Daily access-corridor log; zero closures without alternative. Zero unplanned disruptions without same-day correction.	Rp 100 – Rp 160 M (HOCP preparation Rp 25-50 M; ICRA program coordination Rp 50-100 M; daily liaison officer Rp 25-50 M/yr)	Minor
B.2 Infection Prevention and Control (IPC)										
B.2.1	PRIORITY, Elevated hospital-acquired infection (HAI) risk from construction dust and disrupted HVAC pressure zones (life-threatening to immunocompromised patients)	Construction	Critical	Avoid → Minimize	• Conduct mandatory ICRA for all works near clinical zones; apply Class III/IV barriers as required. • Erect sealed floor-to-ceiling hoarding; maintain negative pressure relative to clinical areas. • Install HEPA filtration in adjacent wards during demolition/drilling. • Conduct daily IPC inspection; halt works on any breach.	Hospital IPC Committee / Contractor HSE / ICRA Team Leader	Continuous monitoring; daily IPC inspection; monthly HAI review	ICRA classification per work package. Zero unresolved airborne exceedances; negative pressure maintained. Zero construction-attributable HAI cases; 100% worker IPC induction.	Rp 300 – Rp 480 M (full ICRA program incl. barriers & monitoring Rp 150-300 M; HEPA filtration units Rp 100-200 M; IPC officer & surveillance Rp 50-100 M/yr)	Moderate

					• Induct all interface-zone workers on IPC; enforce hand hygiene. • Correlate monthly HAI surveillance with construction phases.					
B.3 Traffic, Road Safety, and Emergency Access										
B.3.1	Traffic congestion, accident risk, and compromised ambulance access on approach roads during construction	Construction	Minor	Minimize	• Obtain the Department of Trasnporation (Dinas Perhubungan) approval for a haulage route and schedule pre-mobilization. • Prohibit heavy-vehicle movements during school hours. • Maintain and inspect an unobstructed emergency lane daily. • Station trained marshals at every active exit. • Give 7-day community notice before access changes.	Contractor Traffic Manager / HSE / Dishub Liaison	Route approval pre-mobilization; daily inspection; weekly summary	Approved haulage route on file. Daily emergency-lane log; zero unresolved obstructions. Zero project-attributable incidents without corrective action.	Rp 50 – Rp 95 M (traffic management plan & signage Rp 25-60 M; marshal staffing Rp 15-40 M/yr; community notification Rp 10-20 M)	Minor
B.4 Labor Rights and Occupational Health & Safety										
B.4.1	OHS incidents, falls, crush injuries, fire/explosion, and chronic chemical exposure	Construction	Moderate	Minimize	• Implement an OHS Management Plan aligned with PP 50/2012 (SMK3) and AIIB ESS2 / ILO standards. • Conduct toolbox talks and signed induction before first site day. • Provide and enforce task-specific PPE. • Complete a Job Hazard Analysis for every high-risk task. • Run quarterly emergency drills with the RSDK Emergency Unit. • Report monthly OHS KPIs (LTIFR, near-miss).	Contractor HSE Manager / OHS Committee / Social Safeguards Officer	OHS Plan pre-mobilization; weekly audit; monthly KPI; quarterly drills	Approved OHS Plan and JHAs on file. 100% signed induction records. PPE audit ≥95%; LTIFR=0 target with 24-hour investigation.	Rp 250 – Rp 400 M (OHS plan & SMK3 certification Rp 30-80 M; PPE provision Rp 150-300 M; emergency drills Rp 20-40 M/yr; HSE officer cost allocated from overheads)	Minor
B.4.2	Child labor risk in contractor and subcontractor supply chains	Construction	Minor	Avoid	• Verify age (KTP/birth certificate) for every worker pre-engagement. • Include child-labor prohibition clauses in all contracts. • Require signed Code of Conduct before mobilization. • Conduct unannounced spot-checks; non-compliance triggers suspension.	Contractor HR / Social Safeguards Officer / Disnaker Liaison	Verification per engagement; monthly spot-check	100% age-verification coverage; no worker under 18. 100% signed Code of Conduct. Zero child-labor findings.	Rp 10 – Rp 15 M (administrative controls, Code of Conduct printing/distribution, spot-check labor cost)	Minor
B.4.3	Absence of an effective worker grievance mechanism, suppressing disputes and safety reporting	Construction	Minor	Minimize	• Establish a worker GRM with hotline, suggestion box, and focal person. • Communicate the GRM in Bahasa Indonesia at induction; post on site. • Acknowledge within 5 and resolve within 30 working days. • Maintain a monthly GRM log; quarterly summary to RSDK.	Contractor HR / GRM Focal Person / Social Safeguards Officer	GRM pre-mobilization; monthly log; quarterly summary	100% case categorisation and timeline compliance. ≥80% worker awareness of GRM channels. Quarterly summary submitted on schedule.	Rp 15 – Rp 24 M (hotline setup Rp 5-10 M; suggestion boxes & signage Rp 5-10 M; GRM focal person time allocation Rp 5-10 M/yr)	Minor
B.5 Local Livelihoods and Economic Impacts										
B.5.1 a	Livelihood impact, IGD & Elang canteens (phased relocation; ESS2 Avoidance)	Design & Construction	Minor	Avoid (design stage)	• Build GMS-DC first on the current parking area; relocate both canteens into permanent, equivalent-or-improved GMS-DC space before demolishing IGD/Elang, no trading gap. • Trading terms no less favourable; reimburse capital improvements not replicated in the new space.	RSDK Tenancy Officer / Social Safeguards Officer / EMU	Census pre-relocation; relocation before demolition; monthly GRM monitoring	Both operators relocated with no trading gap; terms no less favourable. Baseline census complete. Demolition only after relocation verified. No income decline attributable to relocation.	Rp 30–65 M (census & baseline Rp 10–20 M; moving, fit-out & signage Rp 20–60 M). No compensation, Avoidance.	Negligible

					• Transition support: moving costs, fit-out time, wayfinding signage. • Priority placement and tailored support for the women-operated IGD canteen (Gender Action Plan). • Pre-construction census/baseline of both operators; monthly GRM check-ins post-relocation. • Demolish IGD/Elang only after relocation is verified (stop-work clearance).					
B.5.1 b	Livelihood impact, Gedung Korpri (5 operators; relocation or non-renewal, pending RSDK decision)	Design & Construction	Moderate–Major (pathway-dep.)	Avoid (Pathway A) → Restore (Pathway B)	• Record formal RSDK decision (relocate vs non-renew) by [Q4 2026] and disclose to AIIB. • Pathway A (recommended): offer replacement space on no-less-favourable terms, sequenced before demolition; prefer ex-KFC (~15 m, no fingerprint, may improve trade) over Record Center (~150 m). If Record Center is chosen, assess and top up any income shortfall. • Pathway B: prepare an abbreviated RAP / Livelihood Restoration Plan (census; entitlements from net income; transition assistance; business re-establishment; staff re-employment), AIIB no-objection before any non-renewal. • Pre-construction census of all 5 operators and their employees, incl. the two vulnerable women at Manfaat Berkah; ≥ 6-month written notice before vacation. • Priority attention to women-operated stalls and vulnerable households/employees (Gender Action Plan). • Fix and communicate a cut-off date (allow for possible 2026→2027 tenant turnover at the December renewal). • Demolition stop-work trigger: no demolition until (A) relocation verified, or (B) LRP AIIB no-objection + pre-demolition measures implemented.	RSDK Director / PIU / Tenancy Officer / Social Safeguards Officer (EMU); AIIB (no-objection)	Decision by Q4 2026; census pre-relocation; notice ≥ 6 months; monitoring until restoration verified	Decision recorded and disclosed to AIIB. Census (incl. employees) complete; cut-off communicated. ≥ 6-month notice given. Pathway A: all operators relocated, no trading gap, terms no less favourable. Pathway B: LRP AIIB no-objection; net-income entitlements disbursed; no household below baseline. Demolition only after clearance.	Pathway-dependent. Pathway A: Rp 60–150 M (relocation fit-out, signage, moving). Pathway B: Rp 300 M + [set from census] (census Rp 20–40 M; transition allowances from net income; re-establishment support; contingency).	Negligible (Pathway A) / Minor (Pathway B LRP)
B.5.1 c	Environmental nuisance to external PKL (≈ 40–45 traders), not displacement (ESS1)	Construction	Minor	Minimize (ESS1)	• Dust suppression; noise/vibration controls during sensitive hours; Andalalin Traffic Management Plan. • Maintain at least one unobstructed pedestrian route along the frontage; clear directional signage. • ≥ 30-day advance notice of significant works; dedicated GRM contact for vendors. • Maintain access under the HOCP so PKL and customers can continuously reach the area. • No relocation and no compensation, PKL are not project-affected persons under ESS2.	Contractor (CESMP) / Social Safeguards Officer / Community Liaison	Throughout active demolition/piling; advance notice ≥ 30 days	Pedestrian route maintained at all times. Dust/noise within thresholds. 30-day notices issued. PKL grievances resolved within GRM timeframe.	Rp 20–40 M (signage, notices, GRM operation, within CESMP nuisance controls). No compensation.	Minor
B.5.2	POSITIVE, Increased demand for food and services from the construction workforce	Construction	Positive	Enhance	• Designate a vendor zone at the site perimeter for local micro-businesses. • Communicate worker meal-break schedules to vendors. • Prohibit unjustified exclusion of local vendors.	Contractor Community Liaison / Social Safeguards Officer	Vendor zone pre-construction; monthly survey	Vendor zone operational within 30 days. Monthly income trend positive or neutral. Zero unjustified exclusions.	Rp 25 – Rp 40 M (vendor zone infrastructure/shading Rp 20-40 M; coordination & communication Rp 5-10 M)	Positive

B.5.3	POSITIVE, Local employment and wage income from project workforce demand	Construction	Positive	Enhance	• Include a local-hiring preference clause (priority to Kec. Semarang Selatan). • Report the local-to-non-local worker ratio monthly. • Coordinate with Disnaker for registration and skills training.	Contractor HR / Social Safeguards Officer / Disnaker Liaison	Local-hiring clause in contracts; monthly report	Monthly origin-disaggregated hiring record. Local worker share ≥40% (target). Disnaker coordination minutes on file.	Rp 20 – Rp 32 M (skills training coordination Rp 10-20 M; Disnaker liaison & reporting Rp 10-20 M)	Positive
B.6 GBV, SEA/SH, and Vulnerable Groups										
B.6.1	Risk of sexual exploitation, abuse (SEA), and harassment (SH) from worker influx	Construction	Moderate	Avoid → Minimize	• Require a signed Code of Conduct with SEA/SH prohibitions pre-mobilization. • Establish referral MoUs (PPT Seruni, PPA Police, LBH APIK, university task forces). • Provide lit, gender-separated sanitary facilities and perimeter lighting. • Appoint a GBV/SEA focal person with a confidential, survivor-centerd procedure. • Conduct SEA/SH awareness at induction and quarterly.	Operations Manager / HSE & PR Officer / GBV Focal Person	Code per engagement; monthly inspection; quarterly awareness	100% signed Code of Conduct before site access. Referral MoUs in place before construction. 100% awareness attendance; zero unresolved cases beyond agreed timelines.	Rp 40 – Rp 70 M (GBV focal person time Rp 15-30 M/yr; referral MoU formalisation Rp 5-10 M; awareness sessions & materials Rp 10-20 M; sanitary facilities upgrade Rp 10-30 M)	Minor
B.6.2	Marginalisation of vulnerable groups (women, elderly, children, PWD, female-headed households) in access to consultation, GRM, and livelihood protection	Construction & Operation	Moderate	Minimize → Restore	• Update vulnerability mapping at commencement, including the Gunung Brintik poverty pocket. • Adapt consultations for accessibility (time, venue, language, sign interpretation). • Keep a gender-disaggregated GRM with a confidential channel. • Annex a Gender & Vulnerable Groups Action Plan (VGAP) to the CESMP. • Issue monthly social monitoring by gender and vulnerability.	Operations Manager / HSE & PR Officer / Community Liaison	Mapping at commencement; monthly report; per-event records	Vulnerability map and register before construction. Disaggregated attendance per event. VGAP annexed before mobilization; no systematic exclusion.	Rp 25 – Rp 50 M (vulnerability mapping & VGAP Rp 10-25 M; accessible consultation costs Rp 10-20 M; monthly reporting Rp 5-15 M/yr)	Minor
B.7 Cultural Heritage										
B.7.1	PRIORITY, Physical damage to nationally registered heritage structures from vibration and settlement (potentially irreversible)	Preparation & Construction	Major	Avoid → Minimize → Restore	• Engage an independent and qualified multidisciplinary cultural heritage team to undertake the HIA and review/endorse the proposed heritage protection and mitigation measures prior to demolition and construction. • Monitor vibration continuously at heritage fabric per ISO 4866 with stricter triggers. • Conduct pre/post condition surveys per sub-phase. • Enforce a 2 m stand-off; closer works require an engineer's method statement. • Mandate non-impact methods in the heritage exclusion zone. • Obtain BPK Jawa Tengah written approval before any heritage-buffer work.	Heritage Specialist / Structural Engineer / Site Manager / BPK Jateng	HIA and specialist review prior to demolition and construction; condition surveys pre- and post-sub-phase; continuous vibration monitoring during relevant works; BPK Central Java approval per package	Specialist appointment and method statements on file. Zero heritage action-level exceedance without stoppage. No new defects in condition surveys; BPK Jawa Tengah approvals on file.	Rp 500– Rp 900 M (multidisciplinary HIA, including heritage, architectural, archaeological, structural, and visual/setting specialist inputs, Rp300–500 M; vibration monitoring at heritage fabric Rp100–200 M; pre/post condition surveys and crack mapping Rp75–150 M; BPK Central Java submission and technical coordination Rp25–50 M)	Moderate
B.7.2	Visual and spatial degradation of the historic setting from incompatible scale and massing	Preparation & Design	Moderate	Avoid → Minimize	• Prepare a Heritage Impact Assessment (HIA) before design finalization. • Submit designs for BPK Jawa Tengah and Dinas Kebudayaan dan Pariwisata Kota Semarang review before permits. • Design visually recessive structures respecting heritage scale and materials. • Prohibit permanent façade alteration without BPK Jawa Tengah approval.	Architect / Heritage Specialist / BPK Jawa Tengah & Dinas Kebudayaan	HIA pre-design; review per milestone; photographic baseline	HIA approved before design finalization. BPK Jawa Tengah and Dinas Kebudayaan dan Pariwisata Kota Semarang approvals on file. Compliance audit confirms heritage-respecting design.	Rp 25– Rp 50 M (Design review and authority consultation)	Minor

B.7.3	Disturbance to the Potential Cultural Heritage Property (ODCB) colonial-era bunker during groundworks	Preparation & Construction	Moderate	Avoid → Minimize	• Document the bunker's location and condition before work. • Demarcate construction exclusion buffer. • Refer the bunker to BPK Jawa Tengah for assessment and possible designation. • Include it in the CHMP and Chance Find Procedure for all groundworks.	Heritage Specialist / Site Manager / BPK Jateng	Baseline and referral pre-construction; buffer inspection during groundworks	Baseline record before construction. Buffer demarcated; daily log confirms no encroachment. BPK Jawa Tengah referral correspondence on file.	Rp 40 – Rp 80 M (baseline documentation & survey Rp 25-50 M; buffer demarcation Rp 5-10 M; BPK Jawa Tengah referral and technical coordination Rp 10-20 M)	Minor
B.7.4	Loss of subsurface archaeological remains from deep excavation and piling (irreversible if unmanaged)	Construction	Moderate	Avoid → Minimize	• Apply a mandatory Chance Find Procedure (CFP) under the CHMP for below-grade works. • Halt within 5 m of any find; notify BPK Jateng within 24 hours; do not disturb until inspection. • Engage an archaeological watching brief during bulk excavation. • Document and report all finds monthly.	Archaeological Specialist / Site Manager / BPK Jateng	CHMP/CFP throughout below-grade works; watching brief during bulk excavation	CFP and 100% induction records before excavation. Watching-brief reports for all bulk phases. Zero finds disturbed without inspector; finds register in monthly report.	Rp 150 – Rp 300 M (archaeological specialist & watching brief Rp 120-250 M; CFP induction & documentation Rp 15-30 M; monthly reporting Rp 15-20 M)	Minor

Note:

- *Residual significance assumes full and effective implementation of all mitigation measures in this table. Where a KPI is not met, the responsible party is required to implement corrective action within 10 working days and report to the ESIA Social/Environmental Safeguards Officer within 5 working days of the non-conformance being identified. Priority management items B.2.1 and B.7.1 require immediate escalation to the RSDK Director and PIU if any KPI exceedance is detected.*
  M: Million ; B: Billion

9 CLIMATE RISK CONSIDERATION

Kecamatan Semarang Selatan is one of sixteen administrative sub-districts within Kota Semarang, Central Java Province, Indonesia. The sub-district spans 5.93 km², or approximately 593 ha, and is administratively divided into ten kelurahan (urban village): Bulustalan, Barusari, Randusari, Mugasari, Pleburan, Wonodri, Peterongan, Lamper Lor, Lamper Kidul, and Lamper Tengah. According to data from Badan Pusat Statistik Kota Semarang (2024), the sub-district is home to approximately 61,212 inhabitants, yielding a population density of around 10,294 people/km². The sub-district is bounded by Kecamatan Semarang Tengah to the north, Semarang Timur and Gayamsari to the east, Gajah Mungkur and Candisari to the south, and Gajah Mungkur and Semarang Barat to the west.

The hydrological character of Semarang Selatan is shaped primarily by the *Sungai Banjir Kanal Barat* (West Flood Canal) and the Kali Semarang River system, both of which traverse the sub-district along a south-to-north axis. These waterways serve a dual function as the principal urban drainage infrastructure and as the main corridors through which floodwaters are conveyed during heavy rainfall events. The *Kajian Risiko Bencana Kota Semarang* 2023–2027 (KRB), published by the *Badan Penanggulangan Bencana Daerah* (*Regional Disaster Management Body*), identifies Semarang Selatan as being vulnerable to fluvial flooding from these waterway systems, covering approximately 405 hectares at a Moderate hazard classification.

The topography of Semarang Selatan is predominantly flat, with approximately 85.7% of the sub-district situated at slopes of 0–2%, according to slope analysis contained in the KRB. Only a limited portion of the southern fringe, encompassing parts of Wonodri, Peterongan, and Lamper Kidul, exhibits moderate slopes of 15–25%, totaling roughly 25 ha or about 4.2% of the sub-district area. The KRB official hazard registry classifies landslide hazard in Semarang Selatan as Low at both the Hazard and the composite Risk Class level, with 12.14 hectares identified as having landslide potential, entirely within the low-hazard category.

Compounding the flat topography is the ongoing land subsidence that affects much of Semarang. In the inland southern districts, including Semarang Selatan, subsidence rates are estimated at 2 to 5 cm/year, considerably lower than the rates of up to 16–23 cm/year measured in the northern coastal areas around Kota Lama and Tanjung Emas (Abidin et al., 2013; Chaussard et al., 2013; recent InSAR studies of North Semarang report comparable coastal rates). Nevertheless, even at these moderate rates, subsidence contributes to a gradual reduction in the effectiveness of gravity-driven drainage systems and elevates the relative importance of pumped drainage during high-water events.

The KRB identifies drought as affecting the entire sub-district area at a Moderate hazard and risk level, driven by Semarang's pronounced seasonality, with effective rainfall ceasing during the months of July through September. Tidal flooding, known locally as *rob*, is not identified as a hazard in Semarang Selatan in the official registry, as the sub-district is located inland from the coast, recording zero hectares of direct

rob exposure. Extreme weather, earthquake, and urban/forest fire are classified as Low hazards and Low composite risk for the sub-district per the official KRB Risk Class column, a correction from the qualitatively-elevated Medium rating used in the prior version of this projection.

9.1 Baseline Hazard Risk Classification

The following baseline risk classifications are taken directly from the official Risk Class column of the KRB hazard registry for Kecamatan Semarang Selatan.

- Fluvial Flooding (*Banjir*): Medium. Hazard area 405.37 ha; risk class medium per KRB. Regular wet-season inundation in *Kelurahan* Wonodri, Peterongan, and Lamper. Key driver: inadequate drainage capacity + river overflow. Contributing factor: land use change reducing permeability.
- Flash Flooding (*Banjir Bandang*): Medium. Hazard area 145.64 ha; hazard class High but vulnerability Low yields composite risk class Medium per KRB. Occurs at slope-flat transition zones, particularly Randusari. Driven by rapid surface runoff from steep slopes during intense short-duration rainfall.
- Tidal Flooding (*Banjir Rob*): Low. Zero hectares of direct rob exposure per KRB, no direct coastal frontage. Indirect exposure only, through stormwater drainage backflow during simultaneous high-tide and heavy rainfall events.
- Landslide (Tanah Longsor): Low. Hazard area 12.14 ha, entirely low-hazard category; risk class Low per KRB. Soil type: expansive clay on steep slopes in Randusari, Mugasari, Bulustalan, and Barusari; localised talud (retaining wall) failures have been recorded but do not elevate the official composite class above Low.
- Extreme Weather (Cuaca Ekstrim): Low. Hazard area 582.38 ha at hazard class Sedang, but composite risk class Low per KRB owing to Medium capacity. City-wide exposure; urban heat island (UHI) effect in dense kampung areas is retained as a compounding factor in the forward-looking projection even though it does not elevate the official baseline class.
- Drought (Kekeringan): Medium. Hazard area 582.38 ha; risk class Medium per KRB. Urban water supply stress during extended dry seasons (June–September). Groundwater over-extraction compounds surface drought conditions. Water supply depends heavily on state-owned water company (PDAM) Semarang City.
- Earthquake (Gempa Bumi): Low. Hazard area 586.04 ha at hazard class Low; risk class Low per KRB. Semarang City sits in a seismically active setting (Java Megathrust; Merapi–Merbabu fault system), but Semarang Selatan has Low risk due to distance from major fault traces and moderate soil amplification factors.
- Urban & Land Fires (Kebakaran Hutan & Lahan): Low, city-wide per KRB. Dense kampung in Bulustalan and Pleburan with narrow lanes (<2 m), aging electrical infrastructure, and high LPG

cylinder usage are retained as local contributing factors that may locally elevate exposure, but do not change the official sub-district baseline class.

9.2 Methodology and Data Source

9.2.1 Data Sources

- **Atmospheric climate projections (temperature, precipitation, humidity, extreme rainfall indices):** World Bank Group Climate Knowledge Portal (CMIP6, 0.25° resolution), downloaded for Jawa Tengah Province at http://climateknowledgeportal.worldbank.org/download-data. Variables: mean temperature (tas), maximum temperature (tasmax), minimum temperature (tasmin), mean annual precipitation (pr), relative humidity (hurs), annual maximum 1-day rainfall (Rx1day), and annual maximum 5-day rainfall (Rx5day). Ensemble: all-model mean, reported as median, 10th percentile (p10), and 90th percentile (p90) across the CMIP6 ensemble.
- **Climate scenarios:** Four Shared Socioeconomic Pathways (SSPs) consistent with IPCC AR6: SSP1-2.6 (sustainability, low emissions), SSP2-4.5 (middle-of-the-road), SSP3-7.0 (regional rivalry, high emissions), and SSP5-8.5 (fossil-fuelled development, very high emissions).
- **Time horizons:** Baseline/historical (1995–2014) and four 20-year forward periods: 2020–2039, 2040–2059, 2060–2079, and 2080–2099, matching the native time-slice structure of the World Bank CKP dataset.
- **Sea level rise projections:** NASA Sea Level Projection Tool (http://sealevel.nasa.gov/ipcc-ar6-sea-level-projection-tool), based on IPCC AR6 (2021). Local/regional projection extracted at the grid point nearest Semarang's offshore waters (−6°, 110°E, northern Java Sea), medium-confidence, all process components ("total"), reported at the 50th percentile (median) together with the 17th–83rd percentile likely range, for SSP1-2.6, SSP2-4.5, SSP3-7.0, and SSP5-8.5 at decadal intervals to 2100.
- **Baseline hazard classification:** *Kajian Risiko Bencana* (KRB) Kota Semarang 2023–2027, Badan Penanggulangan Bencana Daerah (BPBD) Kota Semarang, official Risk Class column for Kecamatan Semarang Selatan, extracted and rechecked against the source registry.

9.3 Atmospheric Driver Summary

The table 67 below summarises the headline anomaly figures (deviation from the 1995–2014 baseline) for *Jawa Tengah* Province across all four-time horizons, shown for the lowest-emissions (SSP1-2.6) and highest-emissions (SSP5-8.5) bookend scenarios.

Table 66 Summary of anomaly figures for Central Java Province

Variable	Baseline (1995–2014)	2020–2039	2040–2059	2060–2079	2080–2099

Mean temperature, ΔT (°C), SSP5-8.5 / SSP1-2.6	25.85°C	+1.06 / +1.00	+2.17 / +1.41	+3.23 / +1.60	+4.64 / +1.64
Max. temperature, ΔTmax (°C), SSP5-8.5 / SSP1-2.6	29.33°C	+1.02 / +1.00	+2.04 / +1.46	+3.26 / +1.64	+4.73 / +1.67
Mean annual precipitation, Δpr (mm/yr), SSP5-8.5 / SSP1-2.6	2,648.7 mm	−38.8 / −15.1	−15.6 / −32.5	−32.8 / +10.8	+16.9 / −3.2
Relative humidity, ΔRH (pp), SSP5-8.5 / SSP1-2.6	79.4%	−0.21 / −0.16	−0.33 / −0.33	−0.44 / −0.49	−0.70 / −0.35
Extreme 1-day rainfall, ΔRx1day (%), SSP5-8.5 / SSP1-2.6	46.0 mm	+14.2 / +10.0	+15.8 / +13.8	+22.1 / +11.5	+34.3 / +13.3
Extreme 5-day rainfall, ΔRx5day (%), SSP5-8.5 / SSP1-2.6	140.7 mm	+1.3 / +3.4	+5.1 / +5.3	+8.4 / +4.1	+12.7 / +5.5

9.4 Sea Level Rise and Local Land Subsidence

Tidal/drainage-backflow hazard (banjir rob) in Semarang Selatan is driven not by eustatic (global mean) sea level rise alone, but by the combination of eustatic sea level rise and local land subsidence, together termed relative sea level (RSL) in this assessment. The eustatic component is taken directly from the NASA AR6 Sea Level Projection Tool median, as described above.

Local land subsidence in Semarang Selatan is reported in the literature at 2–5 cm/year (Abidin et al., 2013; Chaussard et al., 2013), substantially lower than the 6–23 cm/year measured in the coastal northern districts. Because Semarang Selatan is an inland sub-district where subsidence is driven primarily by localised groundwater extraction rather than coastal sediment compaction, a simple linear extrapolation of the current rate across the full 2023–2100 projection horizon would be physically unrealistic (producing 1.5–4 m of cumulative subsidence by 2100) and would mask scenario differentiation entirely. The resulting lifetime subsidence caps range from 0.55 m (SSP1-2.6) to 1.10 m (SSP5-8.5) by 2100, consistent with the inland district's lower baseline rate relative to the coastal zone. The combined relative sea level (eustatic SLR + cumulative local subsidence) used to drive the Tidal Flooding hazard rating in following section.

Table 67 Relative sea level in Semarang Selatan subdistrict

Scenario	2030	2050	2070	2090	2100
SSP1-2.6, eustatic SLR (m)	0.09	0.19	0.30	0.41	0.46
SSP1-2.6, relative sea level, incl. subsidence (m)	**0.29**	**0.64**	**0.82**	**0.95**	**1.01**
SSP2-4.5, eustatic SLR (m)	0.09	0.20	0.34	0.49	0.58
SSP2-4.5, relative sea level, incl. subsidence (m)	**0.30**	**0.74**	**1.01**	**1.21**	**1.30**

SSP3-7.0, eustatic SLR (m)	0.09	0.21	0.37	0.58	0.70
SSP3-7.0, relative sea level, incl. subsidence (m)	**0.31**	**0.81**	**1.15**	**1.45**	**1.57**
SSP5-8.5, eustatic SLR (m)	0.10	0.23	0.41	0.65	0.81
SSP5-8.5, relative sea level, incl. subsidence (m)	**0.32**	**0.87**	**1.26**	**1.62**	**1.78**

Note: the global IPCC AR6 sea level dataset (also supplied alongside the regional download) was reviewed for comparison but not used directly in the hazard rating, since it does not reflect the localised vertical land motion and regional ocean dynamics captured in the −6°,110°E grid-point projection.

9.5 Hazard Rating Derivation Logic

Each of the eight hazards retained from the original assessment is rated on four-tier scale (Low → Medium → High → Very High) at each of the four time horizons, under each of the four SSP scenarios, starting from the official KRB baseline class. The driver logic for each hazard is summarised below.

- **Fluvial Flooding:** mean annual precipitation anomaly (volume-driven river/drainage exceedance) combined with maximum temperature anomaly (proxy for convective rainfall intensity).
- **Flash Flooding:** annual maximum 1-day rainfall (Rx1day) percentage increase over baseline, the standard indicator for short-duration, high-intensity rainfall events that overwhelm urban drainage capacity.
- **Tidal Flooding:** relative sea level (Section 2.4), banded at <0.50 m (Low), 0.50–0.90 m (Medium), 0.90–1.40 m (High), and >1.40 m (Very High).
- **Landslide:** annual maximum 5-day rainfall (Rx5day) percentage increase over baseline, the standard indicator for cumulative multi-day soil saturation that triggers slope failure.
- **Extreme Weather:** mean temperature anomaly, amplified by a +1.0°C urban heat island (UHI) adjustment reflecting Semarang Selatan's dense built-up character.
- **Drought:** relative humidity anomaly as the primary (most temporally consistent) dry-season moisture-stress indicator, with mean annual precipitation deficit as a secondary, capped modifier.
- **Urban & Land Fires:** maximum temperature anomaly combined with precipitation deficit, a standard hot-and-dry compound fire-weather driver.

9.6 Risk Rating Legend

The following four-tier risk classification is applied throughout the projection matrix:

Table 68 Risk Rating Kecamatan Semarang Selatan

Risk Rating	Description
LOW	Hazard is present but unlikely to cause significant disruption; existing capacity and infrastructure are generally adequate.
MEDIUM	Hazard occurs with moderate frequency and/or severity; localised disruption is likely without targeted mitigation.
HIGH	Hazard occurs with high frequency and/or severity; significant disruption to lives, livelihoods, and infrastructure is likely without substantial adaptation investment.
VERY HIGH	Hazard is frequent, severe, and/or compounding; existing capacity is likely to be overwhelmed without transformative adaptation measures.

Kecamatan Semarang Selatan has no direct coastal frontage. Its tidal flood risk arises indirectly from sea-level-rise-driven backpressure in the city drainage system during simultaneous tidal surge and heavy rainfall. Updated relative-sea-level figures show risk reaching Medium by 2040–2059 under every scenario, including SSP1-2.6, and escalating to High by 2060–2079 under SSP2-4.5, SSP3-7.0, and SSP5-8.5, earlier and more broadly than indicated in the prior version of this report.

9.7 Future Climate Hazard Risk Matrix

The matrix below presents the projected risk rating for each of the eight hazards retained from the KRB baseline, under each of the four SSP scenarios, across four 20-year time horizons (2020–2039, 2040–2059, 2060–2079, 2080–2099). Ratings are derived using the methodology and driver logic described earlier, applied to the World Bank Climate Knowledge Portal and NASA AR6 Sea Level Projection Tool data described above.

Table 69 Future Hazard Risk Projection for Kelurahan Randusari, 2023–2100, by SSP Scenario

Hazard	KRB 2023–27 Baseline	Scenario (SSP)	2020–2039	2040–2059	2060–2079	2080–2099
Fluvial Flooding (Banjir)	MEDIUM	SSP1-2.6	MEDIUM	MEDIUM	HIGH	MEDIUM
		SSP2-4.5	MEDIUM	MEDIUM	HIGH	HIGH
		SSP3-7.0	MEDIUM	HIGH	HIGH	VERY HIGH
		SSP5-8.5	MEDIUM	HIGH	HIGH	VERY HIGH
Flash Flooding (Banjir Bandang)	MEDIUM	SSP1-2.6	MEDIUM	MEDIUM	MEDIUM	MEDIUM
		SSP2-4.5	MEDIUM	HIGH	HIGH	HIGH
		SSP3-7.0	MEDIUM	HIGH	HIGH	VERY HIGH
		SSP5-8.5	MEDIUM	MEDIUM	HIGH	VERY HIGH
Tidal Flooding (Banjir Rob)	LOW	SSP1-2.6	LOW	MEDIUM	MEDIUM	HIGH
		SSP2-4.5	LOW	MEDIUM	HIGH	HIGH
		SSP3-7.0	LOW	MEDIUM	HIGH	VERY HIGH

Hazard	KRB 2023–27 Baseline	Scenario (SSP)	2020–2039	2040–2059	2060–2079	2080–2099
		SSP5-8.5	LOW	MEDIUM	HIGH	VERY HIGH
Landslide (Tanah Longsor)	LOW	SSP1-2.6	LOW	MEDIUM	MEDIUM	MEDIUM
		SSP2-4.5	LOW	MEDIUM	MEDIUM	MEDIUM
		SSP3-7.0	LOW	MEDIUM	MEDIUM	MEDIUM
		SSP5-8.5	LOW	MEDIUM	HIGH	VERY HIGH
Extreme Weather (Cuaca Ekstrim)	LOW	SSP1-2.6	MEDIUM	MEDIUM	HIGH	HIGH
		SSP2-4.5	MEDIUM	MEDIUM	HIGH	HIGH
		SSP3-7.0	MEDIUM	HIGH	VERY HIGH	VERY HIGH
		SSP5-8.5	MEDIUM	HIGH	VERY HIGH	VERY HIGH
Drought (Kekeringan)	MEDIUM	SSP1-2.6	MEDIUM	HIGH	HIGH	HIGH
		SSP2-4.5	HIGH	HIGH	HIGH	HIGH
		SSP3-7.0	MEDIUM	MEDIUM	MEDIUM	HIGH
		SSP5-8.5	HIGH	HIGH	HIGH	HIGH
Urban & Land Fires (Kebakaran)	LOW	SSP1-2.6	LOW	LOW	LOW	LOW
		SSP2-4.5	LOW	LOW	MEDIUM	MEDIUM
		SSP3-7.0	LOW	MEDIUM	MEDIUM	HIGH
		SSP5-8.5	LOW	MEDIUM	MEDIUM	HIGH

Tidal Flooding shows the most consistent escalation across all scenarios, rising from a Low baseline (no direct *rob* exposure) to Medium by 2040–2059 under every SSP, and reaching High by 2060–2079 under SSP2-4.5, SSP3-7.0, and SSP5-8.5. This reflects the compounding effect of relative sea level rise on stormwater drainage backflow, even though Semarang Selatan has no direct coastal frontage.

Extreme Weather escalates earliest among the temperature-driven hazards, reaching Very High as early as 2060–2079 under SSP3-7.0 and SSP5-8.5, driven by the combination of rising mean temperature and the assumed +1.0°C urban heat island amplification for this densely built sub-district.

Fluvial Flooding, Flash Flooding, and Tidal Flooding all reach Very High by 2080–2099 under SSP3-7.0 and/or SSP5-8.5, indicating that under high-emissions pathways, Semarang Selatan's water-related hazards compound rather than occurring independently.

SSP1-2.6 shows the most contained trajectory throughout, with no hazard exceeding High at any time horizon, and several hazards (Fluvial Flooding, Extreme Weather) showing a plateau or partial decline after 2060–2079, consistent with that scenario's emissions-overshoot-and-decline pathway.

9.8 Adaptation Measures for Climate Risk

Mitigation measures are prioritised using two independent factors, combined into a single priority rating. This two-axis approach ensures that both the underlying climate risk and the practical reality of construction sequencing drive the priority, a high-risk hazard whose mitigation can only be addressed through irreversible design decisions should outrank a high-risk hazard whose mitigation can still be added later. Each measure is classified by whether it is a design/construction-stage decision that cannot be cost-effectively changed once built (called as LOCK-IN), or whether it can be added, upgraded, or adjusted during operations without major structural rework (RETROFIT-OK). Prioritization rules are defined as follow.

Table 70 The Measurement of Climate Risk

Priority	Assignment Rule	Consideration for the Contractor	Consideration for the Hospital
Critical	LOCK-IN measure addressing a HIGH-or-above composite risk hazard	Must be incorporated into detailed engineering design (DED) before design freeze; cannot be cost-effectively retrofitted once construction is complete.	Treat as a non-negotiable design requirement in the contractor's scope of work and DED review/approval gate; budget accordingly at design stage, not as a future capex item.
High	LOCK-IN measure for a MEDIUM risk hazard, OR a RETROFIT-OK measure for a HIGH-or-above risk hazard	Should be included in DED where feasible; if a RETROFIT-OK item, can be deferred to early operations if construction schedule/budget requires, but should not be deferred indefinitely.	Plan for early-operations budget (Year 1–2 of operation) if not delivered at handover; track as an open item in the O&M handover register.
Standard	RETROFIT-OK measure for a MEDIUM-or-below risk hazard	Can be phased in during operations without major structural rework; lower urgency for the construction contract itself.	Incorporate into routine facilities management planning and budget cycles; review periodically (e.g. every 5 years) against updated climate hazard projections.

Table 71 Climate Risk Adaptation Measures Matrix

Climate Hazard	Mitigation Measure (for Engineering Contractor)	Design / Technical Requirement	Phasing Type	Priority
CONSTRUCTION PHASE				
Flash Flooding	Design site grading and surface drainage to safely convey short-duration, high-intensity rainfall (use updated Rx1day intensity, see climate hazard projection Section 2.3) away from building entrances, ramps, and basement access points.	Site grading plan with calculated peak flow paths submitted as part of DED; minimum 1:200 fall away from all entrances.	LOCK-IN	Critical
	Install trench drains and flood-resistant door/threshold details (raised sills, removable flood barriers) at all ground-level entrances, ambulance bay, and loading dock.	Architectural detail drawings to specify raised sill minimum 150mm or removable barrier system at all exterior openings.	LOCK-IN	Critical
	Establish a rainfall-intensity-triggered work-stoppage protocol for excavation and earthworks activities during construction, with on-call dewatering pump capacity.	Construction-phase EHS procedure; BMKG forecast monitoring integrated into daily site briefing.	RETROFIT-OK	High
	Set finished floor level (FFL) of all new buildings a minimum of 0.5 m above the 25-year design flood elevation for the Kali Semarang/Banjir Kanal Barat catchment (to be confirmed by site-specific hydrological study).	Hydrological study + FFL specification in architectural/civil drawings prior to foundation design approval.	LOCK-IN	Critical
	Size on-site stormwater drainage and detention/retention capacity for the redeveloped GFA (74,627 m^2), not the existing facility footprint, per SNI 2415:2016 (drainage) and SNI 8456:2017 (detention pond design).	Drainage capacity calculation submitted as part of detailed engineering design (DED); detention volume specified in civil drawings.	LOCK-IN	Critical
	Locate critical infrastructure (main electrical switchgear, server/IT room, emergency generator, medical gas plant) above FFL+0.5m or on an elevated/protected plinth, not in basement levels exposed to flood risk.	Critical infrastructure layout review and sign-off by Project Owner's engineer before MEP design freeze.	LOCK-IN	Critical
Extreme Weather / Heat	Specify building envelope, glazing, and shading design to meet or exceed Green Building / EDGE minimum thermal performance requirements (see GHG Inventory report Section 3), reducing cooling load before mechanical systems are sized.	Building envelope thermal performance (U-value/shading coefficient) specified in architectural DED; verified by EDGE/Greenship design-stage assessment.	LOCK-IN	Critical
	Design shaded, naturally ventilated waiting, transit, and outdoor staff work areas (e.g. ambulance bay, loading dock, grounds maintenance areas) rather than relying solely on mechanical cooling for these zones.	Landscape and shading design included in architectural DED for all identified outdoor/semi-outdoor work and waiting areas.	LOCK-IN	High
	Size backup cooling capacity (chillers/split units on emergency power) for critical clinical areas (ICU, operating theatres, pharmacy/cold-chain storage) to maintain safe temperatures during grid outages coinciding with extreme heat.	Emergency power load schedule to explicitly include critical-area cooling load; confirmed in electrical DED.	LOCK-IN	Critical
Drought	Install on-site water storage sized for a minimum 72-hour autonomy of critical hospital water demand (sterilisation, sanitation, cooling tower make-up, patient care), based on the redeveloped facility's projected water demand.	Water storage tank capacity and critical-demand calculation included in plumbing/MEP DED.	LOCK-IN	Critical
	Install rainwater harvesting and greywater recycling systems for non-potable uses (irrigation, cooling tower make-up, toilet flushing) as part of the Green Building design, reducing reliance on PDAM/groundwater supply during dry-season stress.	Rainwater harvesting and greywater system sized and specified in plumbing DED; included in EDGE/Green Building water-efficiency credit documentation.	LOCK-IN	High
	During construction, source non-potable/recycled water for dust suppression, concrete curing, and site sanitation rather than drawing on local community water supply during dry-season stress.	Construction-phase water source plan included in contractor's EHS management plan; withdrawal volumes logged.	RETROFIT-OK	Standard
Tidal / Drainage Backflow	Install backflow check valves (one-way/flap gates) on all stormwater and sewer outfall connections from the site to the municipal drainage system, sized for the redeveloped site's full discharge.	Check valve specification and location shown on civil/MEP drawings; valve type approved by Project Owner's engineer.	LOCK-IN	Critical
	Confirm site finished floor level and critical infrastructure elevation (see Fluvial Flooding measures above) also accounts for projected relative sea level / drainage backflow elevation by 2060–2079 (the period when this hazard is projected to reach HIGH under most scenarios, see climate hazard projection Section 4), not only fluvial flood elevation.	Combined flood/backflow elevation design basis documented in DED basis-of-design report; cross-checked against climate hazard projection Section 2.4 relative sea level table.	LOCK-IN	Critical
OPERATIONAL PHASE				
Flash Flooding	Install and maintain real-time water-level/rainfall sensors at key drainage points, linked to a facility alert system for operations staff.	Sensor specification and alert-system integration included in Building Management System (BMS) scope.	RETROFIT-OK	High
Fluvial Flooding	Establish an annual drainage capacity audit and post-storm-event inspection protocol; clear/desilt detention ponds and culverts before each wet season.	Standard Operating Procedure (SOP) issued to Hospital Facilities Management; included in O&M manual handover.	RETROFIT-OK	High
	Maintain a flood emergency response plan for ground-floor clinical areas, including portable flood barriers and a patient/equipment relocation protocol.	Emergency response plan drafted and drilled annually; reviewed against updated rainfall projections every 5 years.	RETROFIT-OK	High
Extreme Weather / Heat	Implement a Heat Health Action Plan: heat-stress protocols for outdoor/non-climate-controlled-area staff, indoor temperature monitoring in critical clinical areas, and adjusted work scheduling during heat advisories.	HHAP issued to Occupational Health Unit; reviewed annually against BMKG seasonal heat outlook.	RETROFIT-OK	High
Drought	Establish a backup water supply contingency contract (tanker truck delivery) for extended PDAM supply interruptions, and conduct a quarterly water balance review.	Contingency supply contract maintained by Hospital Facilities Management; quarterly water balance log retained.	RETROFIT-OK	High
Tidal / Drainage Backflow	Functionally test all backflow check valves and inspect outfall connections at the start of each wet season.	SOP issued to Hospital Facilities Management; test log retained for annual EHS audit.	RETROFIT-OK	High
	Coordinate with Dinas PU / BPBD Kota Semarang on city-wide drainage and Banjir Kanal Barat planning; re-assess facility exposure every 5 years against updated city drainage plans and relative sea level projections.	5-yearly coordination review documented; triggers re-design if city drainage capacity assumptions change materially.	RETROFIT-OK	Standard

9.9 GHG Emission Inventory

Greenhouse Gas (GHG) emission inventory for RSDK redevelopment project aiming is to assess whether GHG emissions are expected to decrease after the redevelopment is completed, and to compare two possible ways of looking at the results. This inventory follows the GHG Protocol Standard covering Scope 1, direct emissions from on-site fuel combustion, and Scope 2, indirect emissions from purchased electricity. The boundary covers the whole hospital facility. The inventory compares the existing situation with two post-redevelopment scenarios:

- Existing facility (baseline): Current building stock with a gross floor area (GFA) of 179,204.4 m², based on the Environmental Permit (Izin Lingkungan) issued under Decree of the Mayor of Semarang City No. 660.1/76 Tahun 2020.
- Redeveloped facility, assessed under two scenarios:
  - Scenario A, New buildings only: Only the newly constructed buildings (74,627 m²) are assessed. All of these new buildings adopt Green Building design principles.
  - Scenario B, Existing remaining + New buildings: The newly built Green Building portion (74,627 m²) is assessed together with the existing buildings that remain after demolition (162,397.4 m²). The remaining existing buildings are not retrofitted and continue to operate at their current (conventional) energy performance.

The redevelopment plan involves demolishing 16,807 m² of old buildings and constructing 74,627 m² of new buildings built to Green Building standards. The remaining 162,397.4 m² of existing buildings continue to operate without energy-efficiency upgrades.

Table 72 Floor Area Summary

Facility Component	GFA (m²)	Treatment
Existing facility (pre-redevelopment)	179,204.4	Baseline (per Izin Lingkungan)
Less: Demolished buildings	(16,807.0)	To be demolished
Remaining existing buildings	162,397.4	No change, conventional performance
New buildings (Green Building)	74,627.0	EDGE-certified minimum compliance
Total post-redevelopment (Scenario B)	237,024.4	+32.3% vs existing

9.9.1 GHG Scope and Sources

- Scope 1, Direct emissions from fuel combustion: On-site burning of biodiesel (B30/B35/B40 blends) in backup generators, boilers, and other stationary equipment. Historical data covers calendar years 2020–2025, based on records provided by RSDK.
- Scope 2, Indirect emissions from purchased electricity: Electricity purchased from PT PLN (Persero), supplied through the Java-Madura-Bali (JAMALI) interconnected grid serving Central Java. Historical electricity consumption records were not complete or consistent

across 2020–2025. The existing facility's electricity consumption is therefore estimated using a national energy benchmark for hospital buildings

Scope 3 emissions (such as supply chain, waste, staff commuting, and patient/visitor travel) are not included in this inventory.

9.9.2 Activity Data

This section presents the raw activity data used in the inventory, fuel volumes for Scope 1, and floor area plus electricity intensity inputs for Scope 2, before any emissions calculation is applied.

A Scope 1 Activity Data, Fuel Consumption

Table XX shows the hospital's annual biodiesel consumption for 2020–2025. The hospital data shows that biodiesel used including B30, B35 and B40, consistent with Indonesia's mandatory biodiesel blending programme. However, for worse cast and simplicity of calculation the B30 blend (30% FAME (fatty acid methyl ester) / 70% fossil diesel) is chosen to be applied for all years.

Table 73 Annual Biodiesel (B30) Activity Data (2020–2025)

Year	Total B30 Volume (litres)	Fossil-Diesel Volume @ 70% (litres)	FAME Volume @ 30% (litres)
2020	280,000	196,000	84,000
2021	272,000	190,400	81,600
2022	315,000	220,500	94,500
2023	336,000	235,200	100,800
2024	336,000	235,200	100,800
2025	251,000	175,700	75,300
Average	**298,333**	**208,833**	**89,500**

The fossil-diesel and FAME columns are derived directly from the total volume using the 70/30 B30 split. Emissions calculated from these volumes are presented in Section 5.

B Scope 2 Activity Data, Purchased Electricity

For both the existing facility and the redevelopment scenarios, electricity consumption is calculated using a single annual value for each facility (or component), derived as:

Annual electricity (kWh) *= Energy Use Intensity (kWh/m²/yr) × Gross Floor Area (m²)*

The resulting annual kWh value is then multiplied by the JAMALI grid emission factor (0.87 tCO_2/MWh) to obtain Scope 2 emissions.

The required inputs are summarised in Table xx. The EUI values used are given in Section 4.3; the calculations and emission factor are given in Section 5.

Table 74 Scope 2 Activity Data Inputs (per Component)

Component	GFA (m²)	EUI (kWh/m²/yr)	Annual Electricity (kWh)
Existing facility (baseline)	179,204.4	380	68,097,672
Scenario A, New buildings only	74,627.0	304	22,686,608
Scenario B, Existing remaining	162,397.4	380	61,711,012
Scenario B, New buildings	74,627.0	304	22,686,608
Scenario B, Total	237,024.4	(mixed)	84,356,212

Historical electricity consumption records were not complete or consistent across the 2020–2025 period. The 380 kWh/m²/yr figure is therefore used as both the existing baseline and the retained-buildings assumption, rather than a measured value.

9.9.3 Method, Scenarios, and Emission Factors

This section states the calculation method, formally defines the two assessment scenarios, and lists the emission factors used throughout the inventory.

Calculation Method
Emissions are calculated by multiplying activity data by the appropriate emission factor. These formulas are applied to produce the inventory results. For each scope:

- Scope 1 (Fuel): Annual B30 volume (L) × effective B30 fossil-CO_2 factor (1.8644 kg CO_2/L) ÷ 1,000 = tCO_2/yr. Biogenic CO_2 is reported separately as a memo item using the IPCC 2006 default FAME combustion factor.
- Scope 2 (Electricity): Annual electricity (kWh) ÷ 1,000 × JAMALI grid emission factor (0.87 tCO_2/MWh) = tCO_2/yr.
- Emission Intensity: Total Scope 1+2 (tCO_2/yr) × 1,000 ÷ GFA (m²) = kg CO_2/m²/yr.

Assessment Scenarios
The inventory reports emissions under three situations:

1. Existing facility (baseline), 179,204.4 m² operating at the conventional 380 kWh/m²/yr EUI.
2. Scenario A, New buildings only (74,627 m²) operating at the EDGE-minimum 304 kWh/m²/yr EUI. This isolates the emissions of the Green Building portion on its own.
3. Scenario B, Existing remaining (162,397.4 m², no retrofit) + New buildings (74,627 m², Green Building), giving a combined GFA of 247,162.4 m². This reflects the full hospital after redevelopment.

Table 75 Emission Factors and Reference Values

Parameter	Value	Unit	Source
National emission factor, automotive diesel	73.28	tCO_2/TJ	Ministry of Energy and Mineral Resource (MEMR), National EF table
Net calorific value (NCV), automotive diesel	43.27	TJ/Gg	MEMR, National EF table
Diesel fuel density (typical)	0.84	kg/L	Industry standard
Derived fossil diesel emission factor	2.6635	kg CO_2/L	Calculated from above
Biodiesel blend applied	B30	30% FAME / 70% fossil diesel	Data from RSDK
Effective fossil-CO_2 factor for B30 (Scope 1 total)	1.8644	kg CO_2/L	70% × fossil diesel EF
Biogenic CO_2 factor, FAME component (memo)	2.5	kg CO_2/L	IPCC 2006 default, biofuel combustion
Grid emission factor, JAMALI system	0.87	tCO_2/MWh	MEMR Decree No. 163.K/HK.02/MEM.S/2021

Detailed derivation of Scope 1 factor: 73.28 tCO_2/TJ × 43.27 TJ/Gg × (1 Gg / 10^9 kg) × 0.84 kg/L = 2.6635 kg CO_2/L. Effective B30 factor = 2.6635 × 0.70 = 1.8644 kg CO_2/L.

Scope 2 factor source: The JAMALI grid emission factor of 0.87 tCO_2/MWh comes from MEMR's official GHG emission factor determination for Indonesia's interconnected electricity systems, formalised under Minister of Energy and Mineral Resources Decree No. 163.K/HK.02/MEM.S/2021. This is a location-based factor, as recommended by the GHG Protocol Scope 2 Guidance.

9.9.4 Green Building Concept and Projection Basis

Floor Area Change

After redevelopment, the hospital's floor area composition will change as shown in Table xx.

Table 76 Floor Area Composition After Redevelopment

Facility Component	GFA (m^2)	Treatment
Existing facility (pre-redevelopment)	179,204.4	Baseline
Demolished buildings	(16,807.0)	Removed
Remaining existing buildings	162,397.4	No change, conventional performance
New buildings (Green Building)	74,627.0	EDGE minimum compliance
Total post-redevelopment (Scenario B)	237,024.4	+32.3% vs existing

In Scenario A (new buildings only), only the 74,627 m^2 of new Green Building construction is assessed. In Scenario B (full redevelopment), both the retained existing buildings and the new Green Building portion are assessed together.

9.9.5 Projection Methodology

Since the redeveloped facility does not yet exist, post-redevelopment emissions cannot be based on actual meter readings:

- **Scope 1 (fuel):** The existing facility's average annual B30 consumption (298,333 litres for 179,204.4 m², equivalent to 1.6647 L/m²/yr) is applied proportionally to each component:
    - Scenario A: applied to 74,627 m² of new buildings only.
    - Scenario B: applied to 162,397.4 m² of remaining existing buildings + 74,627 m² of new buildings.
    - The same B30 blend and fossil-fuel emission factor are used in both cases.
- **Scope 2 (electricity):** Each component uses its own energy use intensity (EUI):
    - **New buildings:** 304 kWh/m²/yr, minimum 20% reduction vs the 380 kWh/m²/yr baseline, as required for EDGE certification (administered by IFC/GBCI).
    - **Remaining existing buildings:** 380 kWh/m²/yr, no change from the existing baseline, since these buildings are not being retrofitted.

9.9.6 Energy Use Intensity (EUI) Basis

Table 77 Energy Use Intensity by Component

Facility Component	EUI (kWh/m²/year)	Basis
Existing facility (pre-redevelopment)	380	ASEAN-USAID (1992) / SNI 6196 standard IKE benchmark for hospital buildings
Remaining existing buildings (Scenario B)	380	Same baseline, no retrofit assumed
New buildings (Scenarios A and B)	304	EDGE Certified minimum (≥20% savings vs baseline)

Conservative assumption: The 20% reduction is the EDGE entry-level requirement. EDGE Advanced requires ≥40% energy savings (EUI of 228 kWh/m²/yr). Because no complete historical electricity billing data was available for the existing facility, the 380 kWh/m²/yr figure is used as both the existing baseline and the retained-buildings assumption, rather than a measured value. The comparison therefore reflects a standard-vs-standard (conventional-benchmark-vs-EDGE-minimum) comparison rather than actual-vs-projected.

9.10 GHG Emission Calculations and Results

This section applies the formulas from Section 3.1 to the activity data in Section 2, producing the inventory results for the existing facility and both redevelopment scenarios.

9.10.1 Scope 1 Emissions, Existing Facility (2020–2025)

The hospital's annual biodiesel (B30) consumption for 2020–2025 is applied to the effective B30 fossil-CO_2 emission factor of 1.8644 kg CO_2/L to derive Scope 1 fossil-fuel emissions. The biogenic (FAME) component is reported separately as a memo item using the IPCC 2006 default combustion factor of 2.5 kg CO_2/L, consistent with the convention that biogenic CO_2 is treated as part of the natural carbon cycle and excluded from the Scope 1 total. Across the six-year period, Scope 1 emissions ranged from 467.98 tCO_2 (2025) to 626.46 tCO_2 (2023 and 2024), with a six-year average of 556.23 tCO_2/yr. This average is used as the baseline figure for the redevelopment projections.

Table 78 Scope 1 Emissions Derived from Activity Data

Year	B30 Volume (litres)	Fossil-Fuel CO_2 (tCO_2)	Biogenic CO_2 (tCO_2, memo)
2020	280,000	522.05	210.00
2021	272,000	507.13	204.00
2022	315,000	587.30	236.25
2023	336,000	626.46	252.00
2024	336,000	626.46	252.00
2025	251,000	467.98	188.25
Average	298,333	556.23	223.75

9.10.2 Scope 2 Emissions, Existing Facility

For the existing facility, annual electricity consumption is derived by applying the conventional hospital benchmark of 380 kWh/m²/yr to the existing GFA of 179,204.4 m², giving 68,097,672 kWh/yr. Applying the JAMALI grid emission factor of 0.87 tCO_2/MWh yields a Scope 2 emission of 59,244.97 tCO_2/yr, by far the dominant component of the existing facility's footprint. Combined with the 556.23 tCO_2/yr Scope 1 figure from earlier Section, the existing facility's total baseline emissions are 59,801.20 tCO_2/yr, corresponding to an emission intensity of 333.71 kg CO_2/m²/yr.

Table 79 Scope 2 Emissions, Existing Facility

Component	EUI (kWh/m²/yr)	GFA (m²)	Annual Electricity (kWh)	Grid EF (tCO_2/MWh)	Scope 2 (tCO_2/yr)
Existing facility	380	179,204.4	68,097,672	0.87	59,244.97

9.10.3 Scenario A, New Buildings Only

Scenario A assesses the emissions of the 74,627 m² of new Green Building construction on its own, treating the new portion as a stand-alone facility operating at the EDGE-minimum EUI of 304 kWh/m²/yr. Scope 1 fuel is scaled to the new GFA using the existing facility's fuel intensity ratio (1.6647 L/m²/yr), and Scope 2 electricity is calculated directly from the EUI. The result is a total of 19,968.94 tCO_2/yr, substantially lower than the existing facility's 59,801.20 tCO_2/yr because the new portion is

both smaller (58.4% of the existing GFA) and more efficient (20% EUI reduction). The corresponding emission intensity of 267.59 kg $CO_2/m^2/yr$ is 19.8% below the existing baseline, consistent with the EDGE minimum 20% energy-savings requirement.

Table 80 Scenario A Emissions Calculation

Component	Calculation	Result
Annual fuel (litres B30)	74,627 m^2 × 1.6647 $L/m^2/yr$	124,213 L
Scope 1 (tCO_2/yr)	(124,213 × 1.8644) ÷ 1,000	231.59
Annual electricity (kWh)	304 × 74,627	22,686,608 kWh
Scope 2 (tCO_2/yr)	22,686,608 ÷ 1,000 × 0.87	19,737.35
Total Scope 1+2 (tCO_2/yr)	231.59 + 19,737.35	19,968.94
Emission intensity (kg $CO_2/m^2/yr$)	19,968.94 × 1,000 ÷ 74,627	267.59

9.10.4 Scenario B, Existing Remaining + New Buildings

The redevelopment now involves demolishing 16,807 m^2 of the existing 179,204.4 m^2 facility, leaving 162,397.4 m^2 of existing buildings to continue operating at the conventional 380 $kWh/m^2/yr$ EUI. To this is added 74,627 m^2 of new Green Building construction operating at 304 $kWh/m^2/yr$, giving a combined post-redevelopment GFA of 237,024.4 m^2, 32.3% larger than the existing facility.

The Scope 1 figure for the existing-remaining portion is recalculated as 162,397.4 m^2 × 1.6647 $L/m^2/yr$ = 270,375 litres of B30, yielding 504.16 tCO_2/yr, slightly lower than the previous figure of 535.50 tCO_2/yr because less existing floor area remains. The Scope 2 figure for the existing-remaining portion is recalculated as 162,397.4 m^2 × 380 $kWh/m^2/yr$ = 61,711,012 kWh/yr, yielding 53,688.58 tCO_2/yr. Combined with the unchanged new-buildings figures (231.59 tCO_2/yr Scope 1 and 19,737.35 tCO_2/yr Scope 2), Scenario B's total Scope 1+2 emissions are 74,125.41 tCO_2/yr, a 23.9% increase relative to the existing facility, rather than the 29.7% calculated under the previous (smaller) demolition figure.

Despite this absolute increase, emission intensity still improves, falling from 333.71 to 312.72 kg $CO_2/m^2/yr$, a 6.3% reduction. This shows that the new buildings remain more efficient per m^2 than the existing baseline, and that the larger demolition has slightly improved both the absolute and intensity outcomes for Scenario B relative to the earlier calculation.

Of the 74,125 tCO_2/yr total, approximately 72.4% (53,689 tCO_2/yr) is attributable to the retained existing buildings operating at the conventional 380 $kWh/m^2/yr$ EUI. As in the previous calculation, the retained existing buildings remain the single largest source of post-redevelopment emissions and the most important lever for further reductions, but their relative share has fallen slightly because more existing area has been demolished.

Table 81 Scenario B Emissions Calculation

Component	Calculation	Result
Existing remaining		
Annual fuel (litres B30)	162,397.4 m² × 1.6647 L/m²/yr	270,375 L
Scope 1, Existing remaining (tCO_2/yr)	(270,375 × 1.8644) ÷ 1,000	504.16
Annual electricity (kWh)	380 × 162,397.4	61,711,012 kWh
Scope 2, Existing remaining (tCO_2/yr)	61,711,012 ÷ 1,000 × 0.87	53,688.58
New buildings		
Annual fuel (litres B30)	74,627 m² × 1.6647 L/m²/yr	124,213 L
Scope 1, New (tCO_2/yr)	(124,213 × 1.8644) ÷ 1,000	231.59
Annual electricity (kWh)	304 × 74,627	22,686,608 kWh
Scope 2, New (tCO_2/yr)	22,686,608 ÷ 1,000 × 0.87	19,737.35
Scenario B totals		
Total Scope 1 (tCO_2/yr)	504.16 + 231.59	735.75
Total Scope 2 (tCO_2/yr)	53,688.58 + 19,737.35	73,425.93
Total Scope 1+2 (tCO_2/yr)	735.75 + 73,425.93	74,161.68
Emission intensity (kg CO_2/m²/yr)	74,161.68 × 1,000 ÷ 237,024.4	312.87

The contrast between the two scenarios is the central finding: Scenario A shows a large absolute reduction (−66.6%), while Scenario B shows an absolute increase (+23.9%) because the redevelopment adds 57,820 m² of net new floor area. Compared with the previous demolition figure of 6,669 m², the larger 16,807 m² demolition has reduced the net floor area expansion from 67,958 m² to 57,820 m², and accordingly reduced Scenario B's absolute emissions increase from +29.7% to +23.9%, and improved its intensity reduction from −5.9% to −6.3%. The qualitative conclusions of the inventory are unchanged: Scenario B's absolute outcome is dominated by the floor area expansion, and per-m² intensity improves in both scenarios because the new buildings are more efficient than the existing baseline.

Table 82 Summary Comparison: Existing vs. Scenario A and Scenario B

Metric	Existing Facility	Scenario A, New Buildings Only	Scenario B, Existing Remaining + New
Total GFA (m²)	179,204.4	74,627.0	237,024.4
Annual electricity (kWh)	68,097,672	22,686,608	84,356,212
Total Scope 1 (tCO_2/yr)	556.23	231.59	735.51
Total Scope 2 (tCO_2/yr)	59,244.97	19,737.35	73,389.90
Total Scope 1+2 (tCO_2/yr)	59,801.20	19,968.94	74,125.41
Change vs existing	—	−66.6%	+23.9%
Emission intensity (kg CO_2/m²/yr)	333.71	267.59	312.72
Intensity change vs existing	—	−19.8%	−6.3%

The projections above use the EDGE minimum requirement of 20% energy savings relative to the conventional 380 kWh/m²/yr baseline, giving the new buildings an EUI of 304 kWh/m²/yr. This is a deliberately conservative assumption: a hospital designed as a comprehensive Green Building project may exceed the entry-level threshold. EDGE Advanced certification, for example, requires a minimum of 40% energy savings, equivalent to an EUI of 228 kWh/m²/yr. To test how sensitive the inventory results are to this assumption, the calculations have been repeated using the EDGE Advanced threshold.

Under Scenario A, the new buildings' annual electricity consumption would fall from 22,686,608 to 17,014,956 kWh/yr, and Scope 2 emissions would fall from 19,737 to 14,803 tCO_2/yr. Combined Scope 1+2 emissions would then fall to approximately 15,035 tCO_2/yr, a 74.9% reduction relative to the existing facility, compared with the 66.6% reduction obtained under the EDGE minimum assumption. The direction of the result is unchanged, but the magnitude is meaningfully larger.

Under Scenario B, the new buildings' Scope 2 emissions would again fall from 19,737 to 14,803 tCO_2/yr, lowering combined Scope 2 emissions from 73,389.90 to 68,455.56 tCO_2/yr. Combined Scope 1+2 emissions would fall to approximately 69,191 tCO_2/yr. Even at this higher performance level, however, Scenario B still represents a 15.7% increase relative to the existing facility, because the 32.3% expansion in total floor area continues to dominate the calculation. Achieving higher Green Building performance on the new portion alone is therefore not sufficient, in Scenario B, to deliver an absolute reduction in emissions. To move Scenario B into net-reduction territory, the retained existing buildings would also need to be addressed through retrofit or other efficiency measures.

This sensitivity check reinforces the central finding of the inventory: the absolute emissions outcome of the redevelopment depends not only on the performance of the new buildings, but also, and more decisively in Scenario B, on what happens to the existing buildings and on whether the redevelopment results in a net expansion of floor area. The Green Building label applied to the new portion is necessary but not sufficient for absolute emissions reductions when the redevelopment adds substantial new floor area.

10 STAKEHOLDER CONSULTATION AND INFORMATION DISCLOSURE

10.1. Stakeholder Consultation

10.1.1. Purpose of Stakeholder Consultation

The consultation process for the RSDK Semarang redevelopment project aims to:

- Provide clear, accessible, and timely information about project design and activities, with a particular focus on the pre-construction and construction stages, as well as the environmental and social risks and impacts associated with project implementation.
- Engage all project-affected stakeholders, including direct beneficiaries (patients, hospital staff, and visitors), people potentially affected by project activities (vendors and community members in the vicinity of RSDK), and interested parties such as government agencies and civil society.
- Collect concerns, feedback, and recommendations from affected and interested parties for consideration and incorporation into project design and implementation.
- Foster broad stakeholder support and mutual trust, and ensure constructive feedback informs decision-making throughout the project cycle.

10.1.2. Methods of Stakeholder Consultation

The public consultation process is conducted through multiple channels to ensure broad and inclusive participation:

- Public Meetings**:** Formal sessions organised at different project stages to present findings and gather structured feedback from community members and government representatives.
- Mass Media Announcement: Public notice published in the local newspaper Tribun Jateng to ensure wide reach across the project's area of influence.
- Public Hearing (Konsultasi Publik): A structured seminar-style consultation session involving presentations by the project proponent followed by open question-and-answer sessions with attendees.
- Online and Printed Information Disclosure: Project information made available through RSDK's institutional website and public notice boards.
- Feedback Mechanisms: Dedicated contact points for stakeholders to submit inquiries or concerns regarding construction activities and their impacts.

10.1.3. Identification of Project Stakeholders

Affected Stakeholders include:

- Target project beneficiaries: Patients, hospital staff, visitors, and service providers (canteen operators, parking attendants, and other vendors).
- Individuals and *groups potentially affected adversely:* Local residents living near RSDK who may be impacted directly or indirectly by environmental disturbances (dust, noise, vibration, traffic disruption, and labor influx) during construction; street vendors and small traders operating in the vicinity of the hospital whose livelihoods may be affected.

Interested Stakeholders include:

- *Government Authorities:* Ministries, regulatory agencies, and local government bodies, including the Semarang City Environmental Agency (Dinas Lingkungan Hidup Kota Semarang) and MUSPIKA representatives, responsible for approvals and compliance monitoring.
- *Community Leaders:* RT/RW leadership and kelurahan heads from Kelurahan Randusari, Barusari, and Bendungan.

See Annex [X] (Stakeholder Engagement Plan) for further details.

10.2. Results of Stakeholder Consultation

The RSDK redevelopment process commenced in 2018 and preparatory activities, including environmental and social planning, have continued through to the present. The primary statutory consultation was conducted in accordance with the AMDAL process under PermenLHK No. P.26/MENLHK/SETJEN/KUM.1/7/2018. To date, one formal public consultation session has been completed, as summarized below.

10.2.1. Summary of Key Consultation Activities

The following **Error! Reference source not found.** outlines the key consultation activities conducted during the RSDK redevelopment planning process since 2018.

Table 83 Conducted Consultations

No.	Stakeholders Consulted	Date	Venue	Participants	Male	Female	Key Topics Discussed	Key Feedback Raised	Responses Given
1	Public Consultation of Cultural Heritage	19 June 2026	Aula Gedung Penunjang Lt. 2, RSDK Semarang	The Spatial Planning Department, the Culture and Tourism Department of Semarang City, the caretaker of the Bergota tomb, the history activist community,	13	8	Public notice of RSDK service development neighboring on Cultural Heritage in RSDK	There is a need for HIA documents to support CH studies	N/A
2	Mass media public announcement	12 June 2026	Randusari District Office	Local people of Barusari and Randusari, Tenant, Stakeholder (RS Kariadi).	35	21	Public notice of AMDAL and ESIA study for RSDK service development of GMS-DC and SoE	The involvement and empowerment of local communities in employment, consumption suppliers, anticipation of waste from development activities, and traffic jams must be managed.	Stakeholders agreed to prioritize empowering open communities, waste will be monitored regularly, and traffic jams will also be included in the study.
3	Mass media public announcement	17 September 2019	*Tribun Jateng* daily newspaper	General public	—	—	Public notice of AMDAL study for RSDK service development	N/A	N/A
4	Nearby residents (Kel. Randusari, Barusari, Bendungan), Dinas Lingkungan Hidup Kota Semarang, MUSPIKA, hospital management	20 September 2019	Aula Gedung Penunjang Lt. 6, RSDK Semarang	50 participants including community representatives, government officials, hospital management, and consultants	[*To be confirmed*]	[*To be confirmed*]	Masterplan overview; construction impacts on traffic, groundwater, access roads, dust, noise, and working hours; community livelihood impacts; access	Traffic congestion from heavy construction vehicles; declining groundwater affecting community wells; construction material spillage on residential roads; construction noise at night; parking of heavy vehicles on the roadside; reduction in green open space and water recharge areas; livelihood impacts on	Proponent committed to monitoring construction impacts, coordinating with police on heavy vehicle management, limiting construction hours, and providing a designated contact person for community complaints

	for heavy vehicles	vendors near closed hospital access gate

10.2.2. Summary of Key Issues Raised and Project Responses

Table 84 Key Issues and Responses from the Public Consultation (20 September 2019)

No.	Issue Raised	Raised By	Project Response / Commitment
1	Closure of the access gate near the mortuary has reduced foot traffic to surrounding vendors, affecting their livelihoods	Bapak Kartika Hermawan (RT.02/RW.06, Bergota, Randusari)	To be reviewed during detailed project planning; vendor impacts to be assessed
2	Construction material spillage and mud on residential roads	Multiple community members	Proponent to instruct contractors to prevent and clean material spillage along access routes
3	Construction activities extending into evening hours, disturbing residents' rest and prayer times	Bapak Dani (RT.06/RW.02, Bendungan)	Construction hours to be regulated; nighttime work to be minimized and managed
4	No dedicated contact for community complaints related to construction	Bapak Dani (RT.06/RW.02, Bendungan)	Proponent committed to establishing a designated complaint contact for affected residents
5	Deep groundwater extraction by RSDK affecting the water supply of community wells	Bapak Minarto (RW.05, Kel. Randusari); Bapak Widiyanto (Lurah Barusari)	To be investigated; alternative water supply options for the hospital to be considered
6	Heavy construction vehicles parked on road shoulders, creating traffic and safety hazards	Bapak Junaidi Joko (RT.01/RW.05, Kel. Barusari)	Proponent to coordinate with police for traffic management and restrict roadside parking of heavy equipment
7	Dust and noise impacts from ongoing construction works	Bapak Rois (RW.05, Kel. Barusari)	Dust suppression and noise mitigation measures to be implemented by contractors
8	Reduction of green open space and water absorption areas due to new building construction	Bapak Rois (RW.05, Kel. Barusari)	To be addressed in the environmental management plan; green space provisions to be considered in the master plan
9	Traffic congestion concerns related to the construction of the Central Medical Building near the Polrestabes Semarang	Bapak Rois (RW.05, Kel. Barusari)	Traffic impact management plan to be prepared prior to construction

10.3. Information Disclosure

Project information has been disclosed through the following channels since the commencement of the redevelopment process:

- *2019 AMDAL Disclosure*. AMDAL environmental and social information disclosed to the public in 2019 through multiple channels: mass media announcement published in Tribun Jateng on 17 September 2019, formal public consultation event on 20 September 2019 with presentation of project background and environmental/social impacts, and physical notice boards posted at RSDK premises and surrounding kelurahan offices. Public feedback period was 10 working days.
- *2026 ESIA-ESMP Public Consultation*. Formal public consultation on the ESIA-ESMP and updated environmental and social management information was conducted on 12 June 2026, in

accordance with AIIB ESF requirements for Category B projects. Consultation materials, feedback received, and management responses documented per ESS1 requirements.

10.4. Planned Disclosure, Ongoing and Upcoming

As the project preparation and redevelopment process remains ongoing, the following disclosure measures are planned prior to and during construction:

Table 85 Information Disclosure and Communication Channels for Stakeholder Engagement

Document	Disclosure Channel	Language	Timing
ESIA/ESMP (full and non-technical summary)	AIIB project portal; RSDK institutional website; hardcopy at Project Liaison Office	Bahasa Indonesia + English executive summary	≥ 30 days before construction mobilization
Stakeholder Engagement Plan (SEP)	AIIB portal; RSDK website; Project Liaison Office	Bahasa Indonesia + English	≥ 30 days before first pre-construction consultation round
Environmental and Social Management Plan (ESMP / CESMP)	AIIB portal; RSDK website; Project Liaison Office	Bahasa Indonesia + English	Before construction mobilization; updated versions within 30 days of any material change
GRM procedures summary	Printed posters at RSDK gates, kelurahan offices, and site welfare facilities; RSDK website	Bahasa Indonesia	Before mobilization; refreshed quarterly
Monthly ESMP monitoring reports	AIIB project portal; RSDK website (summary version)	Bahasa Indonesia + English	Monthly, within 15 days of end of each reporting period

All documents provided to community stakeholders are in Bahasa Indonesia. Technical documents for the AIIB are in English. Printed copies are held at the Project Liaison Office and RSDK's Customer Service Unit, available at no charge.

10.5. Forward Engagement Plan

Given that project preparation is ongoing and construction has not yet commenced, additional stakeholder consultation activities will be conducted before and during construction. These will include:

- Pre-construction Consultation Rounds: Targeted focus group discussions (FGDs) with affected groups, including local residents, vendors, patients, and community leaders, to present updated project information, share the ESIA findings, and collect final input before works begin.
- Construction-phase Community Updates: Regular community briefings, site notice boards, and RSDK website updates throughout the construction period.
- Grievance Redress Mechanism (GRM): A structured, accessible GRM will be established and communicated to all stakeholders before construction mobilization. Details are set out in Chapter 10.

- Ongoing Disclosure: All monitoring reports and GRM logs will be disclosed in accordance with AIIB ESS10 requirements throughout the project lifecycle.

Consultation activities will be conducted in Bahasa Indonesia. Events will be scheduled to avoid major religious and cultural observance periods (Ramadan, Lebaran, Natal). Engagement formats will be adapted to ensure accessibility for women, elderly persons, persons with disabilities, and informal workers.

The stakeholder consultation and information disclosure activities described in this chapter represent the initial steps of an ongoing, phased engagement process that has been progressively carried out since the commencement of the RSDK redevelopment in 2018. These activities will be further developed and deepened in conjunction with the AMDAL study process, ensuring that environmental and social findings are communicated to, and informed by, affected stakeholders at each stage of assessment. Consultation will continue iteratively as the AMDAL study advances, with additional rounds of public engagement conducted in accordance with the requirements of PermenLHK No. P.26/MENLHK/SETJEN/KUM.1/7/2018 and aligned with AIIB ESS10 obligations.

The detailed framework governing stakeholder consultation and engagement, including stakeholder mapping, engagement methods, consultation schedules, roles and responsibilities, and monitoring arrangements, is presented in **Annex C (Stakeholder Engagement Plan)**.

10.5.1. Coordination Mechanisms

Day-to-day coordination operates through two interlocking mechanisms:

- Project Steering Committee (PSC), convened monthly by RSDK Direksi and co-chaired by the PIU Project Manager. The PSC reviews the integrated ESF dashboard, the GRM case summary, the heritage and H&S log, and financial progress. It has authority to issue corrective-action instructions to the Contractor (via the Independent Engineer) and to the EMU. Minutes and agreed actions are recorded, circulated within five working days, and retained as part of the project record.

- Technical Working Group (TWG), a standing sub-committee of the PSC, convened as needed but at minimum quarterly, comprising EGI, the Independent Engineer, the PIU Environmental and Social Officer, and the EMU representative. The TWG reviews technical monitoring findings, interprets exceedances, and recommends corrective or adaptive actions to the PSC. The TWG also reviews each Living Document version prior to PIU endorsement and AIIB submission.

Both mechanisms feed into the AIIB quarterly E&S reporting obligation described in Chapter 13.

10.5.2. Contractor Management and the C-ESMP

The Construction Contractor is required, as a condition of mobilization, to prepare and obtain PIU and AIIB no-objection for a Contractor's Environmental and Social Management Plan (C-ESMP). The C-

ESMP must be consistent with the approved ESIA-ESMP commitments and must as a minimum address:

- Site-specific dust, noise, and vibration management procedures, including stop-work thresholds consistent with Chapter 12.
- SMK3 system documentation per PP 50/2012, including appointment of a certified K3 Officer.
- Construction waste and B3 waste management plan, including the manifested transport arrangement with PT PRIA.
- Heritage-adjacent works protocol incorporating the Chance Find Procedure.
- Traffic Management Plan (TMP) consistent with the Andalalin approval conditions.
- GBV/SEAH Code of Conduct, signed by all workers, with a named GBV/SEAH Focal Point.
- Community liaison and GRM access information for workers and the surrounding community including inclusive public consultation involving the vulnerable affected people
- Emergency response and spill-response procedures.

The Independent Engineer reviews C-ESMP implementation monthly and has authority to issue a Stop-Work Notice for non-compliance with any critical safety, heritage, or pollution-control requirement. All Stop-Work Notices are reported to the PIU and to AIIB within 24 hours of issuance.

10.5.3. Independent Engineer, Escalation and AIIB Interface

The Independent Engineer operates on a direct-reporting line to AIIB for ESF matters, independent of the PIU and RSDK Direksi. This independence is a core AIIB ESF safeguard. Where the IE identifies a material non-compliance or a risk of significant adverse impact that the PIU has not addressed within an agreed corrective-action period, the IE is authorised to escalate directly to AIIB, which may invoke its remediation and sanctions provisions.

In practice, the IE will submit monthly site inspection reports to the PIU (with a copy to AIIB) and will prepare the quarterly ESF compliance reports that form the backbone of AIIB E&S oversight. The IE also reviews and endorses the PIU's quarterly E&S Progress Report before submission.

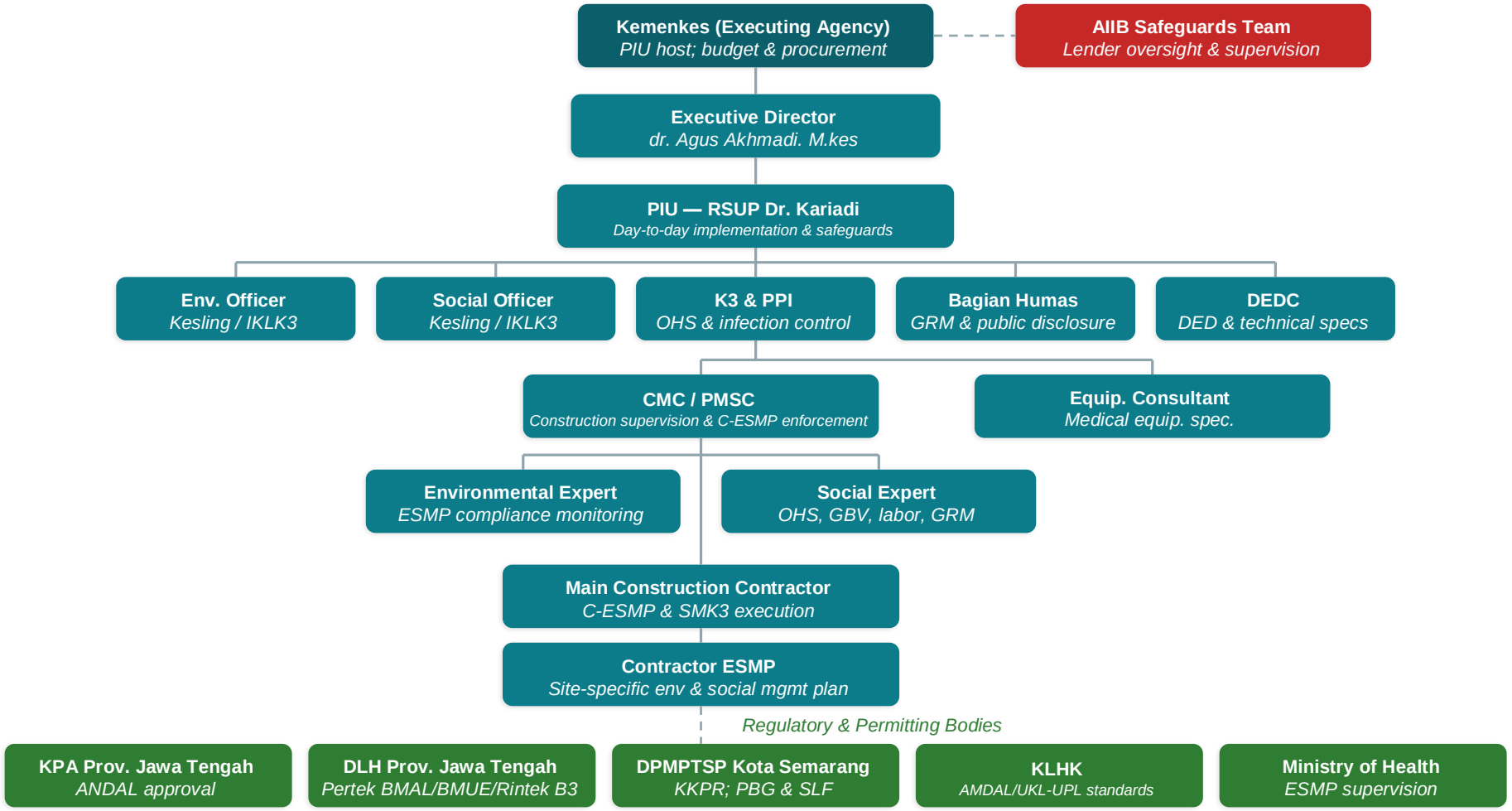


Figure 25 Organization Chart

11 GRIEVANCE REDRESS MECHANISM

11.1. Objectives and Principles

The GRM is established to provide affected stakeholders with a confidential, accessible, and responsive channel for raising concerns about project-related impacts and for receiving timely resolutions. The GRM operates on the following principles:

- Accessibility, multiple channels (walk-in, telephone, digital, written, confidential), language and format adaptation for vulnerable groups, no fee or eligibility barrier;
- Confidentiality, protection of complainant identity, particular protection for GBV/SEAH complaints with female focal point and restricted access response team;
- Independence, investigation by personnel separate from the operations being complained about; AIIB escalation route preserved for unresolved complaints;
- Timeliness, defined service-level commitments at intake (≤3 days), screening (≤7 days), investigation and resolution (≤30 days), and escalation (defined criteria);
- Transparency, periodic public reporting of aggregated GRM metrics; quarterly summary in AIIB E&S reporting (Chapter 13);
- Without retaliation, explicit commitment that complainants will not be subject to retaliation;
- Continuous improvement, regular review of GRM effectiveness, lessons-learned cycle, and capacity-building of GRM personnel.
- Cultural appropriateness, intake, response, and outreach materials adapted to local language (Bahasa Indonesia and Bahasa Jawa) and to the cultural context of the RSDK catchment population.

Proportionality, the GRM does not impede access to administrative, judicial, or customary remedies and is not used to discourage formal legal recourse.

11.2. Applicable Standards and Legal Basis

- The GRM is designed to comply with the following framework:

Table 86 Regulation Project GRM

Standard / Regulation	Relevance to Project GRM
AIIB ESS1 (39–42)	Stakeholder engagement and project-level grievance mechanism; proportionate, accessible, predictable, transparent, culturally appropriate, confidential, non-retaliatory.

Standard / Regulation	Relevance to Project GRM
AIIB ESS2 (29–31)	Worker-specific grievance mechanism for direct, contracted, and primary supply-chain workers.
UU No. 25/2009	Public Service Law, institutional obligation to provide a complaint-handling channel and time-bound response.
UU No. 36/2009 jo. UU No. 17/2023	Health Law, patient right to file complaints regarding health services.
UU No. 27/2022	Personal Data Protection Law (PDP), confidentiality of complainant data, lawful basis for processing, and retention limits.
Permenkes No. 4/2018	Patient and family rights obligations in hospitals, including complaint-handling.
Permen PAN-RB No. 24/2014	Public-service complaint management guidelines.
Instruksi Menteri Kesehatan	Ministerial instruction on reporting suspected ethics violations, basis for the SI PETIK platform.

11.3. Existing Institutional Baseline at RSDK

RSDK operates two existing complaint systems that are integrated into the project GRM.

11.3.1. SI PETIK, Ethics Violation Reporting Platform

- Mandated by the Ministry of Health for reporting suspected professional and institutional ethics violations (intimidation, harassment, bullying, sexual violence, other misconduct).
- Accessible at https://petik.rskariadi.id/ and via QR code posters at hospital entry points.
- The RSDK management has installed barcodes on noticeboards in the lobbies of its buildings, making it easier for individuals to submit reports to hospital management. An example of the complaint barcode is shown in the figure below.



Figure 26 Barcode SI PETIK

- Guarantees confidentiality of the reporter's identity (Instruksi Menteri Kesehatan and RSDK Code of Conduct).
- Serves as the primary patient facing and staff facing ethics reporting channel within the project GRM. For project related grievances (environmental, social, livelihood, construction), the project GRM channels (Section 5) take precedence; SI PETIK is retained for ethics violations that arise alongside the project (e.g., alleged misconduct by project workers toward patients or staff).
- SI PETIK is referenced as a primary patient-facing and staff-facing ethics-reporting channel within the project GRM. For project-related grievances (environmental, social, livelihood, construction-related), the project GRM channels described in Section 10.5 take precedence; SI PETIK is retained for ethics-violation reports that arise alongside the project, for example, alleged misconduct by project workers towards patients or staff. Quick reference, SI PETIK access details:

Table 87 SIPETIK ACCESS

Platform name	SI PETIK (Solusi Pelanggaran Etik), Form Pelaporan Dugaan Pelanggaran Etik RSDK
URL	https://petik.rskariadi.id/
SMS Pengaduan	0888 650 9262
Email	info@rskariadi.co.id
Hospital web	www.rskariadi.co.id
Address	Jl. Dr. Sutomo No. 16 Semarang, Jawa Tengah 50244. Tel: 024-8413476. Fax: +62-24-8318617.
Confidentiality	Identitas pelapor dijamin kerahasiaannya (reporter identity is guaranteed confidential).
Legal basis	Instruksi Menteri Kesehatan; RSDK Code of Conduct.
Scope	Suspected ethics violations: intimidation, harassment, sexual violence, bullying, and other professional or institutional misconduct.

11.3.2. Form Keluhan Pelanggan – Patient Service Quality Complaints

- Dedicated online patient complaint portal for service quality and satisfaction, covering registration, administration, medical/non-medical personnel, clinical services, and hospital facilities.
- RSDK also operates a dedicated online patient complaint portal, Form Keluhan Pelanggan RSUP Dr. Kariadi, accessible at https://keluhan-pelanggan.rskariadi.id. The portal collects the complainant's name, mobile/WhatsApp number, patient medical record number (if available), date and time of incident, chronological description, and a severity scale (1–100).
- Collects complainant name, mobile/WhatsApp, medical record number (if available), incident date/time, description, and severity scale (1–100). Response commitment: 1 × 24 hours.
- RSDK commits to providing a response within 1 × 24 hours of submission. Quick reference, SI PETIK access details:

Table 88 Form Keluhan Pelanggan

Platform name	Form Keluhan Pelanggan RSUP Dr. Kariadi Semarang
URL	https://petik.rskariadi.id/
SMS Pengaduan	0888 650 9262
Email	info@rskariadi.co.id
Hospital web	www.rskariadi.co.id
Address	Jl. Dr. Sutomo No. 16 Semarang, Jawa Tengah 50244. Tel: 024-8413476. Fax: +62-24-8318617.
Response time	1 x 24 hours
Complaint categories	Registration & administration; medical personnel; non-medical personnel; clinical & support services; hospital facilities
Complainant information collected	Name, mobile/WhatsApp number, email, patient medical record number, patient date of birth, date and time of incident, location, financing status (BPJS/insurance/general), chronological description, severity scale (1–100)
Scope	Patient and visitor service-quality complaints; not intended for ethics violations (refer to SI PETIK)
Confidentiality	Identitas pelapor dijamin kerahasiaannya (reporter identity is guaranteed confidential).
Legal basis	Permenkes No. 4/2018 (patient rights and complaint-handling); UU 25/2009 (Public Service Law); UU 27/2022 (Personal Data Protection)

11.4. Proposed Project's Redress Procedures for Submitting Grievance through The Project-affected People's Mechanism of AIIB

Independent Accountability Mechanism: The Project-affected People's Mechanism (PPM) has been established by the Asian Infrastructure Investment Bank (AIIB) to provide an opportunity for an independent and impartial review of submissions from Project-affected people who believe they have been or are likely to be adversely affected by AIIB's failure to implement its Environmental and Social Policy in situations when their concerns cannot be addressed satisfactorily through Project-level Grievance Redress Mechanisms or AIIB Management's processes. For information on how to make submissions to the PPM https://www.aiib.org/en/policies-strategies/operational-policies/policy-on-the-project-affected-mechanism.html.

11.5. Stakeholder Coverage

The project GRM covers three distinct stakeholder groups, each with tailored channels and response pathways:

Table 89 Stakeholder Groups, Grievance Categories, and Communication Channels

Stakeholder Group	Scope	Typical Grievance Categories	Primary Channels
Patients and families	Hospital service users, inpatients, outpatients, caregivers, and accompanying family members.	Construction-related disturbance to clinical service (noise, dust, access disruption, IPC risks), service-quality concerns, and ethics-related concerns regarding staff or workers.	Customer Service Unit, SI PETIK, project GRM hotline, walk-in at Project Liaison Office, online form.
Workers	RSDK staff (medical, nursing, administrative, support), contractor and sub-contractor workers, and primary supply-chain workers.	Labor rights, occupational health and safety, wage and contract disputes, working hours, accommodation, harassment, child labor, retaliation.	Worker-specific GRM (anonymous hotline, suggestion box, focal person), Code-of-Conduct breach reporting, SI PETIK for ethics-related issues.
Community	Residents of Kelurahan Randusari (including Gunung Brintik), neighboring kelurahan, street vendors (PKL), informal traders, school communities, and road users on Jl. Dr. Sutomo and Jl. Dr. Kariadi.	Construction nuisance (noise, dust, vibration, traffic), livelihood impacts on vendors, access restrictions, cultural-heritage concerns, SEA/SH risks from worker influx.	Walk-in at Project Liaison Office, project hotline, online form, written submission via comment boxes, community focal points.

11.6. GRM Channels and Procedures

The project GRM operates across the following channels, each with documented intake, tracking, and reporting procedures.

Table 90 GRM Procedure

Channel	Modalities
Walk-in	Dedicated GRM desk at the RSDK Customer Service Unit, Project Liaison Office (GMS-DC & SoC construction area (Jalan Dr. Sutomo Nomor 16, Randusari, Kota Semarang, Jawa Tengah.) and Village Office (Kantor Desa Randusari) serving as local complaint intake points.
Telephone	Institutional hotline; dedicated project GRM hotline operating in Bahasa Indonesia and Javanese; AIIB escalation line for unresolved complaints
Digital	Project email address; online complaint form on the RSDK institutional website; SMS-to-WhatsApp triage on the project hotline
Written	Physical comment boxes at RSDK gates and at the Project Liaison Office; postal submission to the institutional address; receipt acknowledgement within 3 days
Confidential GBV/SEAH	Dedicated channel with female focal point; access restricted to GBV/SEAH response team; trained intake personnel; survivor-centered protocols (GBV/SEAH Complaints to Semarang CIty DP3A Services (PPT Seruni) Hotline: (024)-70325200, 3566517)
Vulnerable-group accessibility	Printed materials in large print and audio-readable format; accessible written-language adaptation; accompanied submission for elderly and PWD complainants

11.7. Complaint Handling Stages

Complaint handling follows a four-stage process with explicit service-level commitments at each stage:

- Stage 1, Intake and Acknowledgement (≤3 days): receipt of complaint via any channel; registration in the GRM register; acknowledgement to complainant; preliminary categorization (operational/environmental/social/labor/GBV-SEAH).

- Stage 2, Screening and Routing (≤7 days): assignment to the appropriate response team (Operations, Environmental Management Unit, K3, Heritage, GBV/SEAH); preliminary fact-finding; complainant communication on expected next steps.
- Stage 3, Investigation and Resolution (≤30 days): structured investigation; consultation with affected parties; identification of corrective actions; communication of resolution to complainant; closure with complainant agreement where possible.
- Stage 4, Escalation (if dissatisfied): explicit escalation route to (a) RSDK Direksi for operational matters; (b) PIU and Independent Engineer for project-related matters; (c) regulatory authorities (DLH Provinsi, Dishub, BPK Jawa Tengah) for sector-specific matters; and (d) AIIB for unresolved or AIIB-relevant complaints.

Table 91 Process Flow Summary

Stage	Activity	Output	Service Level
1. Intake	All channels (walk-in, phone, digital, written, SI PETIK)	Complaint registered, acknowledged, categorised	≤3 working days
2. Screening	Routing to response team and risk screening	Confirmed routing and complainant notification	≤7 working days
3. Investigation & Resolution	Independent fact-finding and corrective action design	Resolution proposed and communicated	≤30 working days
4. Closure	Complainant agreement or escalation election	Case closed with feedback recorded	Within 5 working days of resolution
5. Escalation (if needed)	RSDK Direksi / PIU / Regulator / AIIB PPM	Independent review and remedy	Per escalation forum rules

11.8. Roles and Responsibilities

Clear allocation of responsibilities prevents diffusion of accountability and supports the independence principle. The following matrix sets out primary and supporting roles:

Table 92 Roles and Responsibilities

Role	Primary Responsibility
GRM Manager (PIU)	Owns the project GRM; chairs the monthly GRM review; signs off on quarterly reports to AIIB; ensures independence of investigators.
RSDK Customer Service Unit	Intake point for patient and family complaints; integrates project complaints into the institutional system; coordinates with Bagian Mutu RSDK.
RSDK Komite Etik (Ethics Committee)	Receives and adjudicates SI PETIK reports; coordinates with GRM Manager when ethics matters overlap with project conduct.
Contractor HSE Manager	Owns worker GRM channels on the contractor side; reports monthly KPIs; ensures Code-of-Conduct enforcement.
GBV/SEAH Focal Person (female)	Receives and triages GBV/SEAH complaints; manages survivor-centered response and referrals; preserves confidentiality.
Community Liaison Officer	Operates Project Liaison Office; intake for community complaints; conducts vulnerability-aware outreach in Randusari and Gunung Brintik.

Environmental Management Unit	Investigates environmental complaints (dust, noise, vibration, waste, water).
Komite K3 / OHS Committee	Investigates occupational safety and labor complaints.
Heritage Specialist	Investigates complaints related to BPK Jawa Tengah, registered heritage and chance-find protocol.
Independent Engineer	Independent review on technical and contractual complaints escalated under Stage 4.
AIIB PPM (escalation)	Independent project-affected people's mechanism for complaints unresolved at project level.

11.9. Roles and KPIs

KPIs for GRM performance include:

- Acknowledgement rate within 3 days (target ≥ 95%)
- Screening within 7 days (target ≥ 95%)
- Resolution within 30 days (target ≥ 90%, with defined exceptions for complex cases)
- Complainant satisfaction (target ≥ 85% post-resolution rating)
- Vulnerable-group access (no group is structurally underrepresented in the complaint volume)
- Zero retaliation incidents (verified via independent monitoring)
- Worker GRM uptake, ratio of worker complaints received to total workforce size, monitored to detect underreporting;
- Channel diversity, share of complaints received through each channel, to detect channel inaccessibility;
- Recurrence rate, share of complaints raising issues previously resolved within the last six months, to detect systemic root causes.

11.10. Worker GRM, RSDK Staff and Contractor Personnel

Per AIIB ESS2 29–31, a dedicated worker grievance mechanism is provided to all RSDK staff, contractor workers, sub-contractor workers, and primary supply-chain workers engaged on the project. The mechanism operates independently of disciplinary procedures and protects workers from retaliation.

Channels:

- Anonymous hotline operated by the contractor HR / HSE Manager;
- Suggestion boxes installed at worker welfare facilities, site offices, and dormitories;
- Designated worker focal person trained in confidentiality and worker-rights principles;
- SI PETIK for ethics-related grievances overlapping with project conduct;

- Escalation route to the PIU GRM Manager, then to Disnaker Kota Semarang or AIIB PPM.

Coverage extends to all working conditions, including wages and benefits, working hours, contracts, accommodation, health and safety, harassment, discrimination, child labor, and retaliation. The Worker GRM is communicated to every worker at induction in Bahasa Indonesia (with Bahasa Jawa support on request), posted prominently at all worker access points, and reinforced via quarterly refresher briefings.

11.11. Patient and Family GRM

Patients and their families access the GRM primarily through the RSDK Customer Service Unit, supplemented by SI PETIK for ethics-related concerns. Project-related grievances (construction nuisance, IPC concerns, access disruption) are routed from the Customer Service Unit to the PIU GRM Manager within 24 hours of intake.

Adaptations for the clinical context include:

- Bedside intake for inpatients unable to walk to the Customer Service desk;
- Dedicated caregiver-intake protocol for ICU, NICU, PICU, and ICCU patients, recognising that the patient may not be the complainant;
- Bahasa Jawa interpretation for elderly local patients;
- Accessible-format submission (large print, audio-readable) for PWD and elderly complainants;
- Direct integration with the institutional Survei Indeks Kepuasan Masyarakat instrument referenced in FS Section 3.13;
- Clear separation between clinical complaints (handled within hospital clinical governance) and project-related complaints (handled by the PIU), to prevent crowding-out of either type.

Submission channels (same as SI PETIK access details): SMS 0888 650 9262, email info@rskariadi.co.id, website www.rskariadi.co.id, or postal address above.

11.12. Community GRM

Community members, including residents of Kelurahan Randusari (with priority to the Gunung Brintik pocket of poverty), neighbouring kelurahan, street vendors, informal traders, and road users, access the GRM through the Project Liaison Office and supporting outreach channels.

Adaptations for the community context include:

- Project Liaison Office located adjacent to the construction zone with visible signage in Bahasa Indonesia and Bahasa Jawa;
- Community focal points appointed in Kelurahan Randusari and other affected kelurahan, with monthly coordination meetings;

- PKL-specific intake channel coordinated with Dinas Koperasi UKM and LBH referral, in line with the C.1.1 risk in the ESIA matrix;
- Vulnerability-aware outreach (women, elderly, PWD, female-headed households) with consultation formats varied by time, venue, and language;
- Quarterly community feedback sessions to disseminate aggregated GRM outcomes and corrective actions.

11.13.Confidentiality, Data Protection, and Non-Retaliation

All complaint data is processed in compliance with UU 27/2022 (Personal Data Protection Law). Specifically:

- Personal data is collected only to the extent necessary to receive, investigate, and resolve the complaint.
- Access to the complainant's identity is restricted to the GRM Manager and the assigned response team; GBV/SEAH complaints are restricted further to the female focal person and the GBV response team; Collaborating with the existing GBV referral and response system in Semarang City (PPT Seruni DP3A Kota Semarang, etc).[3] GBV service mapping in the project area has been identified and is presented in Section 5.2.2 (Women and Gender-Based Violence Risk). Available services include the Seruni Integrated Service Center (DP3A Semarang), the Women and Children Protection Unit (PPA) of Semarang City Police, legal aid and counseling services provided by LBH APIK Semarang, university-based PPKS task forces, and dedicated GBV emergency hotlines.**[1] Details of service providers and contact information are provided in Section 5.2.2 of the report.-added footnote
- Aggregated and anonymised data is used for public reporting; no personal data is disclosed externally without the complainant's informed consent.
- Complaint records are retained for the duration of the project and for a defined period thereafter consistent with UU 27/2022 retention principles.
- Anonymous complaints are accepted and investigated where the information allows; complainants are not required to identify themselves to access the GRM.
- Retaliation against any complainant, witness, or supporter is explicitly prohibited; any retaliatory act is itself a complaint category and triggers disciplinary action up to and including contract termination.

[3] GBV service mapping in the project area has been identified and is presented in Section 5.2.2 (Women and Gender-Based Violence Risk). Available services include the Seruni Integrated Service Center (DP3A Semarang), the Women and Children Protection Unit (PPA) of Semarang City Police, legal aid and counseling services provided by LBH APIK Semarang, university-based PPKS task forces, and dedicated GBV emergency hotlines.Details of service providers and contact information are provided in Section 5.2.2 of the report.

11.14. Outreach, Capacity-Building, and Continuous Improvement

- GRM awareness campaign at project mobilization, repeated quarterly, with materials adapted to each stakeholder group.
- Induction training on the GRM for all project workers, RSDK liaison staff, and contractor supervisors.
- Annual refresher training for GRM intake personnel, GBV/SEAH focal persons, and investigation team members.
- Annual GRM effectiveness review against the KPIs in Section 10.8, with public summary of findings and corrective actions.
- Lessons-learned cycle: recurring or systemic complaints trigger root-cause analysis and corrective action in the CESMP.

11.15. Reporting and Disclosure

- Monthly GRM register reviewed by the PIU GRM Manager;
- Quarterly aggregated GRM summary published as part of the AIIB E&S report (Chapter 13);
- Public disclosure of aggregated and anonymised GRM statistics on the RSDK institutional website;
- Annual GRM effectiveness review submitted to AIIB and the PIU Steering Committee;
- Project-closure GRM report consolidating performance against KPIs and lessons learned for future RSDK projects

11.16. RS-Specific Adaptations

RSDK-specific GRM adaptations include integration with the existing Customer Service Unit framework, Bahasa Jawa interpretation availability for elderly local complainants, dedicated vulnerable-group intake for ICU/NICU/ICCU caregiver-complaints, accessible-format complaint submission for PWD and elderly complainants, and direct integration with the institutional Survei Indeks Kepuasan Masyarakat instrument referenced in FS Section 3.13.

12 IMPLEMENTATION ARRANGEMENTS

12.1. Institutional Roles and Responsibilities

Implementation of the ESIA-ESMP commitments for the GMS-DC project operates through a multi-tiered institutional framework that spans the national level (Ministry of Health / PIU), the hospital-governance level (RSDK Direksi / PSC), the technical-consultancy level (EGI, Independent Engineer), the construction-execution level (Contractor), and the long-term operational level (Institutional Environmental Management Unit). This framework reflects the AIIB ESF requirement for clearly assigned accountability, a defined escalation path, and independent oversight.

The principal institutional interfaces are illustrated in Figure 11-1. The PIU sits at the center of the accountability chain: it receives monitoring data from the Contractor, the Independent Engineer, and the EMU; it consolidates these into the AIIB quarterly and annual reports; and it holds primary responsibility for the Living Document version cycle. RSDK Direksi exercises hospital-level governance through the Project Steering Committee and retains operational accountability for post-construction environmental compliance under the Indonesian regulatory system.

Error! Reference source not found. sets out the detailed roles and responsibilities of each entity.

Table 93 Institutional roles and responsibilities

Entity	Role and Responsibilities
Ministry of Health (Kemenkes)	Project owner; holds ultimate accountability for AIIB ESF compliance; executing-agency role and principal AIIB counterparty; issues no-objection to major ESIA-ESMP revisions and approves the annual ESF Compliance Report before submission to AIIB.
Project Implementation Unit (PIU), within Kemenkes	Day-to-day project management authority; ESIA-ESMP implementation oversight; coordination of AIIB safeguards review; monthly progress reporting to AIIB and to the Project Steering Committee; custodian of the Living Document; first point of contact for the Independent Engineer.
RSDK Direksi / Project Steering Committee (PSC)	Hospital-level governance body; chairs PSC meetings; monthly review of construction progress, ESF compliance status, GRM case summary, financial progress, and risk register; institutional commitment to ESMP resource allocation; co-signatory of the annual Board E&S Brief.
Penanggung Jawab Lingkungan, Bapak Agus Akhmadi	Designated institutional environmental officer under Indonesian regulatory law; internal coordination with consultant that conduct the ESIA and AMDAL Addendum process; principal liaison with DLH Provinsi Jawa Tengah; counter-signatory on RKL-RPL submissions to SI-PELITA.
Institutional Environmental Management Unit (EMU)	Operates the post-construction environmental management system; responsible for IPAL daily operation and monthly compliance testing, TPS LB3 management, stack-emission monitoring, and SI-PELITA semester reporting; supported by the institutional ESO; implements corrective action on monitoring findings.
Independent Engineer / Implementation Consultant (TBC)	External, AIIB-appointed supervision; monthly site inspections during construction; quarterly ESF compliance reports submitted directly to AIIB; ESMP audit against the C-ESMP and the approved ESIA-ESMP commitments; escalation authority to PIU and AIIB for non-compliance findings.

Construction Contractor (TBC)	Site-level implementation of all construction ESMP measures; preparation and AIIB approval of the Contractor's ESMP (C-ESMP) prior to mobilization; operation of the SMK3 system per PP 50/2012; daily safety inspections; maintenance of the heritage-adjacent works protocol, the GBV/SEAH Code of Conduct, and on-site GRM channel.
KAN-Accredited Monitoring Laboratories	Independent compliance testing: monthly IPAL effluent samples; quarterly stack-emission tests (Miura boilers, genset cerobong); semester ambient air and noise surveys at four monitoring points; methodology per SNI 8990:2021 / SNI 9063:2022 / SNI 6989-series and APHA 9221B/C.
PT PRIA, B3 Off-Site Transporter and Processor	Manifested transport of all regulated medical-waste (B3) streams from the RSDK TPS Limbah B3 to an authorised processing facility; contract renewal and updated Rintek B3 scope; quarterly transporter audit by the EMU.

12.1.1. Priority Monitoring Items

Two items carry elevated reporting obligations and are flagged as PRIORITY throughout the program:

B.2.1, Hospital-acquired infection risk from dust and HVAC disruption during adjacent construction. This requires continuous particle counting at sterile-zone boundaries, daily IPC inspection, and monthly HAI-rate review, with findings reported monthly to the RSDK Director and the AIIB safeguards team.

B.7.1, Physical damage to heritage structures from vibration and ground movement. This requires continuous ISO 4866 PPV monitoring at heritage fabric, with any exceedance of the DIN 4150-3 cosmetic-damage threshold triggering stop-work within one hour and BPK Jawa Tengah notification within 24 hours.

Table 94 Environmental and Social Monitoring Plan during Construction Phase

No / Ref	Key Risks & Impacts	Monitoring Parameters	Locations	Measurements / Method	Frequency	Responsibilities	Cost Estimate (IDR)
A. ENVIRONMENTAL							
A.1.1	Dust and particulate matter (PM_{10}, $PM_{2.5}$, TSP)	Real-time PM_{10} and $PM_{2.5}$ concentrations at fenceline monitors Effectiveness of dust-suppression measures (water spray, wheel-wash) ICRA hoarding integrity and HEPA filter status on clinical HVAC intakes Clinical complaints attributable to construction dust	GMS-DC & SoE site boundary fenceline Permukiman RT 1/RW 5 community receptor ICRA hoarding perimeter between construction and clinical zones	Continuous optical-scattering analyser at fenceline Daily visual inspection of suppression measures Quarterly KAN-accredited lab verification sampling	Continuous (real-time monitor) Daily (visual inspection) Quarterly (lab verification)	Main Contractor (PMC) RSDK IPC Team Independent Engineer (monthly audit)	Rp. 50 – 60 M/year (monitors, lab sampling, dust suppression consumables)
A.1.2	Exhaust gas emissions from diesel machinery	Equipment compliance certificates (Euro III or higher) Engine idling duration log Generator positioning relative to clinical zones	Construction site; generator and heavy equipment locations	Pre-mobilisation vehicle compliance verification Monthly equipment inspection records Daily inspection log for engine idling	Pre-mobilisation (compliance check) Monthly (inspection records) Daily (idling log)	Main Contractor PIU Environmental Officer	Rp. 4–8 M/year (inspection programme)
A.2.1	Construction noise exceeding hospital ambient thresholds	Continuous noise levels at ward façades and community boundary Compliance with restricted working hours (08:00–17:00 Mon–Sat) Acoustic barrier installation and SRI performance 48-hour advance notice records to ward managers	Permukiman RT 1/RW 5 community boundary RSDK ICU/ICCU façade Piling and demolition areas	Continuous SLM Class 1 monitoring per IEC 61672 Daily noise log at ward boundary Acoustic barrier SRI certification	Continuous (boundary monitors) Daily (noise log) Per installation (barrier SRI)	Main Contractor RSDK Facility Manager Independent Engineer (monthly audit)	Rp. 30–50 M/year (monitors, barriers, noise management)
A.2.2	Ground vibration affecting heritage structures and sensitive equipment	Peak Particle Velocity (PPV) at heritage structures and imaging suite walls Crack survey progression at heritage buildings MRI/CT/Cathlab operational disruption log	Heritage-adjacent works (all colonial-era buildings) Diagnostic Centre and Elang Jantung blocks Foundation and piling work zones	Continuous triaxial geophone monitoring at ≤20 m centres per ISO 4866 Monthly crack gauge measurements Coordination log with imaging department	Continuous (PPV monitors) Monthly (crack survey) Per piling session (imaging coordination)	Main Contractor Structural Engineer EGI Heritage Adviser (CH Specialist)	Rp. 40–55 M/year (geophones, crack gauges, specialist assessments)

A.3.1-C	ACM removal and disposal during demolition	Personal and area air fibre sampling during removal Negative-pressure enclosure integrity PPE compliance (P3 respirator, coveralls, decontamination) ACM waste double-bagging, manifesting, and disposal records Independent clearance air test certificate	Demolition zones containing identified ACM HEPA-filtered negative-pressure enclosures Licensed hazardous waste disposal facility	Regular personal/area air sampling; stop work if fibres exceed action levels Enclosure integrity checks before each shift Waste manifest tracking per PP 22/2021 Independent clearance air test before enclosure removal	Per shift (enclosure integrity) Per removal activity (air sampling) Per consignment (waste manifest) Per completion (clearance test)	Licensed Asbestos Abatement Contractor Main Contractor PIU Environmental Officer Independent Hygienist	Rp. 70–95 M (abatement + disposal + clearance testing)
A.4.1	Construction waste management (inert, non-hazardous, B3 hazardous)	Segregated waste storage compliance (colour-coded bins) B3 waste manifest completeness and reconciliation with PT PRIA records Site housekeeping and open-burning prohibition Spill containment bund integrity Concrete washout containment; silt fence and sediment trap effectiveness	On-site waste storage areas B3 temporary storage (TPS B3) Machinery maintenance and fuelling areas Earthwork zones and stockpiles	Daily site housekeeping inspection Monthly manifest reconciliation against transporter records Quarterly transporter audit Visual inspection of containment structures	Daily (housekeeping) Monthly (manifest reconciliation) Quarterly (transporter audit)	Main Contractor PIU Environmental Officer Independent Engineer (monthly audit)	Rp. 30–40 M/year (waste management infrastructure + manifesting)
A.5.2	Surface water, groundwater, and drainage protection	Stormwater discharge quality at perimeter discharge points Upstream/downstream surface water quality at Kali Semarang Oil-water separator performance at machinery maintenance areas Silt fence and geotextile integrity around earthwork zones	All perimeter stormwater discharge points Kali Semarang upstream and downstream sampling stations On-site machinery maintenance and fuelling areas	Weekly grab sampling at stormwater discharge points Bi-weekly upstream/downstream water quality sampling Visual inspection of erosion controls	Weekly (stormwater) Bi-weekly (surface water) Daily (visual erosion control)	Main Contractor PIU Environmental Officer KAN-accredited Laboratory	Rp. 25–32 M/year (sampling + lab analysis)
B. SOCIAL							
B.1.1-C	Healthcare service continuity and patient safety during construction	HOCP compliance and ICRA clearance records for each work package Emergency vehicle access corridor daily inspection log Daily construction–hospital interface meeting minutes Number of unplanned utility disruptions and response times 72-hour advance notice records for planned utility shutdowns	All clinical zones adjacent to construction works Emergency vehicle access routes Utility shutdown locations (water, electricity, medical gases)	Document review (ICRA clearance) Daily physical inspection of emergency corridor Meeting attendance and minutes log Utility disruption incident register	Daily (corridor inspection, interface meeting) Per work package (ICRA clearance) Per event (utility disruption)	RSDK Director / Clinical Liaison Officer PIU Project Manager ICRA Team Main Contractor Site Manager	Within project management budget

B.2.1	Hospital-acquired infection (HAI) risk from construction dust and HVAC disruption	ICRA classification compliance for each work zone HVAC negative/positive pressure differential integrity in sterile zones HEPA filter status on fresh-air intakes of clinical buildings Aspergillus and fungal spore monitoring in adjacent wards HAI incidence trend during construction period	Operating theatres, ICU, ICCU, NICU, PICU HVAC systems adjacent to construction zones All clinical buildings downwind of construction	ICRA classification verification per work package Continuous pressure differential monitoring Periodic air sampling for fungal spores in high-risk wards HAI surveillance data from IPC team	Per work package (ICRA) Continuous (pressure differential) Monthly (fungal air sampling) Monthly (HAI surveillance)	RSDK IPC Team ICRA Team Main Contractor PIU Environmental Officer	Rp. 40–50 M/year (IPC monitoring, air sampling, HEPA maintenance)
B.3.1	Construction traffic safety and emergency access	Traffic Management Plan (TMP) effectiveness Emergency access lane availability and response time Heavy-vehicle routing compliance (avoiding emergency lanes) Community complaints about traffic congestion	Key intersections: Jl. Dr. Sutomo / Jl. Dr. Kariadi RSDK main gate and emergency entrance Construction vehicle entry/exit points	Monthly structured observation at key intersections Daily emergency lane inspection log TMP compliance audit by EGI Andalalin Lead	Monthly (intersection observation) Daily (emergency lane inspection) Quarterly (TMP audit)	Main Contractor EGI Andalalin Lead Dishub Kota Semarang (coordination)	Rp. 15–20 M/year (traffic management + monitoring)
B.4.1-C	Occupational health and safety (OHS) during construction	Lost Time Injury Frequency Rate (LTIFR) Job Hazard Analysis (JHA) completion rate for high-risk tasks Daily toolbox talk and induction records PPE compliance (hard hat, safety boots, hi-vis, task-specific protection) Emergency response drill records BPJS Ketenagakerjaan enrolment verification	All construction work zones Contractor site office (records) High-risk task areas (heights, confined spaces, hot works)	Daily safety inspections by SMK3 Safety Officer Monthly safety committee meetings Incident-based investigation per PP 50/2012 Quarterly emergency response drills	Daily (inspections, toolbox talks) Monthly (safety committee, LTIFR report) Quarterly (emergency drills) Per incident (investigation)	Main Contractor (SMK3 Safety Officer) RSDK OHS Officer ESIA Social Safeguards Officer Independent Engineer (monthly audit)	Rp. 30–40 M/year (OHS programme, PPE, drills, training)
B.4.2	Child labour risk	Age verification records (KTP or birth certificate) for all workers Child-labour prohibition clause in contractor/sub-contractor agreements Code of Conduct signed by all workers and supervisors Unannounced spot-check records	All construction work zones Contractor and sub-contractor offices	100% age document verification before engagement Contract clause review Unannounced spot-checks by Social Safeguards Officer	Pre-mobilisation (document verification) Quarterly (spot-checks) Per new worker engagement	Main Contractor RSDK HR / Procurement ESIA Social Safeguards Officer	Within contractor management budget
B.4.3	Worker Grievance Redress Mechanism (GRM) adequacy	Worker GRM channels operational (anonymous hotline, suggestion box, focal person) GRM communication to all workers at induction	Construction site (prominently posted) Contractor site office	Monthly GRM log review by Social Safeguards Officer Quarterly KPI summary in AIIB E&S Report	Monthly (case log review) Quarterly (KPI summary)	Main Contractor RSDK Customer Service Unit ESIA Social Safeguards Officer	Rp. 8–10 M/year (GRM operation)

		Monthly GRM case log (intake, response time, resolution rate) Acknowledgement within 5 working days; resolution within 30 working days		Worker feedback on GRM accessibility	Per case (response tracking)		
B.5.1-C	Internal canteen vendor relocation verification and PKL environmental nuisance monitoring during construction	(a) Internal Canteen Tenants (ESS2 Avoidance Verification) Confirmation that GMS-DC & SoE permanent trading spaces are ready and accepted before canteen operators vacate IGD and Elang buildings Post-relocation trading performance check-ins with both canteen operators via GRM Verification that trading terms in GMS-DC & SoE are no less favourable than at original premises Gender-sensitive relocation support for IGD canteen (three female operators under Dharma Wanita Persatuan RSDK) (b) External PKL (ESS1 Environmental Nuisance Only) Pedestrian and vehicular access continuity along Jl. Dr. Sutomo and Jl. Dr. Kariadi during construction PKL-specific GRM case volume and resolution (environmental nuisance complaints only)	GMS-DC & SoE permanent trading spaces (post-relocation) IGD and Elang building canteen premises (pre-relocation baseline) Jl. Dr. Sutomo and Jl. Dr. Kariadi pavement trading areas (PKL, ESS1 nuisance only) GRM channels	Pre-relocation readiness inspection of GMS-DC & SoE trading spaces Monthly post-relocation check-in with both canteen operators for first 6 months GRM case log for PKL-specific complaints Verification that ESS2 Avoidance conditions (no trading gap, equivalent terms) are met before demolition of IGD/Elang buildings proceeds	Pre-relocation (GMS-DC & SoE readiness inspection) Monthly (post-relocation check-ins, first 6 months) Per case (GRM) Pre-demolition (ESS2 Avoidance verification gate)	PIU Environmental & Social Officer RSDK Bagian Umum (facility handover)	Rp. 8–12 M/year (relocation verification + GRM operation)
B.6.1	GBV/SEAH prevention and response	GBV/SEAH Code of Conduct signed by all workers Named GBV/SEAH Focal Point appointed and trained GBV/SEAH awareness training completion rate Confidential GRM channel for GBV/SEAH complaints Substantiated allegation investigation records	All construction work zones Worker accommodation/welfare facilities GRM confidential channel	Code of Conduct sign-off register Training attendance records Quarterly labour-standards audit (wages, hours, contracts) Confidential case management records	Pre-mobilisation (Code of Conduct) Monthly (training) Quarterly (labour audit) Per allegation (investigation)	Main Contractor (GBV/SEAH Focal Point) ESIA Social Safeguards Officer PIU Environmental & Social Officer	Rp. 15–17 M/year (training, focal point, confidential GRM)
B.6.2	Vulnerable group access and marginalisation	Disaggregated GRM access data (gender, disability, age) Accessibility-feature status for patients during construction	Hospital service points GRM channels Patient access routes during construction	Disaggregated GRM register analysis Accessibility audit of temporary patient routes	Quarterly (GRM analysis, accessibility audit)	RSDK PR / Patient Relations ESIA Social Safeguards Officer	Within project management budget

		Vulnerable group consultation records Vulnerable Groups Action Plan (VGAP) implementation status		VGAP progress review	Semi-annual (VGAP review)	PIU Environmental & Social Officer	
C. CULTURAL HERITAGE							
B.7.1-C	Heritage structure physical damage during construction	Weekly photographic and condition documentation Crack gauge readings at heritage buildings PPV monitoring at heritage-adjacent works Compliance with 20 m non-impact-piling buffer zone	All colonial-era heritage buildings within RSDK complex Heritage-adjacent construction work zones WWII-era bunker structure	Weekly photo documentation by Contractor Monthly site inspection by EGI Heritage Adviser Quarterly formal review with BPK Jawa Tengah Wilayah X Continuous PPV monitoring per DIN 4150-3	Weekly (photo documentation) Monthly (heritage inspection) Quarterly (BPK review) Continuous (PPV monitoring)	Main Contractor EGI Heritage Adviser BPK Jawa Tengah Wilayah X Structural Engineer	Rp. 30–36 M/year (heritage monitoring + specialist)
B.7.4	Subsurface archaeological remains (Chance Find Procedure)	Chance Find Procedure compliance during all earthworks Worker awareness of chance find protocols Chance Find log (any discoveries, actions taken, BPK notifications)	All excavation and earthwork zones within the project site	Chance Find Procedure posted at all excavation zones Worker briefing records on chance find protocol Immediate stop-work and notification procedure upon any discovery	Continuous (during all earthworks) Per event (chance find)	Main Contractor EGI Heritage Adviser BPK Jawa Tengah (notification within 24 hours)	Within construction management budget
D. OVERALL ESMP COMPLIANCE							
D.1	C-ESMP implementation compliance	Monthly C-ESMP compliance audit by Independent Engineer Non-conformance register and corrective action tracking Stop-Work Notice log and resolution records Quarterly AIIB E&S Progress Report	All construction sites and contractor facilities PIU and contractor offices (records)	Monthly field inspection by Independent Engineer Non-conformance process per structured escalation Quarterly consolidated E&S report to AIIB	Monthly (IE inspection) Per non-conformance (corrective action) Quarterly (AIIB report)	Independent Engineer PIU Environmental & Social Officer EGI Safeguards Team	Rp. 20–25 M/year (audit and reporting)
D.2	Stakeholder engagement and community GRM	Stakeholder consultation records (per SEP schedule) Community GRM case volume, resolution rate, and response time Information disclosure records (ESIA, SEP on hospital/PIU website) Community feedback on construction impacts	Kelurahan Barusari and surrounding communities RSDK public information channels GRM intake points	Consultation attendance records and minutes Monthly GRM aggregate review Quarterly KPI summary (resolution rate ≥70% within 30 days) Public disclosure verification	Per consultation event (SEP) Monthly (GRM review) Quarterly (KPI summary, AIIB report)	PIU Environmental & Social Officer RSDK Customer Service Unit ESIA Social Safeguards Officer	Rp. 15–20 M/year (stakeholder engagement + GRM operation)

12.2. Operational Phase Monitoring

Operational monitoring is embedded within the institutional Environmental Management Unit (EMU) and builds on five-and-a-half years of UKL-UPL precedent (Semester 1 2020 through Semester 2 2025). This continuity is a genuine asset: it provides a statistically robust baseline against which post-construction changes can be assessed, and it demonstrates to both DLH Provinsi and AIIB that RSDK operates an established monitoring system rather than one created solely for the project.

The GMS-DC & SoE program expands on the UKL-UPL baseline in three respects: addition of a quarterly GHG inventory (required under the AIIB ESF and under PP 98/2021 where reporting thresholds are triggered); addition of an annual climate-risk adaptation-measure effectiveness review; and extension of water-consumption monitoring to include quarterly *Neraca Air* reconciliation across all SIPA wells and PDAM connections.

Table 95 Environmental and Social Monitoring Plan during Operation Phase

No / Ref	Key Risks & Impacts	Monitoring Parameters	Locations	Measurements / Method	Frequency	Responsibilities	Cost Estimate (IDR)
A. ENVIRONMENTAL							
A.4.2	Operational wastewater and hazardous medical waste	• Effluent BOD, COD, TSS, NH_3, pH, E. coli • Medical-waste volume by stream • Manifest completeness	WWTP outlet; TPS LB3; receiving water body	Accredited-lab effluent testing; waste register	Monthly internal; quarterly external lab	RSDK Technical Manager / Sanitation Unit / HSE	Rp. 60–80 M / year
A.1.x	Operational air quality and GHG (energy demand)	• Ambient air quality • GHG inventory (Scope 1 & 2)	Hospital grounds; utility plant	Periodic ambient sampling; GHG accounting	Semi-annual ambience; quarterly GHG	RSDK HSE / Environmental Management Unit	Rp. 30–40 M / year
A.5.1	Natural-hazard resilience of operational facility	• BMS structural / flood alerts • BCP drill outcomes	Building structure; drainage; BMS dashboard	BMS monitoring; annual hazard drill	Continuous (BMS); annual drill	RSDK Facility Manager	Within O&M budget
A.6.1	Invasive species in landscaped areas	• Invasive-species presence • Native-planting retention	Hospital green areas	Green-area inventory; visual survey	Biannual	RSDK Facilities Team	Rp. 5–8 M / year
B. SOCIAL							
B.4.2-O	Waste-handler occupational safety in operation	• Sharps/needlestick incidents • PPE compliance • Immunization status	Sanitation unit; TPS LB3; clinical waste routes	Incident log; PPE audit	Continuous; monthly review	RSDK HSE / Sanitation Unit	Rp. 10–15 M / year
B.5.1-O	Internal canteen vendor post-relocation performance and operational-phase PKL footfall monitoring	(a) Internal Canteen Tenants (Post-Relocation Verification)	Internal canteen vendor post-relocation performance and operational-phase PKL footfall monitoring	(a) Internal Canteen Tenants (Post-Relocation Verification)	Internal canteen vendor post-relocation performance and operational-phase PKL footfall monitoring	(a) Internal Canteen Tenants (Post-Relocation Verification)	Internal canteen vendor post-relocation performance and operational-phase PKL footfall monitoring

No / Ref	Key Risks & Impacts	Monitoring Parameters	Locations	Measurements / Method	Frequency	Responsibilities	Cost Estimate (IDR)
B.6.2-O	Vulnerable-group access to operational services and GRM	• Disaggregated GRM access • Accessibility-feature status	Hospital service points; GRM channels	Disaggregated GRM register; accessibility audit	Quarterly	RSDK PR / Patient Relations	Within O&M budget
C. CULTURAL HERITAGE							
B.7.1-O	Long-term heritage-fabric condition and setting	• Structural-condition trend • Heritage-setting integrity	Heritage buildings within complex	Annual heritage condition survey	Annual	RSDK Facility Manager / Heritage Advisor / BPK Jateng	Rp. 15–20 M / year

Note: PRIORITY items (B.2.1, B.7.1) require monthly reporting to the RSDK Director and the AIIB safeguards team. All monitoring records feed the Living Document monthly update and the six-month ESMP review. Laboratory analyses must use KAN-accredited laboratories.

12.2.1. Five-Year Operational Monitoring Review

At the five-year mark of GMS-DC & SoE operations (or at the formal project-completion milestone agreed with AIIB, whichever is earlier), the EMU and consultant will conduct a structured review of the full operational monitoring dataset. The review assesses whether any systematic trend, in IPAL effluent quality, ambient air, noise, B3 waste generation, or GHG intensity, warrants a revision to the monitoring program, an investment in additional abatement infrastructure, or a recalibration of Pertek BMAL permit conditions. Findings are reported to AIIB in that year's Annual ESF Compliance Report.

12.3. Data Management and Quality Assurance

Monitoring data are subject to a five-stage quality-assurance chain: field collection by trained personnel using calibrated instruments (with serial number, calibration date, and operator recorded); KAN-accredited laboratory analysis with uncertainty values and chain-of-custody documentation; EMU data entry and PIU review within five working days; IE random-sample audit at each monthly inspection; and PIU Project Manager endorsement before AIIB submission. Social data is presented in sex-disaggregated format throughout.

12.3.1. Training Delivery and Record-Keeping

All training events are documented with sex-disaggregated attendance records, training materials, and a post-training competency check. Third party consultant will be appointed as the principal capacity-building; contractor workforce training is the Contractor's responsibility under the C-ESMP and subject to IE audit. Any competency gap arising from personnel changes triggers a refresher session within 30 days.

12.4. Non-Conformance and Corrective Action

Any monitoring finding that triggers an action threshold is managed through a structured process: the Contractor issues a Non-Conformance Report (NCR) within 24 hours, proposes a corrective action plan within five working days, and implements it within an agreed timeframe. The IE verifies close-out and records it in the monthly audit report. NCRs not closed within the agreed period are escalated to the PIU and, if unresolved for more than 30 days, to AIIB.

A cumulative NCR register is maintained throughout construction. Patterns of repeated NCRs in the same parameter area are flagged for systemic corrective action, revised methodology or contractor retraining, rather than a point-by-point fix.

12.5. Reporting Obligations

Reporting spans three accountability regimes: the Indonesian regulatory system (DLH Provinsi, KLHK, BPK Jawa Tengah, Dinas Perhubungan), the AIIB ESF framework, and the internal project structure (PIU, RSDK Direksi, PSC). These are deliberately aligned rather than run in parallel. The principal alignment point is the semester UKL-UPL cycle: the Semester I report (July) and Semester II report (January) correspond closely to the AIIB mid-year and year-end E&S windows, allowing the EMU and PIU to compile consolidated data sets rather than maintaining parallel records.

Table 96 Reporting Schedule, All Principal Obligations

Recipient	Report	Frequency	Responsible
DLH Provinsi Jawa Tengah	RKL-RPL environmental management and monitoring report, submitted via SI-PELITA online portal.	Semester (Sem I: July; Sem II: January)	Institutional EMU
DLH Provinsi Jawa Tengah	Pertek BMAL, Pertek Emisi, and Rintek Limbah B3 compliance reports; renewed permit scope.	Per respective Pertek reporting schedule	EMU + EGI
KLHK (national)	SRN PPI (national greenhouse gas registry) GHG emissions report were required under PP 98/2021.	Annual (if GHG reporting threshold triggered)	EMU + climat specialist
BPK Jawa Tengah Wilayah X / Disbudpar Provinsi Jateng	Heritage management progress report and Chance Find log; photographic condition record of heritage structures.	Quarterly during construction; annual during operations	Heritage Adviser + ESO
Dinas Perhubungan Kota / Provinsi Jateng	Andalalin compliance monitoring report and TMP performance summary during construction.	Quarterly during construction; annual during operations	Andalalin Lead + Institutional Lalin Officer
AIIB	Semi Annual Environmental and Social Progress Report, covering construction status, monitoring results, GRM summary, incident log, and ESMP compliance status.	Semi Annual	PIU + Independent Engineer
AIIB	Annual ESF Compliance Report, comprehensive review of ESMP and SEP implementation, GHG inventory, climate adaptation, budget utilization, and forward plan.	Annual	Hospital Director + Independent Consultant (IC)
AIIB	Living Document version updates (v0.1 → v0.5 → v1.0 → v1.x) incorporating DED progress, regulatory permit progress, and AIIB safeguards review feedback.	Monthly target cadence post v1.0	Third party consultant
Project Steering Committee (PIU + RSDK Direksi)	PSC Monthly Report, integrated progress, ESF compliance dashboard, GRM case summary, risk register, and budget update.	Monthly	Project Manager
RSDK Direksi	Board E&S Brief, executive summary of ESF compliance, key	Quarterly	Hospital Director

Recipient	Report	Frequency	Responsible
	risks, incidents, and forward actions.		
Public / General Disclosure	Periodic disclosure of aggregated GRM metrics; ESIA Living Document publication on RSDK and PIU websites; AIIB project portal disclosure per AIIB Public Information Policy.	Quarterly GRM metrics; ESIA at each major version update	PIU + RSDK Customer Service Unit

12.5.1. AIIB Incident and Accident Reporting

Five incident categories require immediate notification to AIIB (within 24 hours of occurrence or of PIU becoming aware): any fatality or serious injury attributable to construction activities; any heritage-structure damage from construction vibration or ground movement; any substantiated GBV/SEAH allegation involving project personnel; any significant environmental release exceeding regulatory limits by more than 20 percent or triggering stop-work; and any Stop-Work Notice issued by the IE. A full investigation report follows within 30 days, and the cumulative incident log is included in every quarterly E&S Report.

12.5.2. Living Document Version Cadence

The ESIA-ESMP is not a static compliance submission but a continuously improved record. The version's cadence is:

- **v0.1** (current) – preliminary draft issued for AIIB and PIU review;
- **v0.5** (target: Month 1–2 post-AIIB comments), incorporating review comments, DED progress, and indicative budget figures;
- **v2.0** (target: 30 June 2026) – formal submission; complete AMDAL Addendum and Pertek referenced; baseline quantified; absolute budget confirmed;
- **v2.x** (monthly cadence post-v2.0) – continuous updates reflecting construction progress, monitoring data, GRM performance, and regulatory changes.

Each update is prepared by third part consultant, reviewed by the TWG, endorsed by the PIU, and submitted to AIIB via the project portal. A version-change log is included at the front of each update.

12.6. Indicative ESMP Budget

The ESMP budget is structured to the AIIB ESF expectation of approximately 10–12 percent of total project capex for construction-phase environmental and social management, with an ongoing operational allocation of approximately 1–2 percent of capex per year. The total GMS-DC & SoE capital expenditure, comprising medical equipment, standard civil/MEP works, and non-standard specialized works, will be confirmed by RSDK Bagian Perencanaan and the PIU, with absolute figures integrated at v0.5/v1.0.

Table 97 Indicative ESMP Budget by Domain

Domain	Construction Phase	Operational Phase Yr 1-3	Notes
PIU staffing, Project Manager, Environmental and Social Officer, GRM Coordinator, Heritage Focal Point, H&S Officer	18% of construction ESMP envelope	25% of annual operational ESMP budget	Includes salaries, overhead, and project-specific training and capacity-building costs. Largest single cost center in both phases given the multi-year construction program and the continuity of ESF reporting obligations into operations.
Air quality, noise, and vibration monitoring, equipment, KAN-accredited laboratory fees, and reporting	15% of construction ESMP envelope	8% of annual operational ESMP budget	Construction-phase intensive (continuous fenceline equipment and reagents); operational-phase reduced to semester UKL-UPL testing only. Equipment capital depreciated over construction period.
IPAL discharge Permit update and water quality monitoring, Pertek BMAL renewal, continuous IPAL monitoring, and KAN compliance testing	12% of construction ESMP envelope	18% of annual operational ESMP budget	Based on the current capacity of the IPAL facilities (over 1,500 m^3/day), RSDK does not need to expand the treatment capacity. However, due to updates in wastewater volume and sources, it is anticipated that the IPAL facilities will be required to update their operating permit and revise the monitoring plan.
B3 waste / TPS Limbah B3 capacity uplift, TPS expansion and refreshed PT PRIA transport contract	8% of construction ESMP envelope	15% of annual operational ESMP budget	One-off TPS capex expansion (doubling from 40 m^2 to 80 m^2 per Feasibility Study) dominates construction allocation. Operational-phase share reflects recurring manifested transport and processing fees (PT PRIA or equivalent licensed vendor) at increased GMS-DC & SoE hazardous-waste generation volumes.
Cultural Heritage Management Heritage Adviser, vibration instruments, BPK Jawa Tengah liaison and consultations	10% of construction ESMP envelope	4% of annual operational ESMP budget	Construction-phase intensive: specialist fees, continuous ISO 4866 vibration instruments at heritage fabric, pre/post condition surveys, and BPK Jawa Tengah approval submissions. Operational phase reduced to annual photographic condition reporting and BPK Jawa Tengah liaison.
Stakeholder Engagement and GRM, R1–R3 consultations, translation and accessibility materials, GRM platform maintenance, community liaison officer	10% of construction ESMP envelope	12% of annual operational ESMP budget	Includes production of Bahasa Indonesia / Bahasa Jawa materials and accessible-format adaptations per SEP Chapter 9. PKL census, trader income monitoring, and VGAP implementation clustered in early construction. GRM platform and community liaison officer continue through operations.
Worker H&S, SMK3 implementation, trade-specific training, PPE supply, and third-party audits	14% of construction ESMP envelope	6% of annual operational ESMP budget	Construction-period intensive: SMK3 certification, JHA preparation, PPE provision for peak workforce, quarterly emergency drills with RSDK Emergency Unit, and third-party PP 50/2012 audit. Operational phase covers annual SMK3 audit renewal and routine PPE replenishment.

Climate adaptation and GHG, Solar PV scoping study, energy-efficiency capital items, annual GHG inventory cycle, BMKG data subscriptions	3% of construction ESMP envelope	5% of annual operational ESMP budget	Solar PV capital cost treated separately in the GMS-DC & SoE investment program. Construction allocation covers BMKG data subscription and climate-vulnerability integration review during DED. GHG inventory under PP 98/2021 is a recurring operational cost once the GHG reporting threshold is triggered.
Independent Engineer, ESMP audit and supervision component of the IE scope	8% of construction ESMP envelope	4% of annual operational ESMP budget	Pro-rata allocation of IE monthly inspection and quarterly E&S reporting cost attributable to ESF work. Includes attendance at monthly NCR close-out meetings and annual ESF Compliance Report review.
Safeguards Consultancy, Living Document maintenance, AMDAL Addendum, Pertek and Rintek authoring, heritage and andalalin work	12% of construction ESMP envelope	3% of annual operational ESMP budget	Contracted under 113-AMS-2026. Construction-phase covers AMDAL Addendum finalization, Pertek BMAL/Emisi/Rintek LB3 authoring, Andalalin compliance support, and monthly Living Document updates (v0.5 → v1.0 → v1.x). Operational phase reflects residual Living Document maintenance and annual ESF Compliance Report input.
Sub-total (before contingency)	110% → normalized to 90%	100%	Sub-totals across the ten program domains before the contingency reserve is applied.

12.6.1. Budget Governance

The ESMP budget is a managed reserve, not a fixed allocation. Four governance principles apply. First, the PIU Project Manager reviews utilization against forecast at each monthly PSC meeting; variances exceeding ±15 percent trigger a written explanation. Second, the 10 percent contingency is available only for unforeseen corrective actions, additional community engagement, or new regulatory requirements, with drawdown requiring PIU Project Manager approval and AIIB reporting. Third, at each annual ESF Compliance Report the operational budget is reviewed against actual expenditure and updated for the following year, including any changes driven by revised Pertek scope or new GHG obligations under PP 98/2021. Fourth, AIIB retains the right to request a budget review at any time if monitoring findings indicate additional measures are needed.

The ESMP budget is disclosed to the public as part of the Living Document publication cadence, consistent with the AIIB Public Information Policy and the project SEP.

BIBLIOGRAPHY AND REFERENCES

This bibliography lists the regulatory, methodological, and primary-data references underpinning the GMS-DC & SoE ESIA-ESMP. It is organised into sub-sections covering Indonesian regulations, AIIB ESF documents, international good-practice frameworks, RSDK primary data sources, and comparable ESIA references.

National Legislation and Regulations of the Republic of Indonesia Laws (Undang-Undang)

Republic of Indonesia (2003) Law No. 13 of 2003 concerning Manpower (Undang-Undang Nomor 13 Tahun 2003 tentang Ketenagakerjaan). Jakarta: Government of Indonesia.

Republic of Indonesia (2009) Law No. 32 of 2009 concerning Environmental Protection and Management (Undang-Undang Nomor 32 Tahun 2009 tentang Perlindungan dan Pengelolaan Lingkungan Hidup, UUPPLH). Jakarta: Government of Indonesia.

Republic of Indonesia (2010) Law No. 11 of 2010 concerning Cultural Heritage (Undang-Undang Nomor 11 Tahun 2010 tentang Cagar Budaya). Jakarta: Government of Indonesia.

Republic of Indonesia (2016) Law No. 8 of 2016 concerning Persons with Disabilities (Undang-Undang Nomor 8 Tahun 2016 tentang Penyandang Disabilitas). Jakarta: Government of Indonesia.

Republic of Indonesia (2017) Law No. 5 of 2017 concerning the Advancement of Culture (Undang-Undang Nomor 5 Tahun 2017 tentang Pemajuan Kebudayaan). Jakarta: Government of Indonesia.

Republic of Indonesia (2020) Law No. 11 of 2020 concerning Job Creation (Undang-Undang Nomor 11 Tahun 2020 tentang Cipta Kerja). Jakarta: Government of Indonesia.

Republic of Indonesia (2022) Law No. 12 of 2022 concerning Criminal Offences of Sexual Violence (Undang-Undang Nomor 12 Tahun 2022 tentang Tindak Pidana Kekerasan Seksual). Jakarta: Government of Indonesia.

Republic of Indonesia (2023a) Law No. 6 of 2023 concerning the Enactment of Government Regulation in Lieu of Law No. 2 of 2022 on Job Creation into Law (Undang-Undang Nomor 6 Tahun 2023). Jakarta: Government of Indonesia.

Republic of Indonesia (2023b) Law No. 17 of 2023 concerning Health (Undang-Undang Nomor 17 Tahun 2023 tentang Kesehatan). Jakarta: Government of Indonesia.

Government Regulations (Peraturan Pemerintah)

Republic of Indonesia (2001) Government Regulation No. 74 of 2001 concerning Management of Hazardous and Toxic Materials (PP Nomor 74 Tahun 2001 tentang Pengelolaan Bahan Berbahaya dan Beracun). Jakarta: Government of Indonesia.

Republic of Indonesia (2012) Government Regulation No. 50 of 2012 concerning Implementation of Occupational Health and Safety Management Systems (SMK3) (PP Nomor 50 Tahun 2012). Jakarta: Government of Indonesia.

Republic of Indonesia (2014) Government Regulation No. 101 of 2014 concerning Management of Hazardous and Toxic Waste (PP Nomor 101 Tahun 2014 tentang Pengelolaan Limbah Bahan Berbahaya dan Beracun). Jakarta: Government of Indonesia.

Republic of Indonesia (2014) Government Regulation No. 27 of 2014 concerning Management of State/Regional Property (PP Nomor 27 Tahun 2014), as amended by PP No. 28 of 2020. Jakarta: Government of Indonesia.

Republic of Indonesia (2015) Government Regulation No. 121 of 2015 concerning Exploitation of Water Resources (PP Nomor 121 Tahun 2015 tentang Pengusahaan Sumber Daya Air). Jakarta: Government of Indonesia.

Republic of Indonesia (2021a) Government Regulation No. 21 of 2021 concerning Spatial Use Planning (PP Nomor 21 Tahun 2021 tentang Penyelenggaraan Penataan Ruang). Jakarta: Government of Indonesia.

Republic of Indonesia (2021b) Government Regulation No. 22 of 2021 concerning Environmental Protection and Management (PP Nomor 22 Tahun 2021 tentang Penyelenggaraan Perlindungan dan Pengelolaan Lingkungan Hidup). Jakarta: Government of Indonesia.

Republic of Indonesia (2022) Government Regulation No. 1 of 2022 concerning the National Register and Preservation of Cultural Heritage (PP Nomor 1 Tahun 2022). Jakarta: Government of Indonesia.

Presidential Regulations (Peraturan Presiden)

Republic of Indonesia (2019) Presidential Regulation No. 7 of 2019 concerning Occupational Diseases (Perpres Nomor 7 Tahun 2019). Jakarta: Government of Indonesia.

Republic of Indonesia (2021) Presidential Regulation No. 98 of 2021 concerning Implementation of Carbon Economic Value to Achieve the Nationally Determined Contribution Target and Control of Greenhouse Gas Emissions in National Development (Perpres Nomor 98 Tahun 2021, Enhanced NDC). Jakarta: Government of Indonesia.

Ministerial Regulations, Environment and Forestry (PermenLH / PermenLHK)

Minister of Environment (1996) Regulation No. 48 of 1996 concerning Noise Standards (PermenLH Nomor 48 Tahun 1996 tentang Baku Tingkat Kebisingan). Jakarta: MoE.

Minister of Environment (2009) Regulation No. 13 of 2009 concerning Emission Standards for Stationary Sources (PermenLHK Nomor 13 Tahun 2009 tentang Baku Mutu Emisi Sumber Tidak Bergerak). Jakarta: MoEF.

Minister of Environment (2014) Regulation No. 5 of 2014 concerning Wastewater Quality Standards (PermenLH Nomor 5 Tahun 2014 tentang Baku Mutu Air Limbah), Appendix XLIV, Healthcare Facilities. Jakarta: MoE.

Minister of Environment and Forestry (2015) Regulation No. P.56/Menlhk-Setjen/2015 concerning Procedures and Technical Requirements for the Management of Hazardous and Toxic Waste from Healthcare Facilities. Jakarta: MoEF.

Minister of Environment (2016) Regulation No. 68 of 2016 concerning Domestic Wastewater Quality Standards (PermenLH Nomor 68 Tahun 2016 tentang Baku Mutu Air Limbah Domestik). Jakarta: MoE.

Minister of Environment and Forestry (2018a) Regulation No. P.7 of 2018 concerning B3 Waste Incinerator as Stationary Emission Source (PermenLHK Nomor P.7 Tahun 2018). Jakarta: MoEF.

Minister of Environment and Forestry (2018b) Regulation No. 26 of 2018 concerning Guidelines for the Preparation and Assessment of Environmental Documents (PermenLHK Nomor 26 Tahun 2018). Jakarta: MoEF.

Minister of Environment (2019) Regulation No. 15 of 2019 concerning Emission Standards for Thermal Power Plants (PermenLH Nomor 15 Tahun 2019 tentang Baku Mutu Emisi Pembangkit Listrik Termal). Jakarta: MoE.

Minister of Environment and Forestry (2021a) Regulation No. 4 of 2021 concerning the List of Activities/Undertakings Requiring AMDAL, UKL-UPL or SPPL (PermenLHK Nomor 4 Tahun 2021). Jakarta: MoEF.

Minister of Environment and Forestry (2021b) Regulation No. 5 of 2021 concerning Procedures for Issuance of Technical Approval and Operational Feasibility Certificate in the Field of Pollution Control (PermenLHK Nomor 5 Tahun 2021). Jakarta: MoEF.

Minister of Environment and Forestry (2021c) Regulation No. 6 of 2021 concerning Procedures and Requirements for Management of Hazardous and Toxic Waste (B3) (PermenLHK Nomor 6 Tahun 2021). Jakarta: MoEF.

Minister of Environment and Forestry (2021d) Regulation No. 18 of 2021 concerning Tariff Application for Non-Tax State Revenue at MoEF. Jakarta: MoEF.

Minister of Environment (2025a) Regulation No. 11 of 2025 concerning Wastewater Quality Standards and Domestic Wastewater Treatment Technology Standards, replacing PermenLH No. 68/2016. Jakarta: MoE.

Minister of Environment (2025b) Regulation No. 13 of 2025 concerning Amendments to the Regulation on Mercury-Containing Medical Devices Waste Management. Jakarta: MoE.

Ministerial Regulations, Health (Permenkes)

Minister of Health (2013) Regulation No. 68 of 2013 concerning the Obligation of Healthcare Providers to Report Suspected Child Violence. Jakarta: MoH.

Minister of Health (2014) Regulation No. 25 of 2014 concerning Child Health Efforts (Permenkes Nomor 25 Tahun 2014 tentang Upaya Kesehatan Anak). Jakarta: MoH.

Minister of Health (2016) Regulation No. 24 of 2016 concerning Technical Requirements for Hospital Buildings and Infrastructure (Permenkes Nomor 24 Tahun 2016). Jakarta: MoH.

Minister of Health (2017) Regulation No. 27 of 2017 concerning Guidelines for Infection Prevention and Control in Healthcare Facilities (Permenkes Nomor 27 Tahun 2017). Jakarta: MoH.

Minister of Health (2019) Regulation No. 7 of 2019 concerning Hospital Environmental Health (Permenkes Nomor 7 Tahun 2019 tentang Kesehatan Lingkungan Rumah Sakit). Jakarta: MoH.

Minister of Health (2020) Regulation No. 3 of 2020 concerning Hospital Classification and Licensing (Permenkes Nomor 3 Tahun 2020 tentang Klasifikasi dan Perizinan Rumah Sakit). Jakarta: MoH.

Minister of Health (2022a) Regulation No. 26 of 2022 concerning Hospital Equipment Standards (Permenkes Nomor 26 Tahun 2022). Jakarta: MoH.

Minister of Health (2022b) Regulation No. 40 of 2022 concerning Technical Requirements for Hospital Buildings, Infrastructure, and Health Equipment (Permenkes Nomor 40 Tahun 2022). Jakarta: MoH.

Minister of Health (2025) Regulation No. 2 of 2025 concerning Reproductive Health Services (Permenkes Nomor 2 Tahun 2025). Jakarta: MoH.

Ministerial Regulations, Other Ministries

Minister of Manpower (1985) Regulation No. PER.04/MEN/1985 concerning Occupational Health and Safety in the Use of Asbestos. Jakarta: MoM.

Minister of Home Affairs (2011) Regulation No. 67 of 2011, amending Regulation No. 15 of 2008, concerning General Guidelines for the Implementation of Gender Mainstreaming in Regions (Permendagri Nomor 67 Tahun 2011). Jakarta: MoHA.

Minister of Public Works and Housing (2017) Regulation No. 14/PRT/M/2017 concerning Accessibility Requirements for Buildings (Permen PUPR Nomor 14/PRT/M/2017). Jakarta: MoPWH.

Minister of Energy and Mineral Resources (2018) Regulation No. 12 of 2018 concerning Groundwater Management (Permen ESDM Nomor 12 Tahun 2018). Jakarta: MoEMR.

Minister of Public Works and Housing (2021) Regulation No. 19 of 2021 concerning Technical Guidelines for the Preservation of Cultural Heritage Buildings (Permen PUPR Nomor 19 Tahun 2021). Jakarta: MoPWH.

Minister of Transportation (2021) Regulation No. 17 of 2021 concerning Traffic Impact Analysis (Andalalin) (PermenHub Nomor 17 Tahun 2021). Jakarta: MoT.

Minister of Administrative and Bureaucratic Reform (2024) Regulation No. 11 of 2024 concerning Public Services Friendly to Vulnerable Groups (PermenPAN-RB Nomor 11 Tahun 2024). Jakarta: MoPANRB.

Minister of Women's Empowerment and Child Protection (2024) Regulation No. 8 of 2024 concerning the Protection of Women and Children from Gender-Based Violence in Disaster Management. Jakarta: MoWECP.

Ministerial Decrees (Keputusan Menteri)

Minister of Education and Culture (2017) Decree No. 370/M/2017 concerning the Designation of RSDK Semarang as a National Level Cultural Heritage Property (Bangunan Cagar Budaya Peringkat Nasional). Jakarta: MoEC.

Minister of Health (2009) Decree No. 1226/Menkes/SK/XII/2009 concerning Guidelines for Integrated Services for Victims of Violence against Women and Children in Hospitals. Jakarta: MoH.

Regional Regulations and Decrees

Governor of Central Java (2001) Decree No. 8 of 2001 concerning Ambient Air Quality Standards in Central Java Province (Keputusan Gubernur Jawa Tengah Nomor 8 Tahun 2001). Semarang: Provincial Government of Central Java.

Central Java Province (2023) Provincial Regulation No. 4 of 2023 concerning Environmental Protection and Management. Semarang: Provincial Government of Central Java.

Central Java Province (2024) Provincial Regulation No. 1 of 2024 concerning Environmental Protection and Management Plans. Semarang: Provincial Government of Central Java.

Semarang City Government (2011) Regional Regulation No. 14 of 2011 concerning the Semarang City Spatial Plan (RTRW) 2011–2031 (Perda Kota Semarang Nomor 14 Tahun 2011). Semarang: Semarang City Government.

Semarang City Government (2018) Regional Regulation No. 3 of 2018 concerning the Management and Development of Street Vendors (PKL) (Perda Kota Semarang Nomor 3 Tahun 2018). Semarang: Semarang City Government.

Semarang City Government (2021) Regional Regulation No. 5 of 2021, amending Regional Regulation No. 14 of 2011, concerning the Semarang City Spatial Plan (Perda Kota Semarang Nomor 5 Tahun 2021). Semarang: Semarang City Government.

Indonesian National Standards (SNI)

Badan Standardisasi Nasional (2019) SNI 1726:2019, Seismic Resistance Design Procedures for Building Structures and Non-Building Structures. Jakarta: BSN.

Badan Standardisasi Nasional (2021) SNI 8990:2021, Sampling Methods for Wastewater Physical and Chemical Testing. Jakarta: BSN.

Badan Standardisasi Nasional (2022) SNI 9063:2022, Sampling Methods for Water and Wastewater Microbiological Testing. Jakarta: BSN.

Badan Standardisasi Nasional (n.d.) SNI 6989-series, Test Methods for Water and Wastewater Parameters (TSS, BOD, COD, NH_3, pH, Oil & Grease). Jakarta: BSN.

Badan Standardisasi Nasional (n.d.) SNI IEC 62305, Lightning Protection Systems. Jakarta: BSN.

AIIB Environmental and Social Framework

Asian Infrastructure Investment Bank (2022a) Environmental and Social Framework, Environmental and Social Policy (ESP). Beijing: AIIB.

Asian Infrastructure Investment Bank (2022b) Environmental and Social Standard 1 (ESS1): Environmental and Social Assessment and Management. Beijing: AIIB.

Asian Infrastructure Investment Bank (2022c) Environmental and Social Standard 2 (ESS2): Involuntary Resettlement. Beijing: AIIB.

Asian Infrastructure Investment Bank (2022d) Environmental and Social Standard 3 (ESS3): Indigenous Peoples. Beijing: AIIB.

Asian Infrastructure Investment Bank (2022e) Environmental and Social Exclusion List (ESEL). Beijing: AIIB.

Asian Infrastructure Investment Bank (n.d.a) Directive on Information Disclosure. Beijing: AIIB.

Asian Infrastructure Investment Bank (n.d.b) Directive on Project-Affected People's Mechanism. Beijing: AIIB.

Asian Infrastructure Investment Bank (n.d.c) Operational Policy on Climate Change. Beijing: AIIB.

International Standards and Good Industry Practice

American Public Health Association (APHA) (n.d.) Standard Methods for the Examination of Water and Wastewater, Methods 9221B and 9221C (Coliform). Washington, D.C.: APHA.

Deutsches Institut für Normung (n.d.) DIN 4150-3, Vibration in Buildings: Effects on Structures. Berlin: DIN.

International Finance Corporation (2009) Good Practice Note: Workers' Accommodation, Processes and Standards. Washington, D.C.: IFC.

International Finance Corporation (2012) Performance Standards on Environmental and Social Sustainability. Washington, D.C.: IFC.

International Finance Corporation (2013) Good Practice Handbook: Cumulative Impact Assessment and Management for the Private Sector in Emerging Markets. Washington, D.C.: IFC.

International Finance Corporation (2018) Good Practice Note: Addressing Gender-Based Violence in Investment Project Financing involving Major Civil Works. Washington, D.C.: IFC.

International Labor Organization (n.d.a) Core Conventions: C29 (Forced Labor), C87 (Freedom of Association), C98 (Right to Organise), C100 (Equal Remuneration), C105 (Abolition of Forced Labor), C111 (Discrimination), C138 (Minimum Age), C182 (Worst Forms of Child Labor). Geneva: ILO.

International Labor Organization (n.d.b) Convention C155 on Occupational Safety and Health. Geneva: ILO.

International Organization for Standardization (2015) ISO 14001:2015, Environmental Management Systems, Requirements. Geneva: ISO.

International Organization for Standardization (2018a) ISO 45001:2018, Occupational Health and Safety Management Systems. Geneva: ISO.

International Organization for Standardization (2018b) ISO 50001:2018, Energy Management Systems. Geneva: ISO.

IPCC (2006) 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volumes 1–5. Hayama: IGES.

IPCC (2019) 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories. Hayama: IGES.

IPCC (2021–2023) Sixth Assessment Report (AR6), Working Group I, II, and III. Geneva: IPCC.

Tebaldi, C. et al. (2021) 'Climate model projections from the Scenario Model Intercomparison Project (ScenarioMIP) of CMIP6', Earth System Dynamics, 12, pp. 253–293.

Kurniadi, A. et al. (2024) 'Future projection of extreme precipitation over Java', International Journal of Climatology. doi: [applicable DOI].

United Nations (2006) Convention on the Rights of Persons with Disabilities (UN CRPD). New York: United Nations.

United Nations Framework Convention on Climate Change (2015) Paris Agreement. Bonn: UNFCCC.

Republic of Indonesia (2022) Updated Nationally Determined Contribution (Enhanced NDC). Jakarta: Government of Indonesia.

World Bank Group (2007a) Environmental, Health and Safety (EHS) General Guidelines. Washington, D.C.: World Bank Group.

World Bank Group (2007b) EHS Guidelines for Healthcare Facilities. Washington, D.C.: World Bank Group.

World Bank Group (2007c) EHS Guidelines on Wastewater and Ambient Water Quality. Washington, D.C.: World Bank Group.

World Bank Group (2007d) EHS Guidelines on Air Emissions and Ambient Air Quality. Washington, D.C.: World Bank Group.

World Bank Group (2007e) EHS Guidelines on Occupational Health and Safety. Washington, D.C.: World Bank Group.

World Bank Group (2007f) EHS Guidelines on Community Health and Safety. Washington, D.C.: World Bank Group.

World Health Organization (2014) Safe Management of Wastes from Health-Care Activities. 2nd edn. Geneva: WHO.

World Health Organization (n.d.) Healthcare Waste Management Rapid Assessment Tool. Geneva: WHO.

World Resources Institute and World Business Council for Sustainable Development (2004) The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard. Revised edn. Washington, D.C./Geneva: WRI/WBCSD.

World Resources Institute and World Business Council for Sustainable Development (2011) Corporate Value Chain (Scope 3) Accounting and Reporting Standard. Washington, D.C./Geneva: WRI/WBCSD.

World Resources Institute and World Business Council for Sustainable Development (2015) GHG Protocol Scope 2 Guidance. Washington, D.C./Geneva: WRI/WBCSD.

Government Statistical and Planning Publications

Badan Meteorologi, Klimatologi dan Geofisika (BMKG) (various years) Climatological Data and Extreme-Weather Outlooks for Semarang City. Jakarta: BMKG.

Badan Nasional Penanggulangan Bencana (BNPB) (2012) Regulation of the Head of BNPB No. 2 of 2012 concerning General Guidelines for Disaster Risk Assessment (Perka BNPB Nomor 2 Tahun 2012). Jakarta: BNPB.

Badan Nasional Penanggulangan Bencana (BNPB) (2023) Risiko Bencana Indonesia (RBI) 2023. Jakarta: BNPB. Available at: *https://inarisk.bnpb.go.id/pdf/BUKU%20RBI%202023.pdf*.

Badan Nasional Penanggulangan Bencana (BNPB) (2022) Indeks Risiko Bencana Indonesia (IRBI) Tahun 2022. Jakarta: BNPB. Available at: *https://inarisk.bnpb.go.id/irbi*.

Badan Nasional Penanggulangan Bencana (BNPB) (n.d.) InaRISK, Disaster Risk Mapping Methodology. Available at: *https://inarisk.bnpb.go.id/metodologi*.

Badan Pusat Statistik (BPS) Jawa Tengah (2023) Provinsi Jawa Tengah Dalam Angka 2023. Semarang: BPS Provinsi Jawa Tengah.

Badan Pusat Statistik (BPS) Kota Semarang (2024) Sub-district of Semarang Selatan Dalam Angka 2024. Semarang: BPS Kota Semarang.

Badan Pusat Statistik (BPS) Kota Semarang (2025a) Sub-district of Semarang Selatan Dalam Angka 2025. Semarang: BPS Kota Semarang.

Badan Pusat Statistik (BPS) Kota Semarang (2025b) Kota Semarang, Strategic Data of Semarang Municipality 2025. Semarang: BPS Kota Semarang.

BPBD Kota Semarang (2023a) Dokumen Kajian Risiko Bencana (KRB) Kota Semarang 2023–2027. Semarang: BPBD Kota Semarang. Available at: *https://bpbd.semarangkota.go.id/*.

BPBD Kota Semarang (2023b) Rencana Penanggulangan Bencana (RPB) Kota Semarang 2023–2027. Semarang: BPBD Kota Semarang.

BPBD Kota Semarang (2025) Updating Peta Risiko Bencana dan SEMARISK Tahun 2025, Thematic Risk and Vulnerability Maps (Flooding, Tidal Flooding, Landslide, Flash Flood). Semarang: BPBD Kota Semarang.

BPBD Kota Semarang (n.d.) SEMARisk, Sistem Edukasi, Monitoring dan Pelaporan Informasi Kebencanaan. Available at: *https://semarisk.semarangkota.go.id/*.

Dinas Kesehatan Kota Semarang (2024) District Health Records, December 2024, Stunting and Community Health Data, Sub-district of Semarang Selatan. Semarang: Dinas Kesehatan Kota Semarang.

Dinas Kependudukan dan Pencatatan Sipil Kota Semarang (2024) Regional Population and Civil Registry Data, Semarang Municipality, Semester II 2024. Semarang: Disdukcapil Kota Semarang.

World Bank (n.d.) Climate Change Knowledge Portal (CCKP), Indonesia, CMIP6 Mean and Extreme Projections. Available at: *https://climateknowledgeportal.worldbank.org/country/indonesia* (Accessed: May 2026).

Project Documents and Primary Data Sources

PT Pandu Persada (2025) Laporan Akhir Feasibility Study, Gedung Medik Sentral, Diagnostic Center di RSUP Dr. Kariadi Semarang. Bandung: PT Pandu Persada. 391 pp.

RSUP Dr. Kariadi Semarang (2018) Keterangan Rencana Kota (KRK) 2018. Semarang: RSDK.

RSUP Dr. Kariadi Semarang (2020) ANDAL 2020, Analisis Dampak Lingkungan: Pengembangan Pelayanan RSUP Dr. Kariadi Semarang, including RKL-RPL. Semarang: RSDK.

RSUP Dr. Kariadi Semarang (2020–2025) Laporan UKL-UPL Semester 1 and Semester 2, Years 2020, 2021, 2022, 2023, 2024, and 2025 (twelve semester reports). Semarang: RSDK.

RSUP Dr. Kariadi Semarang (2022) Nomor Induk Berusaha (NIB) OSS-RBA 9120202881023. Jakarta: OSS-RBA.

RSUP Dr. Kariadi Semarang (2022) Izin Operasional Rumah Sakit No. 91202028810230001.9.9.22. Jakarta: Ministry of Health.

RSUP Dr. Kariadi Semarang (2024a) Master Plan RSUP Kariadi 2024, institutional zoning, building inventory, tree inventory, and heritage management reference. Semarang: RSDK.

RSUP Dr. Kariadi Semarang (2024b) Persetujuan Kesesuaian Kegiatan Pemanfaatan Ruang (PKKPR) No. 07022210213374075, issued 28 June 2024. Jakarta: OSS-RBA.

RSUP Dr. Kariadi Semarang (2024c) Sertifikat Tanah confirming 188,080 m² landholding. Semarang: RSDK.

RSUP Dr. Kariadi Semarang (2024d) Struktur Organisasi RSUP Dr. Kariadi, Penanggung Jawab Lingkungan: Agus Akhmadi. Semarang: RSDK.

RSUP Dr. Kariadi Semarang (2024e) Izin Lingkungan Eksisting (existing environmental permit on file). Semarang: RSDK.

RSUP Dr. Kariadi Semarang (2024f) Pertek BMAL Evidence File, Site Plan DED 3 IPAL, Titik Koordinat IPAL (Garuda, Sentral, Rajawali), Neraca Air, Hasil Uji Kualitas IPAL 2024 and 2025, Hasil Pemeriksaan Badan Air Penerima 2024 and 2025, Kompetensi Personil PPA 2025, Alur 3 IPAL, SOP Pengolahan Limbah Cair Rev.4. Semarang: RSDK.

RSUP Dr. Kariadi Semarang (2024g) Pertek Emisi Evidence File, Hasil Uji Emisi Cerobong Genset 2024 and 2025, Data Emisi Cerobong (xlsx), Jam Operasional Genset 2025, Sertifikat Personil PPPU/POPU. Semarang: RSDK.

RSUP Dr. Kariadi Semarang (2026a) Rintek Limbah B3 Evidence File, Fasilitas Penyimpanan B3, Layout Denah TPS B3, Logbook LB3 January–March 2026, Neraca LB3 Q1 2026, SOP Pengelolaan B3 Rev.5, SOP Tanggap Darurat TPS B3 Rev.3, SOP Tanggap Darurat IPAL Rev.2. Semarang: RSDK.

RSUP Dr. Kariadi Semarang (2026b) Surat Perjanjian Limbah B3, PT PRIA (Licensed Off-Site B3 Transporter and Processor). Semarang: RSDK.

RSUP Dr. Kariadi Semarang (2024h) Laporan K3 NIDI Genset, 11 units: Fasum, Garuda A, Garuda B, Parkir A1, Parkir A2, IBS, Merpati, Onkologi, Penunjang, Rajawali, Service. Semarang: RSDK.

RSUP Dr. Kariadi Semarang (2024i) Laporan Riksa K3 Genset, Depnaker 2024. Semarang: RSDK.

RSUP Dr. Kariadi Semarang (2024j) Laporan Riksa Uji Petir 2024, 18 buildings. Semarang: RSDK.

RSUP Dr. Kariadi Semarang (2026c) SLO Damkar Gedung Garuda, 12 March 2026. Semarang: RSDK / Dinas Damkar.

RSUP Dr. Kariadi Semarang (n.d.a) SLO Genset (multi-unit) and SLO Listrik TR. Semarang: RSDK.

RSUP Dr. Kariadi Semarang (n.d.b) Time Schedule Pembangunan (Indicative Construction Schedule). Semarang: RSDK.

RSUP Dr. Kariadi Semarang (n.d.c) RSDK Internal Service Statistics 2024. Semarang: RSDK.

Comparable ESIA References and Methodological Sources

PT Equator Global Internasional (2026a) ESIA-ESMP, RSUP Dr. Soeradji Tirtonegoro Klaten, v0.1 Updated. TRUST Project benchmark. Jakarta: EGI.

PT Equator Global Internasional (2026b) ESIA-ESMP, RSUP Dr. Sitanala Tangerang, v0.1 Updated. TRUST Project benchmark. Jakarta: EGI.

PT Equator Global Internasional (2026c) ESIA-ESMP, RSJ Dr. Radjiman Wediodiningrat Lawang, v0.1 Updated. TRUST Project benchmark. Jakarta: EGI.

PT Equator Global Internasional (2026d) ESIA-ESMP, RSAB Harapan Kita (3 Diamond Hospital). TRUST Project benchmark. Jakarta: EGI.

Komisi Nasional Anti Kekerasan terhadap Perempuan (Komnas Perempuan) / Databoks Katadata (2025) Gender-Based Violence Statistics, Indonesia. Jakarta: Komnas Perempuan.

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APPENDICES

This section contains the technical appendices that complement the body of the ESIA. The Appendices include a Heritage Impact Assessment Framework (HIAF) (Annex F) and a Cultural Heritage Management Plan Framework (CHMPF) (Annex G). Annex F establishes the indicative framework for undertaking the HIA prior to demolition and major construction activities, while Annex G provides the indicative operational framework for managing cultural heritage risks and implementing heritage protection measures. The findings and recommendations of the HIA will inform the refinement of project design and the ESMP and, where required, the finalisation of the project-specific CHMP based on the framework provided in Annex G.

Annex A – Labor Management Plan (LMP)

1. INTRODUCTION

1.1 Purpose

This Labor Management Plan (LMP) sets out the policies, procedures, and institutional arrangements that govern the management of project workers during the construction phase of the RSUP Dr. Kariadi (RSDK) Redevelopment Project in Semarang, Jawa Tengah. It covers everyone who works on or for the project, from the site manager down to a daily laborer hired by a sub-contractor.

The LMP exists for two reasons. First, it ensures that every worker on the project is treated fairly, paid properly, kept safe, and given a real avenue for complaints. Second, it satisfies the labor and working conditions requirements of AIIB Environmental and Social Standard 2 (ESS2) and Indonesian national employment law, both of which are binding on this project.

1.2 Project Overview

RSDK is a Class A national referral hospital located on Jl. Dr. Sutomo No. 16, Semarang. The redevelopment involves the construction of a new Medic Central Unit, Central Diagnostic Center, and Service of Excellent Unit (GMS-DC & SoE), together with associated infrastructure and site works, on an 18.8 ha campus that will remain fully operational throughout construction. The estimated construction period is approximately 36 months (July 2027 to June 2029). The project is financed through a sovereign loan from AIIB, supplemented by Government of Indonesia counterpart funding.

1.3 Scope of the LMP

This plan applies to all categories of project workers as defined in Section 2 below. It covers the entire construction phase, from contractor mobilization through to demobilization and site handover. It is a living document and will be updated whenever there is a material change in workforce composition, employment arrangements, or applicable law.

2. CATEGORIES OF PROJECT WORKERS

AIIB ESS2 requires the project to identify and manage the different types of workers who will be engaged. The following table sets out the categories relevant to this project and the employment relationship that applies to each.

Category	Description	Employer	Estimated Numbers
Direct workers	PIU staff, RSDK employees assigned to the project, consultants engaged directly by the PIU (Independent Engineer, ESIA Consultant).	PIU / RSDK / Ministry of Health	15–25 persons
Contracted workers	Employees of the main construction contractor, including site management, engineers, foremen, skilled	Main Contractor	200–400 at peak (varies by phase)

	tradespeople, and general laborers.		
Sub-contracted workers	Workers employed by specialist sub-contractors (piling, MEP, façade, heritage conservation) engaged by the main contractor.	Sub-contractors	50–150 at peak
Daily / casual laborers	Unskilled or semi-skilled workers hired on a daily or short-term basis, typically from the local community.	Main Contractor or Sub-contractors	Variable
Primary supply workers	Workers employed by suppliers providing materials and equipment (concrete batching, steel fabricators, precast manufacturers) where there is a direct contractual link to the project.	Suppliers	Not based on site; managed through supply-chain requirements

Civil servants (PNS, CPNS, P3K) employed by RSDK or the Ministry of Health who are assigned to support the project remain subject to their existing public-sector employment conditions. However, they are covered by the OHS provisions and the grievance mechanism set out in this LMP.

Security personnel engaged to protect the construction site are treated as contracted workers and are subject to the same labor and conduct standards, with additional requirements set out in Section 9.

3. LEGAL AND POLICY FRAMEWORK

3.1 Indonesian Labor Law

Law / Regulation	Key Provisions
UU 13/2003 jo. UU 6/2023 (Manpower)	Written employment contracts; minimum wage; working hours (40 hrs/week); overtime (max 3 hrs/day, 14 hrs/week); rest periods; termination notice; freedom of association.
UU 40/2004 and UU 24/2011 (Social Security / BPJS)	Mandatory enrolment of all workers in BPJS Ketenagakerjaan (work accident, death, old age, pension) and BPJS Kesehatan (healthcare).
PP 50/2012 (SMK3)	Occupational safety and health management system; mandatory for employers with ≥50 workers or high-risk activities.
UU 12/2022 (Sexual Violence)	Criminal liability for sexual exploitation, abuse, and harassment; employer duty to prevent and respond.
Permen Ketenagakerjaan 5/2018	OHS requirements for the construction sector, including PPE, working at heights, excavation, and electrical safety.
Kepgub Jateng (Provincial Minimum Wage)	UMK Kota Semarang for 2027 (to be confirmed upon publication); all workers must receive at least the prevailing district minimum wage.

3.2 AIIB ESS2 Requirements

AIIB ESS2 (Labor and Working Conditions) requires that the project:

- Provide clear, written terms of employment to all workers at the time of hiring.
- Pay workers on time and at least at the applicable minimum wage.
- Ensure adequate rest periods, and limit overtime to what is permitted by law.
- Apply principles of non-discrimination and equal opportunity.
- Respect workers' rights to form and join workers' organisations.
- Establish an accessible, transparent, and confidential worker grievance mechanism.
- Prohibit child labor (under 18) and all forms of forced labor.
- Protect workers from gender-based violence, sexual exploitation, and harassment.
- Extend protections proportionately to contracted, sub-contracted, and primary supply workers.

Where Indonesian law and AIIB ESS2 diverge, the more protective standard applies.

4. TERMS AND CONDITIONS OF EMPLOYMENT

4.1 Employment Contracts

Every worker on the project must have a written employment contract, signed by both the worker and the employer, before commencing work on site. The contract must be in Bahasa Indonesia and must include at a minimum:

- The identity of the employer and the worker.
- The nature and description of the work, including the specific position and duties.
- The workplace location.
- The wage or salary, method and frequency of payment.
- The working hours, overtime arrangements, and rest periods.
- The contract start date and duration (for fixed-term contracts).
- The social security (BPJS) enrolment status and employer contribution obligations.
- The notice period and termination conditions.
- Reference to the Worker Code of Conduct and the GBV/SEAH policy.

Daily and casual laborers engaged for periods of less than one month must at minimum receive a written work order stating the daily wage rate, the expected duration, the scope of work, and the employer's identity. They must also be enrolled in BPJS Ketenagakerjaan for work-accident insurance from the first day of engagement.

4.2 Wages and Payment

All workers must be paid at least the prevailing UMK Kota Semarang for ordinary hours. Overtime is paid in accordance with UU 13/2003, which stipulates 1.5 times the hourly rate for the first overtime hour and 2 times for subsequent hours. Wages must be paid at least once per month, on a specified date, directly to the worker's bank account or in cash with a signed receipt. Wage deductions are permitted only where required by law (tax, BPJS contributions) or with the worker's written consent.

The Contractor must maintain a wage payment register that records the name, position, days worked, ordinary pay, overtime pay, deductions, and net amount for each worker for each pay period. The register must be available for inspection by the Independent Engineer and the PIU at any time.

4.3 Working Hours and Rest

Ordinary working hours are 40 hours per week, arranged as either 7 hours per day over 6 days or 8 hours per day over 5 days. Overtime requires the worker's written consent and may not exceed 3 hours in a day or 14 hours in a week. Every worker is entitled to at least one rest day per week. Night-shift workers are entitled to a meal and adequate rest facilities.

High-noise and high-vibration construction activities adjacent to active hospital zones are further restricted to 08:00–17:00 Monday to Saturday, as specified in the ESIA-ESMP. This does not override the ordinary working-hour limits; it means that noisy works cannot be scheduled during overtime periods.

4.4 Leave Entitlements

Workers with a continuous employment relationship of 12 months or more are entitled to 12 days of paid annual leave per year. Workers are also entitled to public holidays as gazetted by the Government of Indonesia, and to paid leave for family events as stipulated under UU 13/2003 (marriage, death of a family member, circumcision of a child, baptism of a child, etc.).

5. LOCAL HIRING AND NON-DISCRIMINATION

5.1 Local Hiring Preference

The project is committed to maximising employment benefits for the communities immediately surrounding the site. All contractor and sub-contractor agreements must include a local-hiring preference clause giving priority to residents of Sub-district of Semarang Selatan and adjacent kelurahan, particularly Kelurahan Randusari and the Gunung Brintik area, for unskilled and semi-skilled positions.

The Contractor must report monthly on the ratio of local to non-local workers, disaggregated by skill level and gender. The Contractor must coordinate with Dinas Tenaga Kerja (Disnaker) Kota Semarang for worker registration, skills matching, and access to certified vocational training where local workers require upskilling to fill available positions.

5.2 Non-Discrimination and Equal Opportunity

Employment decisions, including recruitment, assignment, promotion, training access, and termination, must be based on merit and job requirements. Discrimination on the basis of gender,

religion, ethnicity, disability, age (within legal working age), political opinion, marital status, HIV status, or any other characteristic unrelated to job performance is prohibited.

Women must have equal access to all positions for which they are qualified. Gender-disaggregated employment data must be reported monthly. Where women are underrepresented in specific roles, the Contractor must demonstrate what steps have been taken to encourage female applicants.

5.3 Labor Influx Management

The RSDK site is in a dense urban area with existing housing, transport, and commercial infrastructure. The project does not anticipate a large-scale worker camp. However, if the Contractor engages workers from outside the Semarang metropolitan area, the following measures apply:

- Workers must be housed in existing commercial accommodation (kos, rental housing), not in informal settlements or on site.
- The Contractor must inform the PIU Community Liaison Officer of the number and origin of non-local workers before mobilization.
- All non-local workers must attend the GBV/SEAH awareness and Code of Conduct induction (Section 8) before entering the site.
- The Contractor must assess and manage the risk of communicable disease transmission from worker influx, in coordination with RSDK Infection Prevention and Control (PPI) team.

6. OCCUPATIONAL HEALTH AND SAFETY

The detailed OHS management arrangements are set out in the C-ESMP (Chapter 5). This section summarizes the obligations as they relate to the treatment of workers.

6.1 SMK3 System and K3 Officer

The Contractor must implement a certified SMK3 system per PP 50/2012 and appoint a qualified K3 Officer. The safety committee must meet monthly and include worker representatives. All safety meetings must be minuted and the minutes made available to workers.

6.2 Induction and Training

No worker may enter the construction site without completing a site safety induction. The induction covers:

- Site-specific hazards and safety rules.
- PPE requirements and correct use.
- Emergency procedures, assembly points, and first-aid locations.
- The Chance Find Protocol (for below-grade workers).
- The Worker Code of Conduct and GBV/SEAH policy.

- The worker grievance mechanism and how to access it.

Monthly toolbox talks reinforce safety topics relevant to the current phase of works. All training attendance is recorded with the worker's name, ID, signature, date, and topic.

6.3 PPE and Welfare Facilities

The Contractor must provide, at no cost to workers, all PPE required for the tasks to which they are assigned. PPE must be inspected regularly and replaced when damaged. Welfare facilities on site must include clean drinking water, adequate toilet and handwashing facilities (gender-separated, with a minimum ratio of 1 facility per 25 workers), a sheltered rest area, and a first-aid station staffed by a trained first-aider during all working hours.

6.4 Incident Reporting

All workplace incidents, including near-misses, must be reported, investigated, and recorded. The following escalation timelines apply:

Incident Category	Reporting Timeline	Report To
Near-miss	Recorded by end of shift	HSE Manager (internal log)
First-aid injury	Recorded within 24 hours	HSE Manager; IE at next monthly review
Lost-time injury	Notified within 24 hours	IE, PIU, Disnaker Kota Semarang
Serious injury or fatality	Notified immediately	IE, PIU, AIIB, Polrestabes Semarang, Disnaker

BPJS Ketenagakerjaan work-accident claims must be filed in accordance with BPJS procedures. The Contractor must assist injured workers with the claims process.

7. PROHIBITION OF CHILD LABOR AND FORCED LABOR

7.1 Child Labor

No person under 18 years of age may be employed or engaged on any aspect of the project. This is a hard prohibition with no exceptions. It applies to the Contractor, all sub-contractors, and all primary supply workers.

The Contractor must verify the age of every worker before engagement, using an original KTP (identity card) or birth certificate. Photocopies of age-verification documents must be retained in the worker's personnel file. Unannounced spot-checks will be conducted by the PIU E&S Safeguards Officer. Any discovery of underage workers triggers immediate removal of the worker from the site (with referral to appropriate social services), a formal investigation, and potential contract sanctions.

7.2 Forced Labor

No person may be compelled to work on the project through force, fraud, coercion, debt bondage, or retention of identity documents. Workers must be free to resign and leave at any time, subject to

reasonable notice periods specified in their contracts. Retention of a worker's KTP, passport, or any other identity document by the employer or any intermediary is strictly prohibited.

The Contractor must not use labor brokers or intermediaries who are not subject to the same labor standards as the Contractor itself. Where labor-recruitment agencies are used, the Contractor must verify that no recruitment fees have been charged to workers.

8. GBV/SEAH PREVENTION AND RESPONSE

Construction projects with worker influx carry inherent risks of gender-based violence, sexual exploitation and abuse, and sexual harassment. These risks are taken seriously on this project. The arrangements below are mandatory, not aspirational.

8.1 Worker Code of Conduct

Every worker, including sub-contractor workers and security personnel, must sign the Worker Code of Conduct before the first day on site. The Code of Conduct explicitly prohibits:

Sexual exploitation, abuse, or harassment of any person, whether a fellow worker, hospital staff member, patient, visitor, or community member.

Transactional sex or solicitation involving any person associated with the project or the surrounding community.

Any form of intimidation, bullying, or retaliation against a person who reports a GBV/SEAH concern.

A worker who refuses to sign the Code of Conduct may not be admitted to the site.

8.2 GBV/SEAH Focal Person

The Contractor must appoint a dedicated GBV/SEAH Focal Person, who must be female. The Focal Person receives all GBV/SEAH complaints through a confidential channel that is separate from the general worker grievance mechanism. The Focal Person must have received certified training in survivor-centerd response and case management.

8.3 Awareness and Training

A mandatory GBV/SEAH awareness session is delivered to all workers during induction and repeated quarterly. The session covers the definition of SEA/SH, the prohibition under the Code of Conduct, how to report concerns, what happens after a report is made, and the sanction regime.

8.4 Referral Pathways

The project has established referral pathways to local GBV service providers for survivors who need support beyond what the project can provide:

Service Provider	Type of Service	Contact
PPT Seruni (DP3A Kota Semarang)	Integrated service for victims of violence against women and children	[Phone / Address]
PPA Unit, Polrestabes Semarang	Police women and children protection unit	[Phone]
LBH APIK Semarang	Legal aid for women	[Phone / Email]
University task forces (UNDIP, UNNES)	Counselling and psychosocial support	[Contact]

8.5 Sanctions

A substantiated allegation of SEA/SH results in the immediate suspension of the implicated worker pending investigation. Confirmed cases lead to termination of employment and may be referred to the police under UU 12/2022. All cases are reported to the PIU and AIIB within 48 hours. There is no second chance for a confirmed SEA/SH offence.

9. SECURITY PERSONNEL

Where security guards are engaged to protect the construction site and project property, they are treated as contracted workers and are subject to all provisions of this LMP. In addition:

- Security personnel must be vetted for prior criminal convictions and prior GBV/SEAH allegations before engagement.
- Security personnel must receive specific training on the use of proportionate force, de-escalation, the rights of workers and community members, and the prohibition of SEA/SH.
- The use of firearms on the project site is prohibited. Security personnel must not carry or use weapons of any kind unless specifically authorised by the police for a defined emergency.
- Any allegation of excessive force, intimidation, or abuse by security personnel is investigated immediately and reported to the PIU within 24 hours.

10. WORKER GRIEVANCE MECHANISM

10.1 Purpose and Principles

Every worker on the project has the right to raise a workplace concern and have it addressed fairly. The worker grievance mechanism (GRM) is accessible, transparent, and confidential. It operates without retaliation. It does not replace or limit the worker's right to seek remedy through the courts, Disnaker mediation, or trade union channels.

10.2 Channels for Raising Complaints

Workers can lodge complaints through any of the following channels:

- In person: to the Contractor HSE Manager, Community Liaison Officer, or any supervisor.
- Suggestion box: sealed boxes at the site office and welfare area, opened weekly by the HSE Manager.
- Phone / WhatsApp: a dedicated number, publicised at all site offices and welfare areas.
- Confidential channel (GBV/SEAH only): directly to the GBV/SEAH Focal Person through a separate phone number or in person.

Anonymous complaints are accepted and given the same consideration as identified complaints. Workers must be informed of the GRM at induction and reminded through posted signage (Bahasa Indonesia and English) at every site office and welfare area.

10.3 Service Levels

Stage	Action	Timeline	Responsible
1. Receipt	Log complaint, issue tracking number	≤3 working days	HSE Manager / GRM Focal
2. Screening	Categorise and route to responsible person	≤7 working days	HSE Manager
3. Investigation	Fact-finding and proposed resolution	≤30 working days	Investigation team
4. Resolution	Communicate outcome to complainant	Within 5 days of resolution	HSE Manager
5. Escalation (if needed)	To PIU / IE / Disnaker / AIIB PPM	Per escalation rules	PIU

GBV/SEAH complaints follow an accelerated track: initial response within 24 hours, with immediate referral to the GBV/SEAH Focal Person.

10.4 Monitoring and Reporting

The Contractor must maintain a grievance register recording every complaint received, its category, the date of receipt, the resolution, and the date of closure. A monthly summary of GRM performance (number received, resolved, pending, average resolution time) is included in the monthly E&S report to the Independent Engineer and the PIU. The PIU includes GRM KPIs in the quarterly E&S report to AIIB.

11. CONTRACTOR AND SUB-CONTRACTOR MANAGEMENT

11.1 Contractual Obligations

The Contractor's work contract includes binding provisions requiring compliance with this LMP. The same provisions flow down to all sub-contractor agreements. The Contractor is responsible for the labor performance of its sub-contractors. A sub-contractor's non-compliance is treated as the Contractor's non-compliance.

11.2 Sub-contractor Selection

Before engaging any sub-contractor, the Contractor must assess the sub-contractor's capacity to meet the labor standards in this LMP. The assessment must cover:

- Past OHS performance and any recorded incidents or violations.
- HR policies, employment contracts, and wage-payment practices.
- Existing Code of Conduct and GBV/SEAH policies (or willingness to adopt the project's).
- BPJS enrolment practices for workers.

Sub-contractors that cannot demonstrate adequate labor management capacity may not be engaged on the project without remedial action being agreed and implemented first.

11.3 Monitoring and Enforcement

The Contractor must monitor the labor performance of all sub-contractors on a daily basis. The Independent Engineer conducts monthly audits covering wages, working hours, contracts, BPJS enrolment, PPE compliance, and freedom of association. Non-compliance triggers a formal corrective action notice with a defined timeline. Repeated or serious non-compliance results in contract suspension or termination.

13. FREEDOM OF ASSOCIATION

Workers have the right to form and join workers' organisations of their choosing, and to bargain collectively through chosen representatives, in accordance with UU 13/2003 and ILO Conventions 87 and 98 (both ratified by Indonesia). The Contractor must not interfere with, restrict, or retaliate against workers who exercise these rights.

Where workers are not represented by a union, the Contractor must facilitate the election of worker representatives who can participate in safety committee meetings, raise collective concerns through the GRM, and communicate with management on behalf of their peers. Worker representatives must be protected from retaliation.

14. MONITORING, REPORTING, AND KEY PERFORMANCE INDICATORS

14.1 Monitoring Program

The LMP monitoring program is integrated into the overall E&S monitoring described in ESIA Chapter 12. The following parameters are tracked:

Parameter	Frequency	Method	Responsible
Employment contracts (coverage)	Monthly	Register review	Contractor HR / IE
Wage payment (timeliness, amount)	Monthly	Payroll audit	Contractor HR / IE
BPJS enrolment (coverage)	Monthly	Register cross-check	Contractor HR / IE
Working hours and overtime	Monthly	Timesheet audit	Contractor HR / IE

Local-to-non-local worker ratio	Monthly	HR data, disaggregated by gender	Contractor HR
OHS incidents and near-misses	Continuous	Incident register	HSE Manager
Child labor / forced labor screening	Quarterly spot-check	ID verification audit	PIU E&S Officer
GBV/SEAH Code of Conduct coverage	Monthly	Signed CoC register	GBV Focal Person
GRM cases (number, resolution rate)	Monthly	Grievance register	HSE Manager / PIU
Training and induction coverage	Monthly	Attendance records	HSE Manager

14.2 Key Performance Indicators

KPI	Target
Written employment contract coverage	**100% of workers**
BPJS Ketenagakerjaan enrolment	**100% of workers from Day 1**
Wages paid at or above UMK Semarang	**100% compliance**
Worker Code of Conduct signed	**100% before first day on site**
Safety induction completed	**100% before site access**
GBV/SEAH awareness sessions delivered	**100% at induction; quarterly refresher**
GRM complaints resolved within 30 working days	**≥70%**
Lost-time injury frequency rate (LTIFR)	**Below industry benchmark**
Verified child or forced labor incidents	**Zero tolerance**
Substantiated SEA/SH cases unaddressed within 48 hours	**Zero**

14.3 Reporting

The Contractor submits a monthly labor management report to the Independent Engineer and the PIU, covering all the parameters and KPIs above. The PIU incorporates labor management findings into the quarterly E&S report to AIIB. Serious incidents (fatality, serious injury, substantiated GBV/SEAH) are reported immediately to AIIB per the ESF incident protocol.

15. REVIEW AND UPDATE

This LMP is a living document. It will be reviewed and updated:

- At the start of each major construction phase or when the workforce composition changes materially.
- After any serious labor-related incident or substantiated GBV/SEAH case.
- Whenever there is a change in applicable law or regulation (including annual UMK adjustments).
- When AIIB or the Independent Engineer provides feedback requiring procedural changes.

- At a minimum, every 12 months during the construction period.

All revisions are recorded in the document control table and redistributed to all parties.

Annex B – Asbestos Management Framework

A. Purpose and Scope

This Asbestos Management Framework (AMF) establishes the policy commitments, procedural requirements, technical standards, institutional responsibilities, and monitoring and reporting obligations for the identification, assessment, handling, removal, transport, and disposal of asbestos-containing materials (ACM) in connection with the Pembangunan Gedung Layanan Terpadu RSDK Semarang redevelopment project (the Project). It is prepared as a standalone annex to the ESIA-ESMP and forms part of the Project's Environmental and Social Management System (ESMS).

The AMF applies to all phases of the Project in which existing structures may be disturbed, specifically:

- Pre-demolition: survey, sampling, laboratory confirmation, and risk assessment of all structures within the demolition footprint;
- Demolition / construction preparation: ACM removal by a licensed abatement contractor before any structural works commence; and
- Ongoing construction: monitoring, chance-find procedures, and waste management throughout the construction period.

The AMF does not address asbestos-related risks in the operational phase of the new buildings, as no ACM will be incorporated in the new construction, consistent with the Project's Green Hospital strategy and AIIB requirements.

B. Project Context and ACM Risk Basis

a. Structures Subject to Demolition

The redevelopment program requires the demolition or partial removal of the following existing structures within the RSDK complex:

Table B-1 Structures Within the Demolition Footprint

Structure	Function (existing)	Floor Area	ACM Risk Basis
Ex-Laundry & Boiler Building	Former laundry and boiler plant (decommissioned)	881 m² (1 storey)	High probability: industrial boiler buildings of this era typically contain pipe lagging, gaskets, boiler insulation, and cement-asbestos roof sheeting; construction vintage consistent with pre-ban materials.
Gedung Elang (Cardiac Installation Building)	Active cardiac care unit; scheduled for demolition to make way for the Service of Excellence (SoE) building	Not confirmed (multi-storey)	Moderate probability: active clinical building; construction era and roof/ceiling specifications to be verified. Separation from heritage Main Building is < 1 m, ACM removal requires particular care to avoid vibration damage.
Other structures within the rear parking yard (to be confirmed against final DED)	Various support functions	TBC	Low to moderate: to be confirmed against building age and specifications in the full ACM survey.

Source: ESIA-ESMP Draft v0.1 (May 2026); project knowledge review. Final scope will be confirmed against the Detailed Engineering Design (DED) target July 2026.

b. Observations from ESIA Fieldwork

Visual inspection during ESIA baseline fieldwork (April–May 2026) identified the following observations relevant to ACM risk at the RSDK complex. These observations do not constitute a confirmed ACM survey; they are indicative findings that establish the basis for the precautionary approach adopted in this AMF.

Table B-2 Summary of ESIA-Phase Asbestos-Relevant Observations

Obs. No.	Location / Element Observed	Nature of Observation	Action Required
A-01	Corrugated roofing, multiple ancillary buildings across the complex	Grey corrugated fiber-cement sheets consistent in appearance with chrysotile-cement roofing (pre-2000 construction); condition partially weathered	Phase 2 sampling mandatory before any roof works or demolition
A-02	Ceiling tiles, older ward and support building corridors	White flat-surface ceiling tiles of a type consistent with ACM ceiling tiles used in Indonesian government hospital construction through the 1990s	Phase 2 sampling mandatory before any ceiling disturbance
A-03	Pipe lagging, ex-Laundry & Boiler plant room	White/grey lagging around steam and hot-water pipes consistent with chrysotile or amosite pipe insulation	High priority; mandatory Phase 2 sampling; probable ACM given boiler-room context
A-04	Flat fiber-cement panels, partition walls, equipment housings	Grey-white flat sheet material used as wall cladding in service corridors	Phase 2 sampling where within demolition footprint
A-05	Heritage Main Building, roof and ceiling materials	Not inspected in detail; access restricted. Heritage building is not scheduled for demolition but is < 1 m from Gedung Elang demolition face.	Precautionary Phase 2 sampling of accessible roof/ceiling elements adjacent to demolition works; vibration monitoring protocol

Source: ESIA team visual observation, April–May 2026. All observations are indicative only; laboratory analysis is required for confirmation.

c. Why a Full Survey Was Not Completed During ESIA

A comprehensive, building-by-building asbestos material survey, requiring access agreements, dedicated sampling equipment, accredited laboratory analysis, and a licensed occupational hygienist, could not be completed within the time and specialist capacity available during the ESIA study period (February–May 2026). This is not unusual for brownfield hospital redevelopment ESIA studies, and the AIIB Environmental and Social Policy provides for a two-stage approach: (1) identification and framework-setting at the ESIA stage, and (2) a mandatory confirmed survey with specialist abatement prior to the commencement of physical works. This AMF fulfils stage (1); stage (2) is a contractual pre-condition to demolition under this Project.

C. Regulatory and Standards Framework

ACM management under the Project must comply with the hierarchy of regulations and standards set out below. Where Indonesian national regulation and international standards overlap, the more protective standard applies, consistent with the AIIB Environmental and Social Policy (ESP) principle of applying good international industry practice (GIIP) where national requirements are less stringent.

a. Indonesian National Regulations

Table B-3 Applicable Indonesian Regulations

Regulation	Relevance to this AMF
Permen No. 3/1985 (Ministry of Manpower)	Bans the use and import of blue asbestos (crocidolite) in Indonesia. Any crocidolite identified during the ACM survey must be treated as Priority ACM with immediate removal.
Law No. 32/2009 on Environmental Protection and Management (UUPPLH)	Parent law governing hazardous substance management, including asbestos as a B3 material. Establishes the regulatory framework for B3 waste licensing.
PP No. 22/2021 on Environmental Management (replacing PP 101/2014)	Governing regulation for B3 waste handling, storage, transport, manifest system, and disposal. ACM waste is classified as B3 Category 1 (toxic, carcinogenic); all removal, bagging, transport, and disposal must comply with PP 22/2021 procedures including manifests (dokumen limbah B3).
PermenLHK No. 9/2024 on Updated B3 Waste Management	Updated procedural guidance for B3 waste management, including designation of licensed transporters and disposal facilities. All ACM transporters and receiving facilities must hold current licences under this regulation.
Permen PUPR No. 18/2021 on Building Demolition Standards	Requires a pre-demolition review stage (kajian pembongkaran) as part of the demolition approval process. This AMF and the Phase 2 ACM Survey Report constitute the hazardous-materials component of that review.
Permenaker No. 5/2018 on OHS in the Workplace	Establishes occupational safety requirements for hazardous substance handling, including the requirement for personal protective equipment (PPE), training, medical surveillance, and air monitoring for workers handling B3 substances including asbestos.
Government Regulation on Manpower Safety and Health	Requires employer notification to Dinas Tenaga Kerja (Disnaker) of workplaces handling hazardous materials. The licensed abatement contractor must notify the relevant Disnaker office before commencing ACM removal works.

b. AIIB and International Standards

Table B-4 Applicable International Standards and Guidelines

Standard / Guideline	Relevance
AIIB Environmental and Social Policy (ESP) and Environmental and Social Standard 1 (ESS1)	Requires identification and management of asbestos and other hazardous materials in projects involving demolition of existing structures; mandates GIIP for all hazardous materials management; requires contractor competence verification; and requires disclosure and monitoring.
IFC Performance Standard 1 (PS1), Assessment and Management of E&S Risks	Supports the two-stage approach to ACM: framework-setting at ESIA and confirmed survey with specialist management before physical works.
IFC/World Bank Environmental Health and Safety (EHS) Guidelines, Construction and Demolition	Specifies GIIP for ACM management in construction and demolition, including mandatory survey before demolition; wet removal methods; HEPA-filtered negative-pressure enclosures; air monitoring; double-bag and label disposal; independent clearance air test.
WHO Chrysotile Asbestos (2014)	Confirms that all forms of asbestos, including chrysotile (which is not banned in Indonesia), are carcinogenic. Recommends elimination as the preferred approach; where this is not immediately possible, adopts a precautionary management framework.
IARC Monograph, All Forms of Asbestos (2018)	International Agency for Research on Cancer classification of all asbestos types as Group 1 (carcinogenic to humans), including mesothelioma, lung, larynx, and ovarian cancers. This classification underpins the Unlikely/Very High/Major significance rating assigned to ACM release in the Project impact matrix (Impact A.3.1).
ISO 16000-7, Indoor Air Quality: Sampling Strategies for Asbestos	Technical standard for airborne asbestos fiber monitoring methodology, applicable to clearance testing after removal and to routine air monitoring during construction.

Standard / Guideline	Relevance
WHO Air Quality Guidelines (2000), Asbestos	No safe level of asbestos fiber exposure exists; fibers should be reduced to as low as reasonably practicable (ALARP). Action levels adopted in this AMF are set at the most protective end of the range consistent with GIIP.

Indonesia has not banned chrysotile asbestos in building products. Any chrysotile identified in existing RSDK buildings will be managed under the full ACM removal protocol in this AMF, not treated as acceptable for in-place management, because the WHO and IARC position on chrysotile carcinogenicity is unambiguous, and because the demolition activity makes in-place management structurally impossible.

D. Phase 1, Desktop Review and Presumptive Risk Assessment

Phase 1 constitutes the current state of knowledge of ACM risk at RSDK, drawing on the ESIA fieldwork observations (Section 2.2), building records, and standard presumptive criteria. The output of Phase 1 is a Presumptive ACM Risk Register (Table A-5) that prioritises buildings and elements for Phase 2 material sampling.

A presumptive approach treats materials as ACM if they are of a type, vintage, and appearance that would, under GIIP, be treated as containing asbestos until confirmed otherwise by laboratory analysis. The presumptive risk register below is compiled on this basis.

Table B-5 Presumptive ACM Risk Register, RSDK Project

Element / Location	Material Type (Presumptive)	Construction Vintage	Condition (Visual)	Presumptive ACM Class	Priority
Ex-Laundry & Boiler, pipe lagging	Chrysotile / amosite pipe insulation	Est. pre-1990	Damaged, friable in places	Friable ACM (Class A)	P1, Critical
Ex-Laundry & Boiler, roof sheeting	Corrugated fiber-cement	Est. pre-2000	Weathered; partial breakage	Non-friable ACM (Class B)	P1, Critical
Gedung Elang, ceiling tiles (clinical spaces)	Flat ACM ceiling tile	Est. 1980s–1990s	Generally intact; risk of disturbance during demolition	Non-friable ACM (Class B)	P1, Critical
Older ancillary buildings, corrugated roofing	Corrugated fiber-cement	Pre-2000	Weathered	Non-friable (Class B)	P2, High
Service corridor partitions, flat sheet	Flat fiber-cement sheet	Various	Intact	Non-friable (Class B)	P2, High
Heritage Main Building, roof/ceiling (adjacent face)	TBC, not sampled	Colonial era + later modifications	Not fully inspected	Presumptive (Class B)	P2, High
New GMS-DC and SOE buildings (new build)	None, no ACM in new works	N/A	N/A	None	Not applicable

ACM Class: Friable ACM (Class A), material that, when dry, can be crumbled to powder by hand pressure, highest airborne fiber risk. Non-friable ACM (Class B), bonded material that releases fibers primarily when cut, drilled, or broken. Priority P1, Critical:

must be sampled and removed before any demolition of the affected structure. Priority P2, High: must be sampled before any works that could disturb the element.

Source: ESIA team presumptive assessment (2026). All entries are presumptive pending laboratory confirmation from Phase 2 sampling.

E. Phase 2, Confirmed ACM Survey (Pre-Demolition Mandatory)

MANDATORY PRE-CONDITION

The Phase 2 Confirmed ACM Survey is a mandatory pre-condition to demolition. No demolition permit (IMB Pembongkaran / PBG) will be requested, and no structural demolition works will commence, until the Phase 2 survey report has been received, reviewed by the ESIA safeguards team, and the ACM removal works specified in Phase 3 have been completed and cleared by an independent air test.

a. Survey Scope and Methodology

The Phase 2 survey must cover all structures within the demolition footprint, all structures that will be partially disturbed during construction, and a precautionary sample of structures adjacent to demolition works (including the Heritage Main Building façade adjacent to Gedung Elang). The survey must be conducted by a qualified and independent asbestos occupational hygienist with relevant laboratory accreditation.

The survey methodology must follow a three-stage approach:

- Building walk-over and material identification: systematic room-by-room and element-by-element inspection of all structures within scope, recording location, material type, approximate area/quantity, and condition (friable vs. non-friable) using a standardised inspection proforma.
- Sampling: collection of representative bulk samples from each suspected ACM material type and location, using wet-sampling techniques (to suppress fiber release during sampling) and strict PPE (P3 half-mask respirator, disposable Tyvek coveralls). Minimum sample frequencies: (a) homogeneous material in good condition, 3 samples per material type per building; (b) damaged or friable material, 5 samples per type.
- Laboratory analysis: analysis by polarised light microscopy (PLM) or transmission electron microscopy (TEM) at an accredited laboratory (KNAPPP-accredited or equivalent). Results expressed as fiber type present and percentage by weight.

b. Survey Report Requirements

The Phase 2 Survey Report must include, at minimum:

- An annotated floor-plan and/or photographic register of all ACM locations within the survey scope;
- A confirmed ACM inventory table (see Table A-6 template below) for each affected structure;
- Laboratory analysis certificates for all samples;
- Classification of each confirmed ACM element as Friable (Class A) or Non-Friable (Class B);

- A condition assessment and deterioration risk rating for each element;
- A quantitative estimate of ACM volume and weight for each building (required for removal cost estimation and waste manifest planning);
- A recommended abatement methodology for each element; and
- A signed declaration from the qualified surveyor.

Table B-6 Confirmed ACM Inventory Table, Template (to be completed from Phase 2 Survey)

No	Building / Zone	Element / Location	Material (confirmed)	ACM Type	Condition	Area (m^2)	Mass (kg est.)	Abatement method
1	Ex-Laundry & Boiler	Pipe lagging, boiler room	[Lab result]	Friable A	[Rating]	[TBC]	[TBC]	Wet removal; HEPA enclosure
2	Ex-Laundry & Boiler	Corrugated roof sheets	[Lab result]	Non-friable B	[Rating]	[TBC]	[TBC]	Controlled removal; whole-sheet
3	Gedung Elang	Ceiling tiles, all floors	[Lab result]	Non-friable B	[Rating]	[TBC]	[TBC]	Grid-down whole-tile removal
…	…	…	…	…	…	…	…	…

This table is a template. All columns marked [TBC] or [Lab result] must be completed with confirmed data before submission of the Survey Report. Source: ESIA team template based on IFC EHS Guidelines and GIIP.

c. Survey Timeline and Responsibility

Table B-7 Phase 2 Survey Timeline

Step	Activity	Responsible Party	Target Timing
1	Procurement of qualified asbestos occupational hygienist / licensed survey firm	RSDK / PIU, supported by EGI	Within 30 days of ESIA approval (Q3 2026)
2	Access agreement and building preparation	RSDK Facility Management	Concurrent with procurement
3	Building walk-over and bulk sample collection	Licensed Survey Firm	Within 60 days of procurement (Q4 2026)
4	Laboratory analysis, PLM/TEM	Accredited laboratory (KNAPPP or equivalent)	Within 21 days of sample receipt
5	Survey report preparation and EGI/PIU review	Survey Firm → third party consultant → PIU	Within 14 days of lab results
6	Confirmed ACM inventory and abatement plan submitted to AIIB	PIU	Before demolition commencement
7	Demolition commence, only after Steps 1–6 complete AND Phase 3 removal clearance issued	Main Contractor	Not before Q2 2027 at earliest

F. Phase 3, ACM Removal and Abatement

a. Contractor Qualification Requirements

All ACM removal works must be carried out by a licensed asbestos abatement contractor. No person without the required qualifications and PPE shall enter an area where ACM is being disturbed. Contractor qualification requirements:

- Licensed under Indonesian B3 waste handling regulations (PP 22/2021 and PermenLHK 9/2024); current licence to be verified by PIU before contract award;
- Demonstrated prior experience in ACM removal from hospital or institutional buildings (at minimum three comparable projects in the preceding five years);
- Qualified occupational hygienist supervisor on-site at all times during removal works;
- Current worker medical surveillance records (pre-employment chest X-ray, lung function test, and annual review) for all workers engaged in ACM handling; and
- Valid third-party liability insurance covering asbestos removal operations.

b. General Removal Principles

ACM removal works must follow the Avoid → Minimize → Contain → Dispose hierarchy:

- Avoid: where a suspected ACM element is confirmed NOT to contain asbestos (by Phase 2 lab analysis), no special precautions are required beyond normal demolition controls;
- Minimize fiber release: always use wet-removal techniques (misting with amended water, water with added surfactant at 0.5–1% concentration); never use dry abrasive cutting, grinding, or high-pressure air;
- Contain: establish HEPA-filtered negative-pressure enclosures (NPE) for all Friable (Class A) ACM removal; for Non-Friable (Class B) ACM, use shadow-vacuum tools and localised sheeting; and
- Dispose: double-bag, label, manifest, and transport to a licensed B3 disposal facility under PP 22/2021 waste manifest procedures.

c. Procedure for Friable ACM Removal (Class A)

Friable ACM (e.g. pipe lagging, sprayed insulation, loose-fill insulation) presents the highest airborne fiber risk. The following step-by-step procedure applies:

Table B-8 Friable ACM (Class A) Removal Procedure

Step	Action	Technical Requirements
1	Pre-removal planning	Written Method Statement and Risk Assessment submitted to RSDK OHS Officer and third part consultant at least 5 working days before works; approved in writing before commencement.
2	Isolation and access control	Establish exclusion zone using hard barriers and warning tape; post asbestos hazard signage (B3 asbestos warning) in Bahasa Indonesia and English; register all entrants to the enclosure.
3	Negative Pressure Enclosure (NPE)	Erect plastic sheet enclosure (minimum 0.2 mm polythene); install negative pressure unit with HEPA filter (minimum 500 Pa below

		ambient); seal all penetrations, doorways, ducts, and service openings; smoke-test enclosure integrity before works begin.
4	PPE, entry	All workers entering the NPE must wear: (a) P3 half-mask respirator (EN 143 / equivalent) or powered air-purifying respirator (PAPR); (b) disposable Tyvek-style coveralls with hood and boot covers; (c) nitrile inner gloves + gauntlet outer gloves; (d) safety goggles. No facial hair within respirator seal area.
5	Wet removal	Thoroughly mist the ACM with amended water before and during removal; keep material wet throughout the operation; remove whole pieces where possible; minimize breakage.
6	Decontamination unit (DCU) at enclosure exit	Mandatory three-stage DCU: (a) dirty changing area, remove outer PPE and bag; (b) shower (minimum 3 minutes); (c) clean area, fresh clothing. No ACM fiber shall cross the clean/dirty boundary.
7	Decontamination of enclosure surfaces	Upon completion of removal, HEPA vacuum all enclosure surfaces; wet-wipe all hard surfaces; inspect under UV light if available; repeat until no visible ACM debris remains.
8	Independent clearance air test	Before the NPE is dismantled, an independent occupational hygienist (not the abatement contractor) must collect air samples within the enclosure using phase contrast microscopy (PCM) or TEM; clearance criterion: < 0.01 fibers/mL by TEM (WHO clearance level). Works must NOT resume if clearance is not achieved, re-clean and re-test.
9	NPE dismantling	After clearance achieved, progressively dismantle and bag all enclosure materials as ACM waste; HEPA vacuum the surrounding area.

d. Procedure for Non-Friable ACM Removal (Class B)

Non-friable ACM (e.g. corrugated fiber-cement roofing, flat fiber-cement sheeting, ACM ceiling tiles in intact condition) releases fibers primarily when broken, cut, or drilled. The removal procedure is less intensive than Class A but still requires strict controls:

- Work area: delimit with barrier tape and hazard signage; no NPE required for whole-sheet/whole-tile removal from intact material; if cutting is unavoidable, a local mini-enclosure with shadow-vacuum tool is mandatory;
- PPE: P2 half-mask respirator; disposable coveralls; gloves; safety goggles;
- Removal: remove whole sheets or tiles intact; do not break unless unavoidable; mist the element immediately before any break; no angle grinders, circular saws, or high-speed rotary tools;
- Shadow vacuum: use a shadow vacuum (HEPA-equipped) attached at the cutting or drilling point if breakage is unavoidable;
- Air monitoring: personal air sampling for all workers and area monitoring at the site boundary during Non-Friable removal; results reviewed by occupational hygienist; and
- Clearance: visual inspection by occupational hygienist; personal air sampling results reviewed before area returned to general use.

e. PPE Requirements Summary

Table B-9 PPE Requirements by ACM Class

PPE Item	Friable ACM, Class A (Mandatory)	Non-Friable ACM, Class B (Mandatory)
Respiratory protection	P3 half-mask or PAPR respirator (EN 143 or equivalent); fit-tested before use	P2 half-mask respirator (EN 143 or equivalent); fit-tested
Coveralls	Disposable Tyvek-type; full hood; boot covers; single use	Disposable Tyvek-type; hood recommended; single use
Gloves	Nitrile inner + gauntlet outer	Nitrile gloves
Eye protection	Sealed goggles (no vents)	Safety goggles
Decontamination	Three-stage DCU mandatory (dirty area / shower / clean area)	Wet-wipe decontamination; shower available
Medical surveillance	Pre-employment chest X-ray; lung function test; annual review	Pre-employment chest X-ray; lung function test; annual review
Training	RSDK OHS asbestos awareness training (min. 8 hours); specific to licenced abatement work	RSDK OHS asbestos awareness training (min. 4 hours)

G. Air Monitoring Program

Airborne asbestos fiber monitoring is required at three distinct levels: personal monitoring of workers during removal, area monitoring at the site boundary during removal, and clearance monitoring after removal is complete. Monitoring must be conducted by an independent occupational hygienist (not the abatement contractor or site contractor).

Table B-10 Air Monitoring Requirements

Monitoring Type	Location	Frequency	Method	Action Level / Criterion
Personal (worker)	On worker's breathing zone (lapel)	Throughout every shift of ACM removal	PCM (NIOSH 7400) or TEM	Action level: 0.1 f/mL (PCM); investigate immediately if exceeded; stop work if confirmed above 0.1 f/mL by TEM
Area, within enclosure	Inside NPE	Continuous during Class A removal	PCM real-time where available; grab samples minimum 2 per shift	Trigger: 1.0 f/mL PCM, halt works; re-inspect enclosure integrity
Area, site boundary	Perimeter of demolition zone	Once per day during ACM removal	PCM	Alert level: 0.01 f/mL, investigate; Action level: 0.05 f/mL, halt and investigate
Area, patient/clinical zones	Nearest occupied ward or clinical space	Once per day during any nearby demolition	PCM	Alert level: 0.01 f/mL, halt nearby works immediately and notify RSDK OHS
Clearance, post removal	Inside enclosure, after decontamination, before NPE removal	Once per removal event; repeat if not cleared	TEM (ISO 16000-7)	Clearance criterion: < 0.01 f/mL TEM, no works to resume before clearance

PCM = Phase Contrast Microscopy (lower cost, faster, slightly less sensitive). TEM = Transmission Electron Microscopy (definitive, required for clearance certification). f/mL = fibers per millilitre of air. Action levels consistent with WHO/IFC EHS Guidelines for construction.

H. ACM Waste Packaging, Labelling, Transport, and Disposal

All confirmed or suspected ACM waste must be treated as B3 Category 1 hazardous waste under PP 22/2021 and PermenLHK 9/2024. The following mandatory procedures apply throughout the waste chain from generation to final disposal.

a. Packaging

- Double-bag all ACM waste in heavy-duty polyethylene bags (minimum 0.2 mm thickness); seal securely with duct tape; wipe the outside of the inner bag with a damp cloth before insertion into the outer bag;
- Large or rigid ACM pieces (e.g. whole corrugated sheets) must be wrapped in two layers of heavy-duty polythene sheeting and sealed; do not break large pieces to fit into bags;
- No bag shall exceed 25 kg; heavy rigid pieces shall be wrapped and labelled individually; and
- All packaged ACM waste must be stored in a dedicated, clearly labelled, locked B3 temporary storage area (TPS Limbah B3) within the RSDK complex, physically separate from other B3 waste streams, pending licensed transport.

b. Labelling

Each package must be labelled (in Bahasa Indonesia and English) with:

- The words: BERBAHAYA, MENGANDUNG ASBES / HAZARDOUS, CONTAINS ASBESTOS
- The B3 hazard symbol (skull/crossbones and appropriate GHS hazard pictogram);
- Building and location of origin;
- Date of packaging;
- Name of the abatement contractor; and
- Approximate mass (kg).

c. Transport

- Transport must be by a licensed B3 transporter with a current Surat Keputusan Kelayakan Lingkungan (SKKLH) and PP 22/2021 transporter licence;
- A B3 waste manifest (dokumen limbah B3) must be completed for every load, signed by the generator (abatement contractor/PIU), transporter, and receiving facility;
- ACM waste must be transported in a sealed, marked vehicle, not mixed with other waste streams; and
- All original manifest documents must be retained by the PIU for a minimum of five years and made available to AIIB on request.

d. Disposal

- ACM waste must be disposed of at a licensed B3 landfill facility with a current operating permit under PermenLHK 9/2024 that is authorised to receive asbestos waste;
- The existing RSDK B3 disposal contractor (PT PRIA, under service contract) must confirm in writing that its disposal facility is authorised to receive ACM waste before any ACM shipments are made. If PT PRIA is not authorised for ACM, an alternative licensed facility must be identified; and
- Disposal confirmation (certificate of disposal / sertifikat pengolahan limbah B3) must be returned to the PIU and filed with the waste manifest.

Table B-11 ACM Waste Chain, Summary

Stage	Activity	Responsible Party	Documentation
1	ACM removed; packaged and labelled within enclosure	Licensed abatement contractor	Packing list; manifest (generator section)
2	Transported to TPS Limbah B3 within RSDK site	Abatement contractor	Internal site transfer record
3	Stored in dedicated, locked TPS Limbah B3 area (max. 90 days)	RSDK Unit Sanitasi-Lingkungan	B3 storage register
4	Transported to licensed B3 disposal facility	Licensed B3 transporter	B3 waste manifest (full chain); vehicle inspection record
5	Disposal at licensed B3 landfill	Licensed receiving facility	Certificate of disposal / sertifikat pengolahan LB3
6	Manifest reconciliation and reporting to regulator	PIU / RSDK	Manifest archive; quarterly B3 report to KLHK via SiLB3

I. Asbestos Chance Find Procedure

Despite the mandatory pre-demolition Phase 2 survey, construction works may uncover ACM that was not identified during the survey (e.g. ACM within concealed voids, under floor coverings, behind cladding, or in buried pipe runs). The following Chance Find Procedure must be implemented from the first day of construction and maintained until final building completion.

Table B-12 Asbestos Chance Find Procedure

Step	Required Action	Responsible Party	Timeframe
1	STOP WORK immediately in the area where suspected ACM is encountered; cordon off a minimum 5-metre radius; do not disturb the material further.	Any worker / site foreman	Immediately upon discovery
2	Notify the Site OHS Officer (Petugas K3) by telephone; inform all workers in the area to evacuate and remove outer clothing if material has been disturbed.	Site OHS Officer	Within 15 minutes of discovery
3	Site OHS Officer notifies Main Contractor's OHS Manager and third party Environmental Monitor.	Site OHS Officer → Contractor OHS Manager → EGI	Within 1 hour
4	Contractor OHS Manager notifies PIU and arranges for the licensed occupational hygienist to attend site for visual assessment and bulk sampling.	Contractor OHS Manager → PIU	Within 4 hours

5	Occupational hygienist conducts visual assessment; collects bulk sample; submits to accredited laboratory for PLM/TEM analysis.	Licensed occupational hygienist	Within 24 hours of notification
6	Laboratory results received; occupational hygienist issues written ACM confirmation or clearance.	Laboratory + occupational hygienist	Within 5 working days
7a (confirmed ACM)	Issue a Chance Find ACM Removal Order; procure the licensed abatement contractor; conduct Class A or Class B removal per Section 6 before works resume in the affected area.	PIU + Licensed abatement contractor	Before any works resume in the area
7b (no ACM)	Written clearance issued by occupational hygienist; works in the area may resume.	Occupational hygienist → PIU	Upon receipt of clearance
8	Record the chance find in the monthly ESMP monitoring report; notify AIIB in the next quarterly E&S report.	Third part consultant/ PIU	Monthly / quarterly reporting cycle

HOSPITAL CONTEXT, SPECIAL REQUIREMENT

Because RSDK is a fully operational hospital throughout the construction period, any chance find of ACM in proximity to occupied clinical areas (ward, ICU, outpatient, laboratory) must trigger an immediate notification to the RSDK Clinical Director and Komite K3RS. The stop-work cordon must extend to any adjacent occupied space, and air monitoring (PCM, rapid turnaround) must be initiated at the clinical zone boundary within 2 hours of discovery.

J. Roles and Responsibilities

Table B-13 ACM Management, Roles and Responsibilities Matrix

Party	ACM Management Responsibilities
Project Implementation Unit (PIU), RSDK / Kemenkes	Overall accountability for AMF compliance; procurement of licensed Phase 2 survey firm and licensed abatement contractor; review and approval of Phase 2 Survey Report and Abatement Plan; authorisation of demolition works; AIIB reporting; retention of all manifests and certificates.
Environmental and Social Safeguards Consultant	Review and quality assurance of Phase 2 Survey Report; independent verification of Phase 3 abatement contractor qualifications; coordination of independent air monitoring; review of air monitoring results and clearance certificates; monthly ESMP monitoring reporting; inclusion of ACM events in quarterly AIIB E&S reports.
RSDK OHS Officer (Petugas K3 RS)	Asbestos awareness training for RSDK staff; notification gateway for chance finds within the hospital complex; interface between construction OHS program and hospital Komite K3RS; review of medical surveillance records; participation in stop-work decisions.
RSDK Unit Sanitasi-Lingkungan	Management of TPS Limbah B3 storage area for ACM waste; coordination of licensed B3 transporter dispatch; reconciliation of B3 manifest records; SiLB3 quarterly reporting to KLHK.
Main Contractor	Induction of all workers in asbestos awareness (minimum 1 hour; Bahasa Indonesia); immediate implementation of stop-work on ACM chance finds; provision of PPE and decontamination facilities; coordination of licensed abatement contractor; maintenance of site exclusion zones and signage.
Licensed Abatement Contractor	All ACM removal activities per Sections 6–8; qualified occupational hygienist supervision at all times during works; worker medical surveillance; PPE provision; decontamination facilities; waste packaging and labelling; coordination of transport.
Independent Occupational Hygienist (not the abatement contractor)	Conduct Phase 2 sampling (or review Phase 2 report if survey was contracted separately); conduct personal and area air monitoring during removal; issue clearance air test certificates; conduct chance find assessments.
AIIB (Lender)	Review Phase 2 Survey Report and Abatement Plan as part of Environmental and Social supervision; receive quarterly E&S reporting including ACM status; right of inspection of ACM waste manifest records.

K. Training and Awareness

Asbestos awareness training is a mandatory requirement for all parties who may come into contact with ACM or who are working in the vicinity of demolition and ACM removal activities. The training matrix below applies throughout the construction phase.

Table B-14 Asbestos Training Matrix

Target Group	Training Content	Duration (minimum)	Timing
All construction site workers (including laborers)	What is asbestos; where it may be found at RSDK; health risks; what to do if you suspect ACM (stop work, notify); PPE basics; emergency contacts	1 hour (Bahasa Indonesia)	Site induction, before first day on site
Site foremen and supervisors	All of above, plus: how to recognise ACM visually; how to implement stop-work and cordon; Chance Find Procedure; documentation requirements	3 hours	Before construction mobilization
Licensed abatement contractor workers	Full occupational hygiene training for asbestos removal; PPE donning/doffing; enclosure setup; decontamination; emergency procedures	8 hours (minimum); per licencing requirements	Before any removal works
RSDK OHS Officer and K3RS members	Asbestos health and regulatory requirements; AMF procedures; monitoring interpretation; hospital-specific notification pathways	4 hours	Before construction mobilization
RSDK clinical and facility staff (all buildings adjacent to works)	Asbestos awareness; when to report concerns; what to do if dust or debris is suspected; who to contact	30 minutes	Quarterly during construction; refresher after any chance find event

All training must be delivered in Bahasa Indonesia and documented with sign-in sheets. Training records are retained by the PIU and made available to AIIB on request.

L. Monitoring and Reporting

Table B-15 AMF Monitoring and Reporting Requirements

Monitoring / Reporting Item	Responsible Party	Frequency	Reporting Destination
Phase 2 Survey Report, submitted before demolition	PIU / EGI	One-time, pre-demolition	PIU; AIIB (pre-demolition condition)
Abatement Plan, submitted before removal works	Licensed abatement contractor → PIU → EGI	One-time per structure, pre-removal	PIU; EGI; AIIB
Clearance air test certificate, per removal event	Independent occupational hygienist	Per removal event	PIU; EGI; included in monthly ESMP report
Personal and area air monitoring results	Independent occupational hygienist	During all removal activities; see Table A-10	EGI; PIU; retained for 5 years
ACM waste manifest reconciliation	RSDK Unit Sanitasi-Lingkungan / PIU	Per waste shipment; quarterly summary	SiLB3 (KLHK); PIU records; quarterly report
Chance find register	Connsultant / PIU	Continuously updated; reported monthly	Monthly ESMP report; AIIB quarterly report
Worker medical surveillance records	Licensed abatement contractor	Annual; pre- and post-employment	PIU; retained for minimum 40 years (latency of asbestos disease)

AMF compliance status	EGI	Monthly, in ESMP monitoring report	PIU; AIIB quarterly E&S report
Incident / non-conformance reporting	Main Contractor → PIU → EGI	Within 24 hours of any AIR exceedance or stop-work event	PIU; AIIB, immediate notification for Major incidents

Note: Worker medical surveillance records must be retained for a minimum of 40 years because of the long latency period of asbestos-related disease (mesothelioma onset typically 20–50 years post-exposure). The PIU must make provision for the long-term custody of these records beyond the project period.

M. Indicative Budget

The following indicative budget is based on the scope identified in this AMF. Actual costs will depend on the confirmed ACM inventory from the Phase 2 survey (particularly the volume and type of ACM and the number of structures affected) and on prevailing contractor rates in Semarang at the time of procurement. Costs may be significantly higher if ACM volumes are greater than presumed.

Table B-16 Indicative AMF Budget

Phase	Activity	Indicative Cost (USD)	Notes
1	Desktop review and presumptive risk register (completed during ESIA)	Included in ESIA contract	Cost already incurred (EGI)
2	Phase 2 ACM Survey, building walk-over, bulk sampling, laboratory analysis, and survey report (all structures within demolition footprint)	USD 15,000 – 25,000	Excludes Heritage Main Building if only precautionary sampling required; laboratory costs are dominant variable
3a	ACM abatement, Class A (Friable) removal, ex-Laundry & Boiler pipe lagging and confirmed friable materials	USD 20,000 – 40,000	Cost sensitive to volume; confirmed by Phase 2 survey; includes NPE enclosure, DCU, HEPA disposal
3b	ACM abatement, Class B (Non-friable) removal, fiber cement roofing and ceiling tiles (Gedung Elang and other structures)	USD 15,000 – 30,000	Cost sensitive to area (m^2) of confirmed ACM; will be confirmed by Phase 2 survey
4	Independent air monitoring, personal, area, and clearance monitoring throughout removal works	USD 8,000 – 15,000	Number of removal events determines cost; per Table A-10
5	ACM waste packaging, transport, and licensed B3 disposal	USD 10,000 – 20,000	Includes transport manifests, B3 disposal fees; per confirmed ACM volume
6	Contingency for chance finds during construction (allowance)	USD 10,000 – 20,000	Indicative; triggered only if chance finds occur; per Section 9
–	**Total (indicative)**	**USD 78,000 – 150,000**	**To be refined after Phase 2 survey results; included in project contingency budget**

Source: ESIA team estimate; updated from draft AMF indicative budget to reflect RSDK-specific scope and Phase 2 survey requirement. Actual costs subject to Phase 2 survey confirmation and contractor procurement.

N. Implementation Timeline

Table B-17 AMF Implementation Timeline

Milestone	Activity	Target Date	Condition / Trigger

AMF approved	This AMF approved as annex to ESIA-ESMP	Q3 2026	AIIB ESIA review cycle
Phase 2 Survey, procurement	Licensed survey firm procured by PIU	Q3 2026 (within 30 days of ESIA approval)	ESIA approval
Phase 2 Survey, fieldwork	Building walkover and bulk sampling completed	Q4 2026	Survey firm mobilised; access agreements in place
Phase 2 Report, submitted	Survey report with confirmed ACM inventory submitted to PIU and AIIB	Q4 2026 – Q1 2027	Laboratory results received
Abatement Plan approved	Licensed abatement contractor's method statement and work plan reviewed and approved by PIU and EGI	Before removal works	Phase 2 report received
Phase 3 ACM Removal, ex-Laundry & Boiler	All confirmed ACM removed and clearance certificate issued	Q1 2027 (before demolition)	Phase 2 confirmed; contractor mobilised
Phase 3 ACM Removal, Gedung Elang	All confirmed ACM removed and clearance certificate issued	Q2 2027 (before SoE demolition)	Phase 2 confirmed; contractor mobilised
Demolition, ex-Laundry & Boiler	Structural demolition commences (Top-Down Manual method)	Q2 2027 (earliest)	Phase 3 clearance certificate received
Demolition, Gedung Elang	Structural demolition commences	Q2–Q3 2027 (earliest)	Phase 3 clearance certificate received
Chance Find monitoring, ongoing	Active chance find procedure throughout construction	Throughout construction (2027–2029)	Continuous from mobilization
Final AMF close-out report	All ACM removed, disposed, manifests reconciled; report to AIIB	Q4 2029	Practical completion of Project

Annex C – Stakeholder Engagement Plan (SEP)

The Stakeholder Engagement Plan (SEP) is prepared in accordance with AIIB ESS1 (Stakeholder Engagement and Information Disclosure) and reflects the specific stakeholder landscape, a live tertiary teaching hospital, a nationally registered heritage complex, and a dense urban community, established in Chapters 5 and 6. The SEP is a living document: it will be reviewed and updated at each project phase transition and whenever new stakeholders or issues are identified.

The SEP aims to:

- Ensure that all stakeholders affected by or interested in the project have access to timely, accurate, and accessible information about project activities and their potential environmental and social impacts.
- Create meaningful opportunities for stakeholders to raise concerns, provide feedback, and participate in decisions that affect them, before those decisions are finalised.
- Establish a transparent and accessible Grievance Redress Mechanism (GRM) that provides all stakeholders, including vulnerable groups, with a safe channel to raise and resolve complaints.
- Comply with AIIB ESF ESS10 obligations, including public disclosure of the ESIA and SEP documents before construction begins.
- Support the effective implementation of all project management plans (CESMP, LMP, HMP, CHSMP, VGAP) through structured stakeholder feedback loops.

A. Regulatory and Policy Framework

The SEP is grounded in the following frameworks:

- AIIB Environmental and Social Framework (2024), ESS1 (Environmental and Social Assessment and Management) requires AIIB clients to systematically identify and engage stakeholders.
- Indonesian Government Regulation PP 22/2021 on Environmental Protection and Management, requirements for community engagement in AMDAL preparation and implementation.
- PermenLHK No. P.4/2021 on AMDAL Assessment Procedures, prescribes detailed requirements for the Initiator Announcement (Pengumuman Pemrakarsa), public consultations at KA-ANDAL and ANDAL stages, and Sidang Pleno KPA; this regulation is directly operative for this project and is more specific than PP 22/2021.
- UU 14/2008 on Freedom of Public Information, the right of affected communities to access project-related information held by public bodies.
- UU 20/2008 on Micro, Small and Medium Enterprises, protections for PKL (street vendors) relevant to engagement and compensation procedures.
- UU 25/2009 on Public Service, institutional obligation to provide a public complaint-handling channel with defined response timelines, applicable to RSDK as a public service provider.

- UU 36/2009 jo. UU 17/2023 on Health, patient right to information and to raise complaints regarding health services.
- IFC Performance Standard 1 (2012), external communications, project-level grievance mechanisms, meaningful consultation, and disclosure of assessment results.
- IFC Performance Standard 2 (2012), worker engagement, grievance mechanism, and non-retaliation requirements.
- WHO guidance on Community Engagement for Health Infrastructure Projects, particularly for hospital construction in live clinical settings.
- Peraturan Menteri PAN-RB No. 24/2014 on public-service complaint management guidelines, informs the RSDK-specific GRM design in Chapter 10.

B. Stakeholder Identification and Analysis

- Stakeholders are defined as all individuals, groups, and organisations that are affected by, or that can affect or influence, the project outcomes. Identification was conducted through desktop review of the socioeconomic baseline (Chapter 5), the Impact and Risk Matrix (Section 6.2), and consultation with RSDK management, consistent with AIIB ESS1 guidance and Indonesian AMDAL public-consultation procedures.
- Stakeholders are categorised using an interest-versus-influence framework, which positions each group according to (i) their level of interest in the project, principally determined by the degree to which they are affected, and (ii) their capacity to influence project outcomes, including design decisions, regulatory approvals, and mitigation. This categorisation drives the depth and frequency of engagement set out in Sections 10.4 and 10.5. Vulnerable groups are treated as a cross-cutting category irrespective of their interest–influence position, in accordance with AIIB ESS1. Project delivery counterparties are engaged through contract-driven, deliverable-aligned mechanisms.
- High interest, High influence: stakeholders directly affected by the project who also hold formal decision-making, regulatory, or approval authority. Engagement is continuous, formal, and decision-oriented, with documented minutes. This category includes AIIB, Kementerian Kesehatan RI, RSDK Direksi, Komisi Penilai AMDAL Provinsi Jawa Tengah, DLH Provinsi Jawa Tengah, BPK Jawa Tengah, and Disbudpar Kota Semarang.
- High interest, Lower influence: stakeholders directly affected by project activities who do not hold formal decision-making power but have a strong, legitimate interest in outcomes. This category includes patients and caregivers, the RSDK workforce (PNS/CPNS/P3K/BLU), residents of Kelurahan Randusari and neighbouring kelurahan, PKL vendors, and construction workers. Structured consultation, accessible channels, two-way feedback, and vulnerable-group inclusion are required.
- Lower interest, High influence: regulatory and institutional bodies with formal approval authority over specific project components, whose primary mandate extends beyond this project.

Engagement is milestone-driven and regulatory in character. This category includes Dishub Kota Semarang, Dishub Provinsi Jawa Tengah, Pemkot Semarang, BPJS Kesehatan, and KLHK pusat.

- Lower interest, Lower influence: the broader Kota Semarang public, mass media, academic observers, and sector NGOs who have a general interest in the project but are not directly affected. Engagement is through public information disclosure via institutional and project websites and media announcements.
- Vulnerable groups (cross-cutting): elderly persons, women, children, persons with disabilities (PWD), caregivers, low-income BPJS-dependent patients, and ICU/ICCU/oncology patient cohorts. Regardless of their position on the interest–influence matrix, these groups receive enhanced engagement through gender-balanced FGDs, accessible formats, and targeted outreach, consistent with AIIB ESS1 and the Vulnerable Groups Action Plan (VGAP). See Section 10.6.
- Project delivery counterparties: the safeguards consultant team, PT Pandu Persada (feasibility study author), the construction contractor (TBC), the Independent Engineer / Implementation Consultant (TBC), KAN-accredited monitoring laboratories, and PT PRIA (B3 waste transporter). Engagement is contract-driven with a deliverable-aligned cadence.

Table C-1 Stakeholder register, RSDK Development Project

Category (Interest × Influence)	Stakeholder	Key Interests & Concerns (Matrix Ref.)	Influence	Impact Exposure	Engagement Priority
High Interest High Influence	AIIB	ESF ESS1–ESS8 compliance; ESIA and SEP disclosure; ESMP monitoring; PAM oversight	Very High	—	Mandatory
	Kementerian Kesehatan RI	Hospital accreditation; clinical service standards during construction; TRUST Project portfolio oversight	Very High	—	Mandatory
	RSDK Direksi	Service continuity; patient safety; IPC; HOCP; reputational risk management (→ B.1.1, B.2.1)	Very High	High, direct	Mandatory
	Komisi Penilai AMDAL Prov. Jawa Tengah	AMDAL adequacy; Sidang Pleno KPA approval; PP 22/2021 and PermenLHK P.4/2021 compliance	Very High	—	Mandatory
	DLH Provinsi Jawa Tengah	AMDAL/RKL-RPL compliance; IPAL effluent; B3 waste; monitoring oversight	High	—	Mandatory
	Balai Pelestarian Kebudayaan Jawa Tengah	Heritage impact assessment; construction exclusion buffer; Chance Find Procedure notification (→ B.7.1–B.7.4)	Very High	—	Mandatory

	Disbudpar Kota Semarang	Heritage setting; cultural event scheduling; registration status (→ B.7.2)	High	—	High
High Interest Lower Influence	Patients, families, and caregivers	Service continuity; emergency access; noise/dust in clinical areas; infection risk (→ B.1.1, B.2.1)	Low	High, direct	High
	RSDK workforce (~3,000 employees)	OHS; service continuity; IPC; workplace noise/dust; GBV/SH (→ B.4.1, B.2.1, B.6.1)	Medium	High, direct	High
	Residents of Kelurahan Randusari and neighbouring kelurahan	Dust, noise, vibration; traffic disruption; emergency access (→ A.1.1, A.2.1, B.3.1)	Medium	High, direct	High
	Food vendors and informal traders (PKL) along Jl. Dr. Sutomo and Jl. Dr. Kariadi	Livelihood loss; vendor relocation; fair compensation (→ B.5.1, C.1.1)	Medium	High, direct	High
	Construction workers (direct, sub-contracted, daily-wage)	OHS; fair wages; child-labor prohibitions; GRM access; SEA/SH protection (→ B.4.1–B.4.3)	Low	High, direct	High
Lower Interest High Influence	Dishub Kota and Provinsi Jawa Tengah	Haulage route approval; traffic management; road safety audit (→ B.3.1)	High	—	Mandatory
	Pemkot Semarang	Building and environmental permits; kelurahan/kecamatan coordination	High	—	High
	BPJS Kesehatan	Continuity of JKN patient access; billing continuity (→ B.1.1)	High	—	High
	KLHK Pusat	National AMDAL compliance; B3 waste; national reporting	High	—	Mandatory
Lower Interest Lower Influence	Broader Kota Semarang public; mass media; academic observers; sector NGOs	General interest; media coverage; sector research	Low	Low, indirect	Low
	Universitas Diponegoro	Construction traffic and access; staff/student	Medium	Low–Medium	Low

		movement; academic calendar			
Vulnerable Groups (Cross-cutting)	Elderly patients, PWD, pregnant women, community residents	Noise/dust exposure; mobility barriers; heat stress; accessible consultation (→ A.1.1, A.2.1, B.6.2)	Low	High, direct	High
	Women and female-headed households	SEA/SH risk; livelihood impact; inclusive consultation; GRM access (→ B.6.1, B.6.2, C.1.1)	Low	High, indirect	High
	Children and school pupils (Kec. Semarang Selatan)	Traffic safety near schools; school-hour scheduling (→ B.3.1)	Low	Medium	Medium
	Persons with disabilities (45 registered in Kec. Semarang Selatan)	Accessible consultation; GRM access; construction access barriers (→ B.6.2)	Low	High, indirect	High
	Low-income BPJS-dependent patients; ICU/ICCU/oncology cohorts	Service continuity; access disruption; financial burden (→ B.1.1, B.2.1)	Low	High, direct	High
Project Delivery Counterparties	Safeguards Consultant Team	ESIA/ESMP/SEP quality; AIIB compliance; monitoring and reporting	High	—	Contract-driven
	PT Pandu Persada (Feasibility Study author)	Technical design interface; ESIA baseline data alignment	Medium	—	Contract-driven
	Construction Contractor (TBC) and sub-contractors	OHS; CESMP; CoC; GRM; IPC (→ B.4.1, B.2.1)	High	—	Contract-driven
	Independent Engineer / Implementation Consultant (TBC)	Construction quality; ESMP verification; progress certification	High	—	Contract-driven
	KAN-accredited monitoring laboratories; PT PRIA (B3 transporter)	Environmental monitoring quality; B3 manifest compliance (→ A.3.1, A.4.1)	Medium	—	Contract-driven

Note: Influence = capacity to affect project outcomes or decisions. Impact Exposure = degree to which the stakeholder bears project-related risks as identified in the Impact and Risk Matrix (Section 6.2). The interest–influence categorisation is consistent with AIIB ESS1 and Indonesian AMDAL guidance. PWD = persons with disabilities.

C. Engagement Approach and Methods

- Engagement methods are calibrated to the needs, circumstances, and communication preferences of each stakeholder group. The overarching principles are:
- Inclusive: engagement activities are designed to reach stakeholders who may face barriers to participation, including women, elderly persons, persons with disabilities, and informal workers, through adapted formats, venues, and materials.
- Timely: information is shared before decisions are made, not after. Affected stakeholders receive advance notification of work that will affect them, in line with the timelines set out in Table 10.2.
- Two-way: consultation is not limited to information dissemination. Stakeholder views are documented, considered, and fed back to participants with a clear explanation of how they have influenced project decisions.
- Transparent: meeting minutes, GRM logs, and monitoring reports are available to stakeholders on request and disclosed on the AIIB project portal in accordance with AIIB ESF information disclosure requirements.
- Culturally appropriate: engagement is conducted primarily in Bahasa Indonesia; materials for Kelurahan Randusari audiences are adapted for the predominantly Javanese-speaking community. Major consultation events avoid key religious and cultural observance periods (Ramadan, Lebaran, Natal).
- Proportionate: the depth, frequency, and format of engagement is proportionate to the level of risk and impact. High-Priority stakeholders receive structured, two-way, documented engagement; Low-priority stakeholders receive public information disclosure.
- Non-retaliatory: all stakeholders may raise concerns, ask questions, and withhold consent without risk of retaliation. Any retaliatory act is itself a grievance category under the GRM (Chapter 10).

Table C-2 Stakeholder engagement methods, by group and project phase

Stakeholder Group	Pre-construction	During Construction	Monitoring & Feedback	Grievance Access
Patients, families, caregivers	Pre-construction ward briefings; posted construction schedule at ward entrances	Monthly construction bulletin (hardcopy in waiting areas); RSDK website updates	RSDK patient representative mechanism; HOCP review meetings	RSDK Customer Service Unit; SI PETIK platform (https://petik.rskariadi.id/); accessible to mobility-impaired patients
Hospital staff	Staff town hall before mobilization; ICRA	Weekly e-mail/intranet updates; WhatsApp	Construction–hospital interface meetings (daily); staff	Staff HR grievance channel; union representative for

	briefings for affected departments	group for clinical liaison officers	safety committee (quarterly)	PNS staff; SI PETIK for ethics concerns
Kelurahan Randusari & adjacent residents	Community sosialisasi with RT/RW leaders; leaflet distribution	Public notice board at site entrance; monthly community update via RT/RW	Participatory monitoring: community observer at monthly site inspection; What We Heard log (Section 9.7)	Community GRM: dedicated phone number + suggestion box at Kelurahan office
Food vendors / PKL	Individual face-to-face consultation; livelihood baseline survey before works	Direct notification 30 days before any access change	Vendor representative on monthly community liaison meeting	Dedicated vendor GRM channel; LBH referral if dispute escalates
Vulnerable groups (women, elderly, PWD, low-income HH)	Targeted FGDs; home visits where mobility limits attendance; accessible materials (large-print, audio, sign)	Adapted materials and formats per Section 9.6	Gender-disaggregated GRM register; VGAP monitoring; What We Heard disclosed to participants	Referral to UPPA and LBH APIK for GBV/SEA; VGAP implementation monitoring
Construction workers	Induction briefing Day 1; CoC signing; GRM orientation	Toolbox talks twice weekly; GRM, CoC, and safety rules posted on site	Monthly safety committee with worker representatives; quarterly worker voice survey	Anonymous worker GRM hotline; suggestion box; designated focal person (Chapter 10)
Regulatory authorities (AIIB, Dinas, Kemenkes)	Formal project notification and ESIA/SEP disclosure packages	Monthly progress and ESMP compliance reports; AMDAL reporting as required	Quarterly supervision meetings; AIIB supervision mission (semi-annual)	Official correspondence; formal response within 15 working days
BPK Jawa Tengah	Pre-construction HIA submission and consultation meeting	Notification before works within heritage buffer	Chance Find Procedure: BPK Jawa Tengah notification within 24 hours of any find	Formal correspondence; BPK Jawa Tengah representative invited to pre-piling inspection
LBH APIK, UPPA, Dinas Nakertrans	SEP orientation meeting; referral pathway agreed before mobilization	Case referrals as required; quarterly coordination meeting	Shared GRM log (anonymised); joint case review if escalated	Joint monitoring of SEA/SH and child-labor indicators
Kelurahan / RT/RW leaders	Sosialisasi before construction; community liaison officer appointed	Monthly community update; advance notice of major works	Representation on Community Liaison Committee (CLC)	CLC as first-tier GRM relay; escalation to RSDK E&S team within 5 working days

D. Consultation Program and Engagement Schedule

- The consultation program follows a phased approach aligned with both the Indonesian AMDAL procedure, Initiator Announcement, KA-ANDAL stage, and ANDAL stage, and the AIIB ESS1 project-lifecycle requirement. The two frameworks are sequential and complementary: AMDAL

milestones define the mandatory regulatory consultation steps, while AIIB requirements ensure meaningful engagement continues through construction and into the operational phase. Table 10.3 sets out the full schedule. Activities designated as Mandatory cannot be deferred without written agreement from AIIB.

- Initiator Announcement (10 working days, mandatory under AMDAL): public notice via mass media (Suara Merdeka, Tribun Jateng, RSDK website, and social media channels); physical posting at RSDK gates and surrounding kelurahan kantor; formal written notification to BPK Jawa Tengah and Disbudpar Kota Semarang; English-language announcement on the AIIB project page.
- First AMDAL Public Consultation, KA-ANDAL stage: structured feedback session on the assessment scope, key issues, methodological assumptions, and the Living Document approach; documented minutes; integration with AIIB ESS1 guidance.
- Pre-construction consultation Round 1 (May–June 2026, M1): FGDs with vulnerable groups (elderly, women, PWD, caregivers, low-income BPJS-dependent patient cohorts); workforce communication sessions; Kelurahan Randusari community meeting; BPK Jawa Tengahconsultation; Universitas Diponegoro consultation.
- Pre-construction consultation Round 2 (September 2026, M5): updated baseline survey results shared with affected stakeholders; construction-phase mitigation measures reviewed with residents; GRM procedures re-communicated.
- Construction phase engagement (M6 onwards): periodic community meetings (monthly during high-impact phases); GRM register reviews; structured monthly progress communication via RSDK website; site liaison with Kelurahan Randusari.
- Operational phase consultation Round 3 (November 2026, M7): formal Round 3 consultation as part of Sidang Pleno KPA; institutional patient-feedback systems activated; integrated GRM operational; routine community liaison established.

Table C-3 Stakeholder engagement and consultation program schedule

Activity Type	Engagement Activity	Phase	Primary Audience	Output / Record	Timing
AMDAL, Mandatory	Initiator Announcement (Pengumuman Pemrakarsa)	Preparation	Broader public; mass media; kelurahan kantor; BPK Jawa Tengah and; Disbudpar Kota Semarang; AIIB	Public notice in Suara Merdeka and Tribun Jateng; RSDK website and social media; physical posting at RSDK gates and kelurahan; formal written notification to BPK Jawa Tengah and Disbudpar Kota Semarang; English-language announcement on AIIB project page	10 working days (mandatory); before KA-ANDAL stage
AMDAL, Mandatory	1st AMDAL Public Consultation, KA-ANDAL stage	Preparation	Komisi Penilai AMDAL; DLH Provinsi; all directly affected stakeholders	Meeting minutes; Q&A log; scope and methodology documented; AIIB ESS1 guidance integrated	Before KA-ANDAL submission; minimum 30 days after Initiator Announcement

Pre-construction	Regulatory notification and ESIA / SEP disclosure	Preparation	AIIB; Dinas LH; Kemenkes; BPK Jawa Tengah	Disclosure acknowledgement letters; AIIB portal upload; RSDK website update	≥30 days before principal consultation events
Pre-construction	Asbestos & Heritage pre-construction surveys	Preparation	BPK Jawa Tengah; heritage conservation specialist; RSDK clinical team; all regulatory authorities	Written survey reports; BPK Jawa Tengah notification letter; heritage HIA submitted	Before demolition permit issued
Pre-construction	Pre-construction consultation Round 1, FGDs and community sosialisasi	Preparation	Women; elderly; PWD; caregivers; low-income BPJS patients; residents of Kelurahan Randusari and PKL; Dinas Kebudayaan dan Pariwisata Kota Semarang; BPK Jawa Tengah; Universitas Diponegoro	FGD minutes (gender-disaggregated); community sosialisasi minutes; attendance registers; Q&A log	May–June 2026 (M1); ≥30 days before mobilization
Pre-construction	Staff town hall, RSDK clinical and administrative	Preparation	All RSDK staff	Meeting minutes; ICRA briefing record	≥14 days before mobilization
Pre-construction	Pre-construction consultation Round 2, baseline and mitigation review	Preparation	Affected residents; PKL vendors; RT/RW leaders; Kelurahan government	Updated baseline summary shared; mitigation review documented; GRM re-communicated	September 2026 (M5)
Pre-construction	Worker induction and Code of Conduct signing	Preparation	All construction workers	Signed CoC records; induction register	Day 1 of each worker's engagement
During construction	Community Liaison Committee (CLC) monthly meeting	Construction	RT/RW leaders; PKL reps; vendor reps; RSDK E&S Officer	Meeting minutes posted at Kelurahan noticeboard	Monthly throughout construction
During construction	Construction–hospital interface daily briefing	Construction	Site Manager; RSDK clinical liaison; IPC officer	Daily log; action items tracked	Every working day
During construction	ESMP compliance report to AIIB	Construction	AIIB; Dinas LH	Monthly progress report with GRM log	Monthly
During construction	GRM log review and response	Construction	All affected stakeholders	GRM register updated; response letters issued	Acknowledgement: ≤5 days; resolution: ≤30 days
During construction	AIIB supervision mission	Construction	AIIB; RSDK project management; E&S team	Aide-mémoire; agreed action plan	Every 6 months

During construction	Heritage monitoring, pre/post works structural survey	Construction	BPK Jawa Tengah; heritage conservation specialist	Structural condition reports; BPK Jawa Tengah notification before works in heritage buffer	Before and after each construction sub-phase
During construction	Vendor livelihood monitoring	Construction	PKL and vendors	Monthly income monitoring register	Monthly
Operation, AMDAL	Operational phase consultation Round 3, Sidang Pleno KPA	Operation	Komisi Penilai AMDAL; DLH Provinsi; AIIB; all affected stakeholders	Formal ANDAL consultation minutes; KPA plenary approval; AIIB disclosure update	November 2026 (M7)
Operation	SEP close-out report	Operation	AIIB; community; RSDK management	Final stakeholder engagement report; lessons learned	At project practical completion
Operation	Ongoing community and patient liaison	Operation	Kelurahan Randusari; Dinas LH; patient representative mechanism	Annual community satisfaction survey; patient feedback reports	Annually, Year 1–3 post-completion

Note: Activities shown are minimum requirements. The E&S Social Safeguards Officer may add activities in response to emerging issues identified through the GRM or monthly monitoring. M = months from project mobilization.

E. Vulnerable Groups Engagement Protocol

Vulnerable groups are stakeholders who, because of their particular circumstances, may be more adversely affected by the project, face barriers to participation, or be underrepresented in standard consultation processes. Consistent with AIIB ESS1 and the Vulnerable Groups Action Plan (VGAP) annexed to the CESMP, this section sets out enhanced engagement protocols for each vulnerable sub-group identified in Section 9.2.

Table C-4 Engagement Planning Table and Social Protection Indicators

Vulnerable Sub-group	Specific Barriers and Risks	Engagement Adaptations	Monitoring Indicator
Women and female-headed households	Mobility constraints; care-work time burden; SEA/SH risk in mixed-gender settings; lower digital literacy	Women-only FGD sessions with female facilitator; early-morning or weekend slots; GBV/SEA focal person reachable confidentially; SI PETIK channel communicated	% women in FGD attendance; % GRM cases with female complainants; gender-disaggregated data reported quarterly
Elderly persons	Mobility limitations; hearing or vision impairment; Bahasa Jawa as primary language; lower digital comfort	Home visits for mobility-impaired individuals; large-print and audio materials; Bahasa Jawa facilitation; walk-in GRM at accessible location	Home-visit records; large-print materials distributed; Bahasa Jawa interpreter deployed per event
Persons with disabilities (PWD)	Physical access barriers to venues; communication barriers (visual, hearing,	Sign-language interpretation at all public events;	# events with sign-language interpretation; % PWD in participation

	cognitive); exclusion from standard formats	accessible venue selection; large-print and audio; accompanied GRM submission	records vs. registered PWD population (45 individuals)
Children and school pupils	Not direct consultation participants; affected by traffic and noise; parents/guardians are primary engagement point	Engage parent/guardian associations and school principals; school-hour no-heavy-vehicle schedule communicated before each school term	School principal consultation records; zero heavy-vehicle incidents during school hours
Low-income BPJS-dependent patients; ICU/ICCU/oncology cohorts	Cannot attend community meetings; may be in critical condition; caregivers are the primary intermediary	Caregiver-specific intake via RSDK Customer Service Unit; HOCP review meetings with patient representative; ward-level briefings	Caregiver complaint register; HOCP review attendance; service continuity incidents logged
PKL and female-headed vendor households	Livelihood dependency on project corridor; legal vulnerability without formal licence; risk of exclusion due to informal status	Individual face-to-face consultation per vendor; livelihood census before works; dedicated GRM channel; LBH referral available	100% vendor census coverage before works; monthly income monitoring; GRM cases by vendor category

F. Meaningful Consultation and Feedback Loop

Meaningful consultation requires more than information delivery. It requires a structured process for recording stakeholder views, demonstrating how those views have influenced project decisions, and disclosing that outcome back to the stakeholders who participated. This section describes the feedback loop that underpins all consultation activities in Section 9.5.

a. What We Heard / What We Did Register

At every formal consultation event the Social Safeguards Officer maintains a What We Heard register capturing: the concern or suggestion raised; the stakeholder sub-group who raised it; and, within 30 days, the documented response (What We Did) explaining what change was made to project design or mitigation, or, if no change was made, the reason why. This register is publicly disclosed on the RSDK website and at the Project Liaison Office.

b. Consultation Closure Communication

Within 30 days of each formal consultation round the E&S team produces a two-page Consultation Summary in Bahasa Indonesia that: (i) summarizes the main issues raised; (ii) describes the project response; (iii) confirms where views have altered design or mitigation; and (iv) states where further consultation will occur. The Summary is distributed via the same channel used to notify the event.

c. Iterative Baseline Updates

If consultation reveals new or materially different baseline conditions, for example, a newly identified vulnerable household or an unrecorded informal trading location, the relevant sections of Chapters 5 and 6 and the Impact Matrix are updated within 30 days and disclosed on the AIIB project portal.

G. External Communications Protocol

A structured external communications protocol prevents misinformation, ensures consistent project messaging, and protects affected stakeholders from reputational harm.

a. Designated Spokespeople

All official statements to media, NGOs, or the broader public are made exclusively by the designated project spokesperson: the RSDK Director of Planning and Development (or delegate) for technical and clinical matters, and the PIU Communications Officer for project-progress matters.

Construction workers and site supervisors are instructed at induction not to speak to media on behalf of the project.

b. Media Monitoring and Response

The PIU Communications Officer monitors print, broadcast, and social media coverage weekly. Any adverse coverage, allegations, complaints, or misinformation, is logged and a factual response prepared within 5 working days.

Social media content raising a legitimate project concern (dust, noise, access) is treated as an informal GRM intake and routed to the GRM Manager within 24 hours.

c. Material Change Notification

If the project scope, design, phasing, or assessed impacts change materially from what was disclosed at any prior consultation event, affected stakeholders are re-consulted before the change is implemented. Material change means any change that: (i) introduces a new significant impact not previously assessed; (ii) removes a previously committed mitigation measure; or (iii) alters the project footprint, timeline, or operational profile in a way that affects the interests of a High Priority stakeholder group. Re-consultation uses the same or more appropriate format and generates a new What We Heard entry.

H. Integration with Existing RSDK Engagement Mechanisms

RSDK operates a suite of institutional engagement and feedback mechanisms that pre-date this project. The project SEP is designed to complement, not duplicate, these mechanisms. The table below maps the relationship between each existing mechanism and the project GRM/SEP.

Table C-5 Integration Matrix of Existing Institutional Mechanisms with Project SEP/GRM

Existing Mechanism	Institutional Scope	Interface with Project SEP / GRM	Responsible for Integration

Customer Service Unit and IKM patient satisfaction survey	Patient and family feedback on clinical and facility services; institutional annual reporting	Project-related patient grievances received here are tagged and forwarded to the PIU GRM Manager within 24 hours. IKM data disaggregated for construction-phase impacts (noise, dust, access) is included in quarterly SEP monitoring reports.	RSDK Customer Service Unit / PIU GRM Manager
SI PETIK ethics-violation platform (https://petik.rskariadi.id/)	Suspected professional ethics violations: intimidation, harassment, bullying, sexual violence	SI PETIK is the primary channel for ethics-related project concerns (e.g. misconduct by construction workers towards patients or staff). Cases that also constitute project grievances are notified to the PIU GRM Manager.	RSDK Komite Etik / PIU GRM Manager
Accreditation-driven patient rights mechanism (Permenkes 4/2018 / KARS / JCI)	Patient right to information, complaint, and second opinion	Project disclosures (construction schedule, IPC measures, GRM access) integrated into the patient-rights information package distributed at admission.	RSDK Patient Rights Officer / PIU
RSDK PNS/P3K staff union and HR grievance mechanism	Labor relations for RSDK government employees; HR-mediated dispute resolution	Project worker GRM (Chapter 10) covers contractor workers. RSDK staff project-related grievances (OHS, IPC, working conditions) can be routed through either channel; the PIU GRM Manager is notified of project-related cases.	RSDK HR / PIU GRM Manager

I. SEP Monitoring, Adaptive Management, and Version Control

a. SEP Performance Indicators

The following indicators assess whether the SEP commitments in this chapter are being met. They are reported in the monthly ESMP report (**Error! Reference source not found.**):

Table C-6 SEP Implementation Monitoring and Evaluation Matrix

Indicator	Measurement Method	Target	Frequency
Consultation events conducted vs. planned (Table 9.3)	Event log by Social Safeguards Officer	≥100% mandatory; ≥90% non-mandatory	Monthly
Proportion of consultations with gender-disaggregated attendance records	Attendance registers with gender column	100%	Per event
What We Heard items with documented What We Did response within 30 days	What We Heard register reviewed by PIU GRM Manager	≥90%	Monthly

Disclosure documents published within committed timelines (Section 9.5)	Disclosure log (AIIB portal upload timestamps; RSDK website dates)	100% for mandatory documents	Per milestone
Stakeholder satisfaction with consultation process	Short feedback form at end of each formal consultation event	≥80% positive rating	Per consultation round
Vulnerable-group representation (women, elderly, PWD, PKL) relative to affected-population profile	Disaggregated attendance data vs. VGAP baseline	No group structurally underrepresented	Per event; quarterly summary

b. Adaptive Management Triggers

The SEP is revised when any of the following triggers is met:

- A new stakeholder group or impact is identified that is not covered by the current register;
- A project scope or design change meets the material change definition in Section 9.8.3;
- A SEP performance indicator falls below target for two consecutive reporting periods;
- An escalated GRM complaint reveals a systemic engagement failure;
- An AIIB supervision identifies a compliance gap.
- SEP revisions are submitted to the PIU Director for approval and, where material, to AIIB for information before they take effect.

c. Document Version History

Table C-7 Document Version History

Version	Date	Summary of Changes	Approved by
V0.1 (Draft)	[Draft date]	Initial draft: Sections 9.1–9.4 and stakeholder register.	Third Party Consultant Team Lead
V0.2	[Current]	Added Sections 9.5 (Information Disclosure), 9.6 (Vulnerable Groups Protocol), 9.7 (Meaningful Consultation and Feedback Loop), 9.8 (External Communications Protocol), 9.9 (Integration with RSDK Mechanisms), and 9.10 (SEP Monitoring, Adaptive Management, and Version Control). Regulatory framework expanded to include PermenLHK P.4/2021, UU 25/2009, UU 17/2023, IFC PS1/PS2, and Permen PAN-RB 24/2014. Cross-references throughout corrected (GRM is Chapter 10, not Section 10.6). Chapter introduction updated to reference Sections 9.5 and 9.7.	Third Party Consultant Team Lead / PIU Director
V1.0	[Pre-construction]	Final version incorporating pre-construction consultation Round 1 outcome, updated baseline, and AIIB pre-disclosure review.	PIU Director / AIIB

Note. *Yellow highlights mark content added or substantially revised in version V0.2. Six new sections were added (9.5 through 9.10); the regulatory framework, introduction, and cross-references were updated; and Table 9.2 was revised to include the SI PETIK platform, the What We Heard mechanism, and worker voice surveys*

J. Information Disclosure

AIIB ESS10 §20–24 requires that project information is disclosed in a manner and form that is meaningful, accessible, timely, and understandable to affected stakeholders. This section sets out the specific disclosure commitments for the GMS-DC & SoE project.

a. Documents to be Disclosed

- The following documents are disclosed to the public before the first principal consultation event and, where applicable, before construction begins:

Table C-8 Document to be Disclosed

Document	Disclosure Channels	Language	Timing
Environmental and Social Impact Assessment (ESIA) with non-technical summary	AIIB project portal; RSDK institutional website; hardcopy at Project Liaison Office	Bahasa Indonesia + English executive summary	≥30 days before first AMDAL public consultation
Stakeholder Engagement Plan (SEP)	AIIB portal; RSDK website; Project Liaison Office	Bahasa Indonesia + English	≥30 days before first AMDAL public consultation
Environmental and Social Management Plan (ESMP / CESMP)	AIIB portal; RSDK website; Project Liaison Office	Bahasa Indonesia + English	Before mobilization; updated versions within 30 days of change
Labor Management Plan (LMP) and Worker Code of Conduct	Posted at site welfare facilities; Project Liaison Office; AIIB portal	Bahasa Indonesia	Before worker induction begins
Heritage Impact Assessment (HIA)	BPK Jawa Tengah; AIIB portal; Project Liaison Office	Bahasa Indonesia + English	Before demolition permit issued
GRM procedures summary card (Chapter 10)	Printed posters at RSDK gates, Kelurahan kantor, site welfare facilities; RSDK website	Bahasa Indonesia; Bahasa Jawa adaptation	Before mobilization; refreshed quarterly
Monthly ESMP monitoring and GRM reports (aggregated and anonymised)	AIIB project portal; RSDK website (summary version)	Bahasa Indonesia + English	Monthly, within 15 days of end of reporting period

b. Document Accessibility Standards

- Non-technical summary (NTS): a plain-language summary of the ESIA prepared in Bahasa Indonesia and available in large-print format; does not require literacy in the full technical document to be useful.
- Language: all documents provided to community stakeholders are in Bahasa Indonesia. Bahasa Jawa oral summaries at sosialisasi events in Kelurahan Randusari. Technical documents for AIIB are in English.
- Format: documents are available in digital (PDF) and printed formats. Printed copies held at the Project Liaison Office and RSDK Customer Service Unit at no charge.
- PWD accessibility: NTS in large print; audio reading on request; sign-language interpretation at all public consultation events.

Disclosure acknowledgement: receipt of key disclosure packages (ESIA, SEP) by regulatory counterparties (AIIB, DLH, BPK Jawa Tengah) is confirmed by signed acknowledgement letters filed in the project E&S registry.

Annex D – Framework for Preparation of the Construction Environmental and Social Management Plan (CESMP)

1. INTRODUCTION AND PROJECT DESCRIPTION

1.1 Purpose and Scope

Guidance: State the purpose of the C-ESMP, confirm it applies to all construction activities under the Contractor's scope of work, and identify the contract package it covers. Reference the approved ESIA-ESMP document by title, date, and revision number.

1.2 Project Description

Guidance: Summarize the scope of construction works, including the principal building components, key quantities (gross floor area, number of storeys, piling type and depth), and the anticipated construction program and phasing. Include a site layout plan showing the construction footprint, temporary facilities, access routes, and the relationship to active hospital buildings.

1.3 Contractor's Organisation and Key Personnel

Guidance: Provide an organizational chart that identifies every person with environmental, social, health, safety, or heritage responsibilities. As a minimum, the chart must name the following roles:

- Site Manager (overall C-ESMP accountability)
- HSE Manager and certified K3 Officer (PP 50/2012 SMK3 requirement)
- Environmental Officer (dust, noise, vibration, waste, water quality)
- Social and Community Liaison Officer
- GBV/SEAH Focal Person (must be female)
- Heritage Works Coordinator (liaison with CH Specialist and BPK Jawa Tengah)
- Traffic Management Coordinator
- Emergency Response Coordinator

Include CVs of key personnel as an annex. State minimum qualifications and experience requirements for each role.

2. LEGAL AND REGULATORY FRAMEWORK

Guidance: List every Indonesian law, government regulation, ministerial regulation, and local regulation that applies to the construction works, together with the applicable AIIB Environmental and Social Standards (ESS). As a minimum, cover:

Topic	Key Regulations and Standards
Environmental protection	UU 32/2009; PP 22/2021; Kep Gub Jateng 8/2001; AIIB ESS1, ESS3

Noise and vibration	KepmenLH 48/1996; KepmenLH 49/1996; KepmenLH 51/1996; DIN 4150-3; ISO 4866
Waste and B3 materials	PP 22/2021; PermenLHK 6/2021; Asbestos management per IFC EHS Guidelines
Occupational health and safety	UU 13/2003 jo. UU 6/2023; PP 50/2012 (SMK3); AIIB ESS2
Cultural heritage	UU 11/2010; PP 1/2022; Permen PUPR 19/2021; AIIB ESS1 (cultural heritage)
Traffic management	PermenHub 17/2021 (Andalalin)
GBV/SEAH and labor	UU 12/2022; UU 13/2003 jo. UU 6/2023; AIIB ESS2
Stakeholder engagement	AIIB ESS10; project GRM procedures (ESIA Chapter 10)
Building permits	PKKPR; PBG per PP 16/2021

Where Indonesian standards and AIIB requirements diverge, the more stringent standard applies.

3. ENVIRONMENTAL MANAGEMENT PLANS

This chapter must contain a separate management plan for each environmental parameter, each with the same internal structure: objective, applicable standards, management measures, monitoring method and frequency, trigger and action levels, responsible person, and records to be maintained.

3.1 Air Quality and Dust Management

Guidance: Describe site-specific dust suppression measures (water spraying, wheel-wash, sealed haul roads, hoarding). Specify the location and type of PM_{10} boundary monitors. State the trigger level (80% of Kep Gub Jateng 8/2001 / PP 22/2021 limits) and the stop-work level. Describe ICRA hoarding requirements for the interface between the construction zone and active clinical buildings. Include measures for HEPA filtration of fresh-air intakes on downwind clinical buildings. Specify the engine-emission standard required for all equipment (minimum Euro III) and the engine-idling policy.

3.2 Noise Management

Guidance: Define permitted working hours (e.g. 08:00–17:00 Mon–Sat for high-noise works). Specify the location and type of continuous noise monitors (SLM Class 1 per IEC 61672). State trigger levels consistent with KepmenLH 48/1996. Describe acoustic barrier specifications (minimum SRI 25 dB) and their placement relative to active wards and ICU. Include the 48-hour advance notification procedure to ward managers before high-noise activities.

3.3 Vibration Management

Guidance: Describe the vibration monitoring system (triaxial geophones, PPV thresholds per DIN 4150-3 with heritage-specific stricter levels per ISO 4866). State the locations of monitoring points relative to heritage structures and sensitive medical equipment (CT, MRI, Cathlab). Define the pause threshold and the stop-work threshold. Include the procedure for structural-response assessment when thresholds are approached.

3.4 Water Quality and Stormwater Management

Guidance: Describe erosion and sediment control measures, stormwater discharge arrangements, and dewatering procedures. State the monitoring locations (perimeter discharge points, Kali Semarang upstream/downstream). Specify the sampling frequency (weekly grab sampling, bi-weekly surface water) and the compliance standard (PP 22/2021 Class II).

3.5 Construction Waste Management

Guidance: Describe the waste segregation system (non-hazardous, hazardous/B3, recyclable). Identify the licensed B3 waste transporter (currently PT PRIA) and the manifested transport arrangement. Describe on-site temporary storage areas and housekeeping procedures. Include the monthly manifest reconciliation procedure.

3.6 Hazardous Materials and Asbestos Management

Guidance: If demolition works are within scope, describe the pre-demolition asbestos survey procedure, handling and disposal protocols per IFC EHS Guidelines, and worker protection measures. Describe the management of other hazardous substances used during construction (fuels, solvents, concrete admixtures). Include the spill-response procedure and spill-kit locations.

3.7 Demolition Management Plan

Guidance: The GMS-DC & SoE project includes the sequential demolition of two multi-storey reinforced-concrete buildings, the IGD building and Gedung Elang, following completion and commissioning of the GMS-DC & SoE building. Because demolition occurs within a fully operational hospital complex, adjacent to occupied clinical wards and nationally registered heritage structures, the Contractor must prepare a standalone Demolition Management Plan for each building, submitted for Independent Engineer and PIU approval before demolition works commence. As a minimum, each plan must address:

- Demolition methodology selection and justification (top-down manual, mechanical, or hybrid), with a comparative risk assessment demonstrating that the selected method minimises vibration, dust, and noise impacts on adjacent occupied buildings and heritage structures. Impact demolition methods (wrecking ball, uncontrolled explosive demolition) are prohibited within the RSDK complex.
- Pre-demolition structural survey confirming the structural condition, identifying any post-tensioned or pre-stressed elements, confirming the location of all utility connections (water, electricity, medical gases, data), and verifying that all utility isolations are completed and certified before any structural dismantling commences.
- Pre-demolition hazardous materials clearance confirmation, written certification from the licensed asbestos abatement contractor (per Section 3.6 and ESIA Annex B) that all identified ACM has been removed and independent clearance air testing has been passed, before any structural demolition commences. No structural demolition shall proceed without this clearance certificate.

- Demolition sequencing and phasing plan, showing the order of element removal, temporary structural support arrangements, and the interface with adjacent occupied buildings. The phasing plan must be reviewed and endorsed by a qualified structural engineer.
- Vibration and noise control measures specific to demolition, including: PPV monitoring at heritage structures with alert threshold at 2 mm/s and stop-work threshold at 5 mm/s per DIN 4150-3; restricted demolition hours (08:00–17:00 Mon–Sat); coordination with RSDK ward managers before each demolition phase; and real-time noise monitoring at the nearest occupied ward façade.
- Dust suppression measures specific to demolition, including: continuous water misting at the point of breaking; solid hoarding enclosure around the demolition zone; HEPA filtration on clinical building air intakes downwind of the demolition zone; and suspension of demolition activities when wind speed exceeds 5 m/s and is directed toward occupied clinical buildings.
- Demolition waste management plan, including: estimated waste volumes by category (concrete, steel, timber, mixed inert), segregation procedures, on-site temporary storage areas, licensed disposal routes, and daily site-clearing regime. Demolition debris must not be stockpiled above the height of the perimeter hoarding.
- Structural exclusion zone around the demolition perimeter (minimum equal to the height of the structure being demolished, or as determined by the structural engineer's risk assessment, whichever is greater). The exclusion zone must be physically barricaded, signed, and enforced throughout the demolition period.
- Coordination with the internal canteen tenant relocation: demolition of the IGD and Elang buildings shall not commence until written confirmation is obtained from the PIU that both canteen operators have been successfully relocated to permanent GMS-DC trading spaces and that the ESS2 Avoidance conditions (no trading gap, equivalent or improved terms) have been verified.

4. CULTURAL HERITAGE MANAGEMENT

RSDK is a nationally registered heritage property (SK Mendikbud 370/M/2017). This chapter must demonstrate that the Contractor understands the heritage constraints and has integrated them into all work methods.

4.1 Heritage-Adjacent Works Protocol

Guidance: Describe the method statements for all works within the heritage buffer zone: minimum 2 m stand-off from heritage fabric, non-impact foundation methods within the exclusion zone, dust suppression and façade protection for heritage buildings, vibration monitoring with heritage-specific thresholds. Confirm that method statements will be submitted to BPK Jawa Tengah for approval before work commences.

4.2 Chance Find Procedure

Guidance: Confirm adoption of the project Chance Find Procedure (ESIA Annex). Describe how the CFP will be communicated to all excavation supervisors and workers. State that no below-grade works may commence until all relevant personnel have completed CFP induction. Include the bunker exclusion zone in the site layout plan.

4.3 Archaeological Watching Brief

Guidance: Describe the arrangements for the archaeological watching brief during initial bulk excavation, including coordination with the CH Specialist appointed by the PIU.

5. OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT

5.1 SMK3 System

Guidance: Describe the Contractor's SMK3 system per PP 50/2012. Attach the SMK3 policy statement signed by the Site Manager. Name the certified K3 Officer. Describe the safety committee structure, meeting frequency (monthly), and reporting line.

5.2 Risk Assessment and Safe Work Methods

Guidance: Present a task-based risk assessment covering at minimum: working at heights, confined spaces, lifting operations, demolition, excavation, electrical and mechanical works, hot works, and work near live clinical areas. For each high-risk task, attach a safe work method statement (SWMS) or job safety analysis (JSA).

5.3 Personal Protective Equipment

Guidance: List the PPE requirements by work activity. Describe the procurement, issuance, inspection, and replacement regime. Confirm that PPE will be provided at no cost to workers.

5.4 Incident Investigation and Reporting

Guidance: Describe the incident classification system, investigation procedure, root-cause analysis method, and reporting timelines. Confirm that any lost-time incident triggers a 24-hour root-cause notification to the Independent Engineer and PIU. Confirm that any fatality or serious injury triggers AIIB immediate notification per the ESF incident protocol.

5.5 Construction Infection Risk Assessment (ICRA)

Guidance: Because the hospital remains operational during construction, describe how each work package will be subjected to ICRA review and clearance before execution. Describe the physical separation measures (solid hoarding, negative air pressure, sealed penetrations, conditioned pedestrian gantries) between construction zones and active clinical areas.

Because hospital-acquired infection (HAI) risk from construction dust and HVAC disruption is designated a PRIORITY monitoring item in the ESIA (entry B.2.1, Critical pre-mitigation significance), the Contractor must integrate the following three-tier IPC framework into every ICRA submission:

Tier 1, Engineering Controls

ICRA Class III/IV hoarding between the construction zone and clinical areas; maintenance of HVAC negative/positive pressure differentials in sterile zones (operating theatres, ICU, ICCU, NICU, PICU); HEPA filtration on fresh-air intakes of all clinical buildings downwind of active works; and continuous particle-count monitoring at the sterile-zone boundary.

Tier 2, Administrative Controls

Weekly coordination meetings between the Contractor's Environmental Officer, the RSDK IPC Team, and the ICRA Team to review dust-monitoring data and HVAC integrity; monthly HAI surveillance data review by the RSDK Komite PPI with trend analysis against the pre-construction baseline; and a month-on-month HAI incidence alert threshold of >10% above baseline triggering an immediate review of ICRA controls.

Tier 3, Escalation Decision Tree

- Yellow Alert (HAI incidence >40% above baseline for any single ward adjacent to construction): immediate joint inspection by the Contractor, RSDK IPC Team, and Independent Engineer; identification of causal pathway; implementation of enhanced controls within 48 hours; notification to PIU.
- Red Alert (HAI incidence >60% above baseline, or any single confirmed case of invasive aspergillosis attributable to construction dust): stop-work on the implicated work package within 1 hour; immediate notification to the RSDK Director and AIIB safeguards team; root-cause investigation by an independent IPC specialist; work may not resume until the Independent Engineer and RSDK Komite PPI have jointly certified that the causal pathway is eliminated.

HAI surveillance findings must be reported monthly to the RSDK Director and the AIIB safeguards team throughout the construction period, as required by the PRIORITY designation of this item.

5.6 Working at Heights and Scaffolding Erection, Installation, and Inspection

Guidance: Working at heights is the single largest cause of fatal and serious injuries on hospital construction sites globally. Because the GMS-DC & SoE structure rises immediately adjacent to occupied clinical buildings and high-traffic patient circulation areas, the Contractor must demonstrate a rigorous, standards-based regime for all work at height and all scaffolding operations. The following safety principles and requirements apply to every work package that involves any task where a person could fall 2 m or more, or where scaffolding, mobile elevated work platforms (MEWPs), or temporary access structures are used.

General Safety Principles

- Apply the hierarchy of controls in strict sequence: (i) eliminate the need to work at height through design or prefabrication at ground level wherever feasible; (ii) where elimination is not feasible, prevent falls through permanent or temporary edge protection, scaffolding, or MEWPs; (iii) where fall prevention is not fully achievable, arrest falls through personal fall-arrest systems (harnesses, lanyards, anchor points) compliant with SNI ISO 10333 or equivalent.

- No work at height shall commence without a current, task-specific Permit to Work (PTW) authorised by the HSE Manager. The PTW must identify the specific hazards, the control measures in place, the rescue plan, and the duration of validity. PTWs are not transferable between tasks or locations.
- All workers performing tasks at height must hold a valid competency certificate for the type of work (scaffolding, MEWP operation, harness use) issued by a training body recognised under PP 50/2012 or equivalent international certification.
- A rescue plan specific to each at-height work location must be prepared before work commences. The plan must identify the rescue method, the trained rescue personnel on site, the rescue equipment and its location, and the maximum response time (not exceeding 10 minutes from fall occurrence to rescue initiation). Rescue drills must be conducted before the first at-height task and quarterly thereafter.

Standard Operating Procedures and Protocols

The Contractor must prepare and submit for Independent Engineer approval the following SOPs before any at-height work or scaffolding activity commences on site:

- SOP for Working at Heights, covering PTW procedures, hazard identification, pre-task briefing, fall-protection equipment selection and inspection, exclusion zone establishment below elevated works, adverse weather stand-down criteria (wind speed exceeding 40 km/h or during rain, lightning, or poor visibility), and end-of-shift securing procedures.
- SOP for Scaffolding Erection, Modification, and Dismantling, covering sequence of erection, component inspection before assembly, base preparation and levelling, bracing and tie-in requirements, loading limitations, tagging and handover procedures, and the prohibition of any use of incomplete scaffolds.
- SOP for Scaffolding Inspection, covering the inspection regime (after initial erection, after any modification, after any event that may have affected integrity, and at intervals not exceeding 7 calendar days), the standardised inspection checklist, the tag system (Green = fit for use; Yellow = restricted use with stated conditions; Red = do not use), and the documentation and record-retention requirements.
- SOP for Mobile Elevated Work Platforms (MEWPs), covering operator certification, pre-use inspection, ground-condition assessment, outrigger deployment, exclusion zones, and simultaneous operations restrictions.

All SOPs must reference the applicable Indonesian standards (PP 50/2012, Permenaker 9/2016 on working at heights) and international good practice (IFC EHS General Guidelines Section 2.4, ISO 12480 for lifting operations near scaffolds). SOPs must be reviewed and re-approved at six-monthly intervals or whenever the scope of at-height works materially changes.

Scaffolding, Design, Erection, and Use

- All scaffolding must be designed, erected, modified, and dismantled under the direct supervision of a certified Scaffolding Supervisor holding a valid competency certificate recognised under PP 50/2012 or equivalent (e.g. CISRS, equivalent ASEAN MRA certification).
- Scaffolding design must be documented in a scaffold design drawing specifying: foundation and base-plate requirements, standard and ledger spacing, brace locations, tie-in points and intervals (maximum 4 m vertically and 6 m horizontally), working platform widths (minimum 600 mm for access, minimum 800 mm for working platforms), guardrail heights (minimum 1,100 mm with mid-rail and toe-board), and maximum permissible loading.
- All scaffold components must be inspected for damage, corrosion, and deformation before assembly. Defective components must be rejected and removed from site. No mixing of scaffold systems from different manufacturers is permitted unless compatibility is confirmed by a qualified structural engineer.
- Upon completion of erection or any modification, the Scaffolding Supervisor must conduct a formal handover inspection, complete the standardised inspection checklist, and attach the appropriate colour-coded scaffold tag (Green/Yellow/Red) at every access point.
- Where scaffolding is erected adjacent to or overhanging hospital circulation areas, occupied clinical zones, or heritage structures, the following additional measures apply: (i) debris netting on all external faces from the first lift upward; (ii) a solid fan scaffold or catch platform at the level immediately above any public or patient circulation route; (iii) coordination with the RSDK Clinical Liaison Officer before erection; and (iv) daily inspection of debris-netting and catch-platform integrity.

Personal Fall-Protection Equipment

- Full-body harnesses, shock-absorbing lanyards, self-retracting lifelines, and anchor devices must comply with SNI ISO 10333 (or EN 361/EN 355/EN 360 equivalent). All equipment must be inspected by the user before each use and by a competent person at intervals not exceeding 6 months.
- Anchor points must be rated to withstand a minimum static load of 15 kN per person attached. Anchor point locations must be identified in the method statement and physically marked on site.
- Equipment that has arrested a fall must be immediately withdrawn from service, quarantined, and inspected by a competent person before any decision to return to service or condemn.

6. HOSPITAL OPERATIONAL CONTINUITY INTERFACE

Guidance: Describe the Contractor's arrangements for maintaining hospital operations during construction. As a minimum, address:

- The daily construction–hospital interface meeting with RSDK Clinical Liaison Officer.

- The permanently marked emergency vehicle access corridor including daily inspection and documentation.
- The 72-hour advance notice procedure before any planned utility shutdown (water, electricity, medical gases).
- The prohibition on simultaneous shutdown of redundant utility systems.
- The procedure for coordinating with RSDK when construction noise, dust, or access disruption may affect clinical areas.
- Temporary wayfinding signage for patients, visitors, and staff during phased access changes.

6.2 Public Safety, Hospital Visitors, Outpatients, and Staff During Construction

Guidance: Because RSDK remains a fully operational tertiary hospital throughout the construction period, receiving approximately 2,100 outpatients and visitors daily alongside 3,000 staff, the Contractor must demonstrate that all construction activities are physically and operationally segregated from areas accessed by hospital users. The public safety measures described in this section apply continuously from mobilisation to practical completion.

Physical Segregation and Barricading

- Establish and maintain a continuous physical barrier system, solid hoarding (minimum 2.4 m height), steel mesh fencing, or concrete jersey barriers as appropriate to the hazard, along the full perimeter of every active construction zone.
- Where construction zones are immediately adjacent to patient, visitor, or staff circulation routes, install covered pedestrian gantries with overhead protection (minimum 50 mm timber decking or equivalent), handrails, non-slip surfacing, and adequate lighting (minimum 50 lux at ground level).
- Prohibit storage of materials, equipment, or debris outside the barricaded construction zone. Any temporary encroachment into hospital circulation areas requires prior written approval from the RSDK Clinical Liaison Officer.
- Maintain a minimum 3 m clear separation between any active construction work face and any accessible hospital circulation route, unless additional engineering controls (enclosed scaffold, netting, catch platforms) are in place and approved by the Independent Engineer.

Signage and Wayfinding

- Install bilingual (Bahasa Indonesia / English) safety signage at all points where hospital users may approach the construction zone perimeter. Signage must include: construction zone boundary warning, prohibited entry, PPE requirement, GRM contact number, and the name and phone number of the Contractor's Community Liaison Officer.

- Provide temporary wayfinding signage along all diverted patient, visitor, and staff routes. Wayfinding signs must be installed at least 48 hours before any route change takes effect and must be legible to persons with visual impairment (minimum letter height 50 mm, high-contrast colour scheme).
- Display a site-perimeter information board at each public-facing boundary showing: the project name, simplified site plan indicating restricted areas and safe pedestrian routes, GRM contact details, and the schedule of upcoming high-impact activities.

Traffic Marshals and Pedestrian Safety

- Deploy trained traffic marshals at every vehicle entry and exit point serving the construction zone during all periods of construction vehicle movement. Traffic marshals must hold a valid flagman certification or equivalent, wear high-visibility clothing, and carry stop/go signage.
- No construction vehicle movement shall occur within or across hospital circulation areas without a traffic marshal physically controlling the manoeuvre.
- Establish and enforce a maximum construction vehicle speed limit of 10 km/h within the RSDK compound.
- Separate pedestrian and construction vehicle routes entirely wherever feasible. Where shared use is unavoidable, install physical separation (jersey barriers, bollards) and ensure a traffic marshal is present at all times during construction vehicle movements.

Overhead Works and Falling-Object Protection

- Establish a demarcated exclusion zone at ground level below all areas where work at height is in progress. The exclusion zone must extend a minimum horizontal distance equal to 1.5 times the height of the working platform, or 6 m, whichever is greater.
- Where the required exclusion zone would obstruct a hospital circulation route, install a solid overhead protection structure (fan scaffold, covered gantry, or equivalent) approved by the Independent Engineer.
- Prohibit all throwing, dropping, or uncontrolled lowering of materials, tools, or debris from any elevated work position. All materials must be raised and lowered by mechanical hoist, gin wheel with a secured bucket, or enclosed debris chute.
- Require all workers at height to use tool lanyards for hand tools and to secure all loose materials against displacement by wind.

Protection of Vulnerable Hospital Users

- Ensure that all diverted pedestrian routes remain accessible to persons with disabilities, patients on stretchers or in wheelchairs, and elderly visitors. Temporary ramps, handrails, and non-slip surfaces must comply with Permen PUPR 14/PRT/M/2017 accessibility requirements.

- Coordinate with RSDK Patient Relations to provide assisted wayfinding for patients and visitors during any major route change affecting outpatient departments, IGD, or the main entrance.
- Schedule high-noise and high-dust activities to avoid peak outpatient arrival and departure periods (07:00–09:00 and 12:00–14:00) wherever operationally feasible.

Monitoring and Inspection

- Conduct a daily pre-shift inspection of all barriers, hoarding, gantries, signage, and lighting. Record results in the daily site inspection log. Any deficiency must be rectified before the work shift commences.
- Include public safety compliance as a standing agenda item in the daily construction–hospital interface meeting (Section 6.1).
- Report any near-miss or incident involving a hospital user (patient, visitor, or staff member) to the Independent Engineer and PIU within 24 hours, and to AIIB within 48 hours if the incident results in injury.

7. TRAFFIC MANAGEMENT PLAN

Guidance: Present the site-specific TMP consistent with the Andalalin approval conditions. As a minimum, address:

- Designated contractor vehicle routes and approved entry/exit points.
- Permitted hours for heavy vehicle movements (avoiding peak hospital traffic periods).
- Construction of parking and lay-down areas, separate from hospital parking.
- Flagman and traffic control arrangements at key intersections (Jl. Dr. Sutomo / Jl. Dr. Kariadi, RSDK main gate).
- Emergency access corridor maintenance and daily inspection log.
- Pedestrian safety measures (covered walkways, barriers, signage).
- Monthly effectiveness review based on structured observations at key intersections.

8. LABOR MANAGEMENT PLAN

8.1 Employment Conditions

Guidance: Describe the employment terms for all categories of workers (direct employees, subcontractor workers, daily laborers). Confirm compliance with UU 13/2003 jo. UU 6/2023 on minimum wages, working hours, overtime, rest periods, and BPJS Ketenagakerjaan enrolment. State the Contractor's commitment to prioritize local hiring from Kelurahan Randusari and surrounding communities.

Sub-contractor Environmental and Social Compliance

The Contractor bears full responsibility for the environmental and social performance of all sub-contractors, regardless of tier. Before engaging any sub-contractor, the Contractor must:

- Include the C-ESMP requirements (including the Worker Code of Conduct, GBV/SEAH obligations, child-labour prohibition, PPE standards, and GRM access) as binding terms in every sub-contract agreement.
- Conduct a pre-engagement due diligence assessment of each sub-contractor's OHS record, labour practices, and environmental management capability. Sub-contractors with a record of serious safety incidents, labour violations, or environmental non-compliance within the preceding three years must not be engaged without prior written approval from the PIU.
- Ensure that all sub-contractor workers complete the site induction (Section 15) and sign the Worker Code of Conduct before their first entry to the site. The Contractor's HSE Manager must verify compliance and maintain a register of all sub-contractor personnel, updated weekly.

Local Hiring Targets

The Contractor must prioritise the recruitment of unskilled and semi-skilled workers from Kelurahan Randusari and adjacent kelurahan within Kecamatan Semarang Selatan. The minimum local-hire target is 40% of the total unskilled and semi-skilled workforce, measured monthly and reported in the monthly E&S report. The Contractor must maintain a local-to-non-local worker ratio register, disaggregated by gender. Where the local-hire share falls below target for two consecutive months, the Contractor must submit a corrective action plan to the PIU within 10 working days.

8.2 Worker Accommodation and Welfare

Guidance: If worker accommodation is provided, describe the hygiene and sanitation standards. If not, state the arrangements for worker transport and confirm that no informal camping will be permitted on site.

8.3 Worker Grievance Mechanism

Guidance: Describe the internal grievance mechanism for workers, including anonymous and confidential reporting channels. Confirm alignment with the project GRM (ESIA Chapter 10). State the service levels for acknowledgement (≤3 working days) and resolution (≤30 working days).

8.4 Prohibition of Child and Forced Labor

Guidance: Confirm the Contractor's zero-tolerance policy on child labor and forced labor. Describe the age-verification procedure for all workers. Confirm that the same standards apply to all subcontractors.

9. GBV/SEAH PREVENTION AND RESPONSE

Guidance: This is not optional. The Contractor must demonstrate a functioning GBV/SEAH prevention and response system before mobilization. Address the following:

- The signed Worker Code of Conduct with explicit SEA/SH prohibition, attached as an annex. Every worker (including subcontractor workers) must sign before starting work.
- The named GBV/SEAH Focal Person (must be female) with contact details and reporting procedure.
- The confidential and survivor-centered reporting channel, separate from the general worker GRM.
- Mandatory SEA/SH awareness sessions at induction and quarterly thereafter for the entire workforce.
- Well-lit and gender-separated sanitary facilities; adequate perimeter lighting.
- Referral pathways to local service providers: PPT Seruni (DP3A), PPA Unit Polrestabes Semarang, LBH APIK.
- Sanction regime: substantiated allegation triggers immediate suspension and investigation; findings reported to PIU and AIIB within 48 hours.

10. COMMUNITY LIAISON AND STAKEHOLDER ENGAGEMENT

Guidance: Describe the Contractor's arrangements for community engagement during construction. Address:

- The Contractor's Community Liaison Officer: name, contact details, office hours.
- Advance notification to affected communities before high-impact activities (piling, demolition, road closures).
- The accessible GRM channel for community complaints, including walk-in, phone, and digital options.
- Coordination with the RSDK Community Liaison Office and the project GRM (ESIA Chapter 10).
- Information boards at the site perimeter displaying project details, expected impacts, GRM contact numbers, and the schedule of major works.
- Engagement with vulnerable groups: consultation events at varied times, venues, and languages; sign-language interpretation where required; targeted outreach to the Gunung Brintik community.

11. EMERGENCY PREPAREDNESS AND RESPONSE

Guidance: Describe the site-specific emergency response plan covering at minimum:

- Fire: detection, alarm, first response, evacuation routes, coordination with RSDK fire safety and Damkar Semarang.
- Medical emergency: first-aid stations on site, trained first-aiders, ambulance access, coordination with RSDK IGD.
- Structural collapse or equipment failure: rescue procedure, exclusion zone, notification chain.
- Chemical/B3 spill: spill-kit locations, containment procedure, clean-up contractor, DLH notification if required.
- Unexploded ordnance (UXO): evacuation to 100 m, police notification, bomb disposal coordination (see Chance Find Procedure).
- Flood or extreme weather: site-securing procedure, dewatering, protection of heritage structures.

Include a site plan showing assembly points, evacuation routes, first-aid stations, spill-kit locations, and fire extinguisher positions. Attach the emergency contact list. State the frequency of emergency drills (at minimum, one full-scale drill within the first month and quarterly thereafter).

12. ENVIRONMENTAL AND SOCIAL MONITORING PROGRAM

The monitoring program must be consistent with ESIA Chapter 12 and the C-ESMP commitments. Present the program on a single summary table with the following columns:

Parameter	Location	Method	Frequency	Trigger / Action Level	Responsible
PM_{10} at boundary	*80% of Kep Gub Jateng 8/2001 limit*	*100% of Kep Gub Jateng 8/2001 limit*	*PM_{10} at boundary*	*80% of Kep Gub Jateng 8/2001 limit*	*100% of Kep Gub Jateng 8/2001 limit*
Noise at ward façade	*55 dB(A) Leq (daytime)*	*60 dB(A) Leq sustained >15 minutes*	*Noise at ward façade*	*55 dB(A) Leq (daytime)*	*60 dB(A) Leq sustained >15 minutes*
PPV at heritage structures	*2 mm/s (alert)*	*5 mm/s (stop-work)*	*PPV at heritage structures*	*2 mm/s (alert)*	*5 mm/s (stop-work)*

The full list of parameters must include: air quality, noise, vibration, water quality, construction waste, B3 waste manifests, OHS, cultural heritage, construction traffic, GBV/SEAH, labor standards, and GRM performance.

13. REPORTING REQUIREMENTS

The Contractor must commit to the following reporting obligations:

Report	Content	Frequency	Submitted To
Weekly site inspection	HSE observations, dust/noise readings, non-conformances	Weekly	IE / PIU
Monthly E&S report	All monitoring data, incidents, GRM cases, training records, heritage log	Monthly	IE / PIU / AIIB
Incident notification	Any lost-time incident, heritage damage, environmental exceedance	Within 24 hours	IE / PIU
Serious incident notification	Fatality, serious injury, GBV/SEAH finding	Immediate	PIU / AIIB
Quarterly E&S summary	Aggregated KPIs, trend analysis, lessons learned	Quarterly	PIU / AIIB
Chance find report	Per Finds Register and BPK notification	Per event	PIU / BPK Jawa Tengah

14. NON-CONFORMANCE AND CORRECTIVE ACTION

Guidance: Describe the structured non-conformance management process. As a minimum:

- Classification of non-conformances (minor, major, critical).
- Corrective action timeframes: minor within 10 working days; major within 5 working days; critical requires immediate stop-work.
- Root-cause analysis method and documentation.
- Verification of corrective action closure by the HSE Manager and the Independent Engineer.
- Escalation procedure: third occurrence of the same non-conformance type triggers formal warning from PIU; continued non-compliance may result in stop-work notice or contract sanctions.

The Independent Engineer has authority to issue a Stop-Work Notice for non-compliance with any critical safety, heritage, or pollution-control requirement. All Stop Work Notices are reported to the PIU and AIIB within 24 hours.

15. TRAINING PLAN

Guidance: Present the training program in a summary table:

Training Topic	Target Audience	Frequency	Delivery Method
Site induction (HSE + E&S)	All workers before first entry	Per new worker	Classroom + site walk

Chance Find Procedure	All excavation workers and supervisors	Before below-grade works + monthly refresher	Toolbox talk
GBV/SEAH awareness	Entire workforce	At induction + quarterly	Classroom
Dust and noise management	Equipment operators, supervisors	Monthly toolbox talk	Toolbox talk
Heritage-adjacent works	Workers in heritage buffer zone	Before each sub-phase	Method statement briefing
Emergency response drills	Entire workforce	Monthly (partial) + quarterly (full-scale)	Practical drill
ICRA and hospital interface	Supervisors, interface coordinators	Before each work package	Briefing with RSDK CLO
Spill response	Relevant workers	Quarterly	Practical drill
Worker GRM and Code of Conduct	All workers	At induction	Classroom

All training must be recorded with attendance sheets (name, ID, signature, date, topic, trainer). Records are submitted monthly as part of the E&S report.

16. DOCUMENT CONTROL AND REVIEW

Guidance: Describe the document control system for the C-ESMP and all associated sub-plans. Include:

- Revision history table (revision number, date, description, author, approver).
- Distribution list and controlled-copy register.
- Procedure for updates: who initiates, who reviews, who approves, how superseded versions are withdrawn.
- Triggers for mandatory review: material change in scope, method, or personnel; any serious incident; BPK Jawa Tengah or AIIB feedback; minimum six-monthly cycle.

17. REQUIRED ANNEXES

The following documents must be attached to the C-ESMP. Submissions that are missing any of these annexes will be returned without review.

Annex	Title	Status
A	Contractor's organizational chart and CVs of key E&S personnel	*[Attached / Pending]*
B	SMK3 policy statement and K3 Officer certification	*[Attached / Pending]*
C	Site layout plan (construction footprint, temporary facilities, heritage buffer, access routes)	*[Attached / Pending]*
D	Risk assessments and safe work method statements for high-risk tasks	*[Attached / Pending]*
E	Worker Code of Conduct (GBV/SEAH provisions)	*[Attached / Pending]*

F	Chance Find Procedure (adopted from ESIA annex)	*[Attached / Pending]*
G	Traffic Management Plan	*[Attached / Pending]*
H	Emergency Response Plan and site plan	*[Attached / Pending]*
I	B3 waste transport contract and manifesting arrangement	*[Attached / Pending]*
J	Environmental monitoring equipment specifications and calibration certificates	*[Attached / Pending]*
K	Training record templates and attendance sheets	*[Attached / Pending]*
L	GRM information materials (poster, leaflet) for workers and community	*[Attached / Pending]*
M	Asbestos survey report and management plan (if demolition is in scope)	*[Attached / Pending]*

Annex E – Gender & Vulnerability Action Plan

A. Introduction

The Gender Action Plan (GAP) is a structured instrument designed to ensure that gender equality considerations are systematically integrated into the planning, implementation, and operation of the GMS-DC & SoE redevelopment Project at RSDK Semarang (RSDK). The project involves the construction of the Gedung Medic Central Unit–Diagnostic Center (CMU-DC) and associated clinical facilities, financed by the Asian Infrastructure Investment Bank (AIIB) under a Category B classification.

RSDK is Indonesia's premier national referral hospital in Central Java, serving approximately 280,000 outpatient visits per year and providing specialized clinical and educational services. The hospital's patient population includes a significant proportion of women of reproductive age, elderly patients, persons with disabilities, and low-income households. Women also constitute the majority of the nursing and allied health workforce. These characteristics create both opportunities and obligations to mainstream gender considerations across the full project cycle.

The GAP responds directly to the finding in the ESIA gap analysis that Indonesian national regulations do not mandate the identification or mitigation of gender-specific impacts in development projects. The AIIB Environmental and Social Policy (ESP) and Environmental and Social Standard 1 (ESS1) require the project to identify gender-specific risks, develop targeted mitigation measures, and report against gender indicators throughout implementation and operation.

This GAP addresses six thematic areas: gender-responsive employment; women's participation in consultation and decision-making; universal access to services; prevention of gender-based violence (GBV) and sexual exploitation, abuse, and harassment (SEAH); community health access for women and vulnerable groups; and gender-responsive monitoring. Together, these areas reflect the intent of AIIB's ESP and align with Indonesia's national gender mainstreaming framework under Peraturan Menteri Dalam Negeri No. 67 Tahun 2011.

The GAP is a living document, subject to revision following each major project milestone or as new gender-specific risks are identified. Revisions will be submitted to AIIB and disclosed to stakeholders in accordance with the AIIB Directive on Information Disclosure.

B. Policy and Regulatory Framework

a. AIIB Environmental and Social Policy (ESP, 2024)

The AIIB ESP establishes overarching principles for environmental and social risk management in AIIB-financed projects. Under the ESP, RSDK as the implementing institution, through the Project Implementation Unit (PIU) is required to assess and manage potential adverse gender-specific risks throughout the project lifecycle, in proportion to the project's nature and risk level. The ESP affirms that no project person should face discrimination based on gender, and that project benefits should be accessible equally to men, women, and vulnerable groups.

b. AIIB Environmental and Social Standard 1 (ESS1)

ESS1 requires that the ESIA identify potentially adverse gender-specific risks and impacts of the project, consider how project activities may exacerbate those risks, and develop mitigation measures integrated into project design. ESS1 specifically requires the Gender Action Plan to address:

- Identification of gender-specific risks, including those relating to GBV and SEAH in the context of construction workforce influx.
- Women's participation in stakeholder consultations and decision-making processes.
- Collection and reporting of sex-disaggregated data for project beneficiaries.
- Integration of gender-sensitive design standards into physical infrastructure.
- Monitoring of gender indicators throughout implementation and operation.

c. National Regulatory Framework

At the national level, the following regulations provide the legal basis for gender mainstreaming in infrastructure and healthcare projects:

- Peraturan Menteri Dalam Negeri No. 67 Tahun 2011, General Guidelines for Gender Mainstreaming in Regional Government.
- Peraturan Menteri PPA (PermenPPA No. 8/2024), Current ministerial regulation on women's empowerment and child protection applicable to project settings.
- Undang-Undang No. 12 Tahun 2022 on Sexual Violence, establishes criminal liability and victim support mechanisms for cases of sexual violence and harassment.
- Keputusan Menteri Kesehatan No. 1226/Menkes/SK/XII/2009, Integrated Services for Victims of Violence Against Women and Children in Hospitals.
- Peraturan Menteri Pekerjaan Umum dan Perumahan Rakyat No. 14/PRT/M/2017, Building accessibility requirements for persons with disabilities.

Where AIIB ESF requirements exceed national regulatory standards, as identified in the ESIA gap analysis, this GAP applies the more stringent AIIB requirement.

C. Gender Action Plan Matrix

Gender Risk Assessment-RSKD Semarang

The baseline assessment identifies several gender-related risks that may affect the equitable distribution of project benefits and expose women and vulnerable groups to disproportionate adverse impacts. Reported cases of gender-based violence (GBV) remain a concern in Semarang City. In 2024, a total of 335 cases of violence against women were recorded (Table 36), including physical and sexual violence, with women constituting the majority of victims. In South Semarang Subdistrict, where Dr. Kariadi Hospital is located, 10 cases were reported. In addition, 273 cases of violence against children

were recorded in Semarang City, with girls accounting for approximately 90% of victims (Table 38). These data indicate that women and girls continue to face significant vulnerability to physical, sexual, and psychological violence. As women represent approximately 62% of the RSKD workforce (Table 45), the project workforce may include a substantial number of female workers who could be exposed to GBV/SEAH risks if adequate preventive measures are not implemented.

The baseline assessment also highlights barriers related to participation and access to project benefits. While overall literacy rates are relatively high, female literacy rates among those aged 45 years and above remain lower than those of men, reflecting historically unequal access to education (Table 39). This may affect the ability of some women to access information, participate in consultations, and benefit from project opportunities. The Gender Action Plan (GAP) therefore promote meaningful participation of women in public consultations, equitable access to employment opportunities, and inclusive access to health services and project benefits.

Livelihood conditions in Semarang City indicate an economic disparity between men and women. As shown in Table 46, men's real per capita expenditure reached IDR 18.18 million per year, compared with IDR 15.75 million per year for women, resulting in a gap of approximately IDR 2.43 million. This lower expenditure level among women may reflect lower labor force participation, concentration in informal employment, and a greater burden of unpaid domestic and caregiving responsibilities. These gender-based economic disparities are relevant to the livelihood context of the affected vendor groups assessed below, many of whom are women.

The assessment further identifies the need to address accessibility for persons with disabilities. A total of 45 persons with disabilities were recorded in South Semarang Subdistrict (Table 32), while the number of workers with disabilities in Semarang City has shown an increasing trend during 2019–2024. These conditions highlight the importance of applying Universal Design principles to ensure that project facilities, services, and information are accessible to all users. The GAP support and strengthen the hospital’s commitment to disability-inclusive services by ensuring universal access considerations are incorporated into the design and operation of project facilities.

The Gender Action Plan has been aligned with the Environmental and Social Impact Mitigation Matrix ESIA. These measures include requiring all workers to sign a Code of Conduct containing GBV/SEA/SH prohibitions prior to mobilization; establishing referral arrangements for GBV SEAH with relevant service providers, such as PPT Seruni, the Women and Children Protection Unit (PPA) of the Police, LBH APIK, and university-based support services; providing gender-segregated sanitation facilities and adequate lighting; appointing a GBV/SEA grievance focal person and implementing confidential, survivor-centred grievance procedures; conducting SEA/SH awareness training during worker induction; updating vulnerability mapping at the commencement of construction; and ensuring consultations are accessible and inclusive in terms of timing, venue, communication methods, and participation of vulnerable group

The detailed Gender Risk Assessment, including the baseline findings, risk assessment, and proposed Gender Action Plan measures, is presented in the table below

Tabel 1 - Gender Risk Assessment - RSKD -Semarang City

GAP Area	Baseline Findings	Gender Risk Assessment	Gender Action Plan (GAP)
Promote Gender-Responsive Employment	Women generally have lower incomes than men despite comparable literacy levels and higher life expectancy. Women account for approximately 62% of Dr. Kariadi Hospital's workforce – and 90% women workers in 3 Canten DPW in RSKD area	Women may not equally benefit from project-related employment, training, and career development opportunities. Female workers may also face barriers related to workplace conditions, occupational safety, and career advancement- Including women workers employed by the affected canteen tenant in the IGD area of RSKD.	Promote gender-responsive employment through gender-sensitive HR, recruitment and promotion policies, equal-pay audits, targets for women's participation in project employment, a confidential GRM with a female focal point, and gender-responsive working conditions.
Strengthen Women's Participation in Consultation and Decision-Making	Female literacy rates among those aged 45 years and above remain lower than those of men, reflecting historical inequalities in access to education. Women may face constraints in accessing information and participating in decision-making processes.	Women, particularly older women and vulnerable groups, may be underrepresented in consultations, resulting in their needs and concerns not being adequately reflected in project implementation	Ensure meaningful participation of women throughout the project by promoting their representation in consultations, decision-making, and monitoring processes, and by disseminating information through accessible and women-friendly channels
Improve Universal Access to Services for Women and Vulnerable Groups	Baseline data indicate the presence of women, children, elderly persons, and persons with disabilities in the project area. South Semarang Subdistrict recorded 45 persons with disabilities, while the number of employees with disabilities at the hospital has increased in recent years.	Women and vulnerable groups may face physical, social, economic, or informational barriers in accessing project facilities, healthcare services, and project benefits. Without inclusive design, some groups may not benefit equally from the project	Design hospital facilities with gender-sensitive access requirements integrated into the Detailed Engineering Design (DED) and Shop Drawings
Prevent Gender-Based Violence (GBV) and Sexual Exploitation,	In 2024, Semarang City recorded 335 cases of violence against women	Existing vulnerabilities indicate a risk of GBV/SEAH during	Implement measures to prevent and respond to GBV/SEAH through

Abuse, and Harassment (SEAH)	and 273 cases of violence against children. Women and girls constituted the majority of victims, including cases of physical and sexual violence.	construction activities and worker-community interactions. Female workers and community members may face heightened exposure to harassment, exploitation, or abuse if preventive measures are not implemented	mandatory worker Codes of Conduct, awareness and IEC campaigns, a confidential survivor-centered grievance mechanism, and referral pathways with relevant service providers. Safety measures, including adequate lighting, signage, and other protective infrastructure, will also be provided to reduce GBV/SEAH risks at project sites and surrounding communities

Based on the Gender Risk Assessment, a Gender Action Plan (GAP) matrix has been developed as an action plan to mitigate the identified gender-related risks and address the assessment findings.

Table below presents the full GAP matrix, setting out objectives, activities, indicators and targets, responsible parties, timelines, and budget estimates for each thematic area.

Table 2, Gender Action Plan Matrix: RSDK GMS-DC & SoE redevelopment Project

Objective	Activities	Indicators / Targets	Responsible Party	Timeline	Budget Estimate (IDR)
1. Promote Gender-Responsive Employment	1. Develop and adopt gender-sensitive HR, recruitment, and promotion policy-Including women workers employed by the affected canteen tenant in the IGD area of RSKD. 2. Establish equal-pay audits to eliminate wage disparities for equivalent roles. 3. Set a minimum target of 20–30% women in civil works and technical project positions. 4. Establish a confidential grievance redress mechanism (GRM) with a designated female focal point. 5. Ensure gender-responsive working	1. Gender-sensitive HR policy adopted and disclosed-including women workers employed by the affected canteen tenant in the IGD area of RSKD. 2. 100% of workers and contractors sign the Code of Conduct. 3. No gender pay gap reported for equivalent positions. 4. Women constitute at least 20–30% of the project workforce. 5. Functional GRM with confidential reporting channel. 6. Separate toilet facilities, lactation	PIU/PMU; HR Manager; Contractor HSE Manager	Pre-construction & construction	Integrated into overall ESMP budget

	conditions: separate sanitary facilities, maternity protection, and flexible work arrangements.	rooms, and maternity provisions in place.			
2. Strengthen Women's Participation in Consultation and Decision-Making	1. Conduct women-only focused group discussions (FGDs) and consultations at each project stage. 2. Ensure at least 30% female representation in all stakeholder consultation forums, including community liaison groups for workers, medical professionals, patients, and communities. 3. Disseminate project information through women-friendly channels (PKK meetings, Posyandu, Yasinan gatherings). 4. Include women in project decision-making bodies and monitoring committees.	1. Number of women-only FGDs/consultation sessions held per stage. 2. At least 30% women participants across all consultation forums. 3. Number of information dissemination activities targeting women's community groups. 4. Women's representation documented in decision-making bodies.	PIU Social Officer; Community Liaison Officer; GBV/SEAH Focal Person	Planning/design, pre-construction, & construction	Rp 50,000,000
3. Improve Universal Access to Services for Women and Vulnerable Groups	1. Design hospital facilities with gender-sensitive access requirements integrated into the Detailed Engineering Design (DED) and Shop Drawings. 2. Install separate toilet facilities for women and men. 3. Provide dedicated lactation/breastfeeding rooms. 4. Ensure barrier-free access: ramps, handrails, wheelchair-accessible pathways and toilets. 5. Install adequate lighting, safe pedestrian routes, priority seating, child-friendly waiting areas, and accessible parking. 6. Install gender-sensitive signage, complaint/GRM desks with privacy provisions.	1. All inclusive facilities verified during DED review and pre-construction Shop Drawing approval. 2. Site inspection checklist confirms: separate toilets, lactation rooms, accessible ramps, CCTV, adequate lighting, GRM signage. 3. Zero non-conformances in final commissioning inspection relating to gender-sensitive access.	RSDK Direksi; PIU; Design Consultant; Contractor	Planning/design (DED) & pre-construction (Shop Drawing)	Integrated into civil works contract

4. Prevent Gender-Based Violence (GBV) and Sexual Exploitation, Abuse, and Harassment (SEAH)	1. Distribute GBV/SEAH awareness information, education, and communication (IEC) materials at project sites and surrounding communities.- Including for women workers employed by the affected canteen tenant in the IGD area of RSKD. 2. Establish and operate a confidential GBV grievance channel, distinct from the general GRM, managed by the female GBV/SEAH Focal Person. 3. Require 100% of workers to sign a Gender-Responsive Code of Conduct that explicitly prohibits GBV/SEAH- Including women workers employed by the affected canteen tenant in the IGD area of RSKD. 4. Install safety infrastructure: adequate lighting at work areas, access roads, parking, pedestrian paths, and around toilet facilities; CCTV or sensor lighting in isolated/high-risk areas; and safety and GBV hotline signage. 5. Coordinate referral pathways with local GBV service providers (UPTD PPA, health centers, police, and NGOs). 6. Conduct regular safety and security monitoring of construction sites, with corrective action tracking.	1. Number of GBV/SEAH awareness activities and IEC materials distributed. 2. Functional confidential GRM channel operational with female focal point. 3. 100% of workers signed the Code of Conduct. 4. Safety infrastructure in place and verified by monthly site inspection. 5. Referral pathways established and documented with at least two local service providers. 6. Number of safety inspections conducted per month with corrective action closure rate.	GBV/SEAH Focal Person; Contractor HSE Manager; PIU Social Officer	Pre-construction & construction	Rp 75,000,000
5. Strengthen Community Health Access for Women and Vulnerable Groups	1. Conduct targeted health outreach activities for women and vulnerable groups, including maternal and reproductive health, cancer awareness, nutrition, mental health, GBV prevention,	1. Number of outreach activities targeting women and vulnerable groups per quarter. 2. Number of mobile health service	RSDK Medical Director; PIU; Community Liaison Officer	Pre-construction through operation phase	Rp 100,000,000

	family planning, menstrual hygiene, anaemia and stunting prevention, NCD screening, and healthy lifestyles. 2. Provide mobile health services (health screening, vaccination, maternal care, and medical check-ups) in underserved or remote communities. 3. Improve referral and transport support: ambulances, subsidised transport, community-based referral coordination mechanisms, and an emergency hotline.	deployments per year. 3. Number of referral and transport support services provided, disaggregated by type.			
6. Monitor Gender-Responsive Outcomes	1. Collect, analyze, and report sex-disaggregated data for all project beneficiaries across construction and operation phases. 2. Track a Quality-of-Service Achievement Index for women and vulnerable groups. 3. Include gender indicators in semi-annual ESMP progress reports to AIIB. 4. Conduct annual gender outcome reviews with findings disclosed to stakeholders.	1. 100% of beneficiary data collected with sex disaggregation. 2. Quality-of-Service Achievement Index reported semi-annually. 3. Gender indicators included in all AIIB progress reports. 4. Annual gender outcome review conducted and disclosed.	PIU Social Officer; PMU; RSDK Direksi	Construction & operation phase	Rp 30,000,000

Note: Budget estimates are indicative and subject to adjustment at contract award. Costs integrated into civil works contracts are absorbed within the overall ESMP budget.

D. Institutional Responsibilities

Effective implementation of this GAP depends on clearly assigned accountability within RSDK's multi-tiered institutional framework. The following matrix defines the primary GAP-related responsibilities of each entity. This framework is consistent with the broader ESMP implementation arrangements set out in Chapter 11 of the main ESIA, under which the PIU serves as the central accountability node for AIIB ESF compliance.

Table 2, Institutional Responsibility Matrix for GAP Implementation

Entity	Responsibilities	GAP Role
Ministry of Health (Kemenkes)	Project owner; holds ultimate accountability for AIIB ESF compliance; approves the annual ESF Compliance Report before submission to AIIB; provides policy guidance on gender mainstreaming.	*Strategic oversight*

Project Implementation Unit (PIU)	Day-to-day GAP implementation oversight; coordinates gender monitoring; ensures GAP indicators are integrated into quarterly and annual AIIB reports; custodian of the Living Document.	*Primary GAP custodian*
RSDK Direksi / Project Steering Committee (PSC)	Hospital-level governance; reviews GAP compliance status in monthly PSC meetings; co-signatory of the annual Board E&S Brief; ensures institutional resource allocation for GAP implementation.	*Hospital governance*
PIU Social Officer / GBV/SEAH Focal Person (female)	Leads gender consultations; manages the confidential GBV/SEAH grievance channel; maintains sex-disaggregated data; coordinates community outreach; provides monthly gender compliance reports to PIU.	*Day-to-day implementation*
Construction Contractor / HSE Manager	Implements gender-sensitive employment practices; ensures Code of Conduct compliance; installs and maintains safety infrastructure; provides monthly labor and GBV/SEAH incident reports.	*Field implementation*
Community Liaison Officer (CLO)	Conducts women-inclusive outreach in Randusari and Gunung Brintik; facilitates women-only FGDs; distributes IEC materials through women's community groups.	*Community engagement*
Independent Engineer	Verifies gender-sensitive design compliance at DED and Shop Drawing stages; includes gender infrastructure checklist in site inspections; flags non-conformances to PIU.	*Technical verification*

The GBV/SEAH Focal Person must be female, stationed at or regularly present on the RSDK project site, and have direct access to the GRM Manager and to external service providers. No GBV/SEAH case shall be handled without the involvement of the Focal Person. Where a conflict of interest is identified, the case shall be escalated directly to the PIU Social Officer and, if necessary, to AIIB.

E. Capacity Building

Capacity gaps among project personnel represent a principal risk to GAP implementation. Gender mainstreaming in construction and healthcare project contexts requires targeted, role-specific training that goes beyond general awareness. This section sets out the structured capacity building program for the RSDK GMS-DC & SoE project, designed to equip all relevant parties to fulfil their GAP obligations before they are required to act.

All training activities shall be documented, with participant registers maintained by the PIU Social Officer. Non-attendance by mandatory participants shall be reported to the PIU within five working days and corrective action taken within ten working days. Training materials shall be made available in Bahasa Indonesia and adapted to the literacy and language needs of the target participants.

The Contractor shall conduct the training and include it in the CESMP. The Contractor shall prepare the Terms of Reference (ToR) for the training and ensure that competent and qualified resource persons are engaged, such as representatives from government agencies responsible for women's and child protection, relevant NGOs, or academic institutions with expertise in gender and GBV issues.

Table 3, GAP Capacity Building Program

Training Topic	Target Participants	Standards / References	Timing	Method
Gender Mainstreaming in ESIA/ESMP	PIU staff, PMU, RSDK management	AIIB ESF (ESP, ESS1); national gender regulations	Within first 3 months of project commencement	Workshop (1 day)
GBV/SEAH Prevention and Response	All construction workers, supervisors, healthcare staff, and community liaisons	ILO C111; AIIB ESF ESS1; GBV/SEAH Protocol	Pre-construction; refresher every 6 months	Training (half-day) + mandatory Code of Conduct signing
Gender-Responsive Consultation Facilitation	Community Liaison Officers; PIU Social Officer; GBV/SEAH Focal Person	AIIB Stakeholder Engagement best practice; GEDSI principles	Pre-construction	Facilitation skills training (1 day)
Sex-Disaggregated Data Collection and Reporting	PIU Social Officer; M&E staff; medical records staff	AIIB Monitoring and Reporting requirements	Prior to construction commencement; refresher annually	Workshop (half-day) + data template training
Gender-Sensitive Design Standards	Design consultants; procurement officers; site supervisors	WHO Healthcare Facility Design; AIIB ESF ESS1	DED phase	Technical briefing + design checklist review
Community Health Outreach for Women	RSDK outreach health workers; CLOs	Ministry of Health outreach protocols; AIIB ESP	Pre-operation; annually thereafter	Training on women's health topics + outreach methodology

In addition to formal training, the PIU shall facilitate knowledge-sharing between RSDK and comparable hospital redevelopment projects under the AIIB portfolio, where gender-responsive practices have been documented. The Community Liaison Officer shall also coordinate with local women's organisations (including PKK, Posyandu networks, and UPTD PPA) to build community-level capacity for GBV/SEAH reporting and referral.

F. Monitoring and Reporting

a. Monitoring Framework

GAP implementation will be monitored through an integrated framework that operates alongside the broader ESMP monitoring system. The PIU Social Officer is the primary custodian of gender monitoring data, responsible for collecting, consolidating, and reporting gender indicators at monthly, quarterly, and annual intervals as specified below.

Where a gender indicator falls below target, the PIU shall prepare a corrective action note within ten working days, identify root causes, and implement remedial measures within twenty working days. Persistent non-conformances, defined as non-attainment of a target indicator over two consecutive reporting periods, shall be escalated to the RSDK Direksi and reported to AIIB in the next scheduled progress report.

b. Monitoring Indicators and Responsibilities

Table 4, GAP Monitoring and Reporting Framework

Indicator	Monitoring Parameter	Frequency	Responsible Party	Reporting Mechanism
Women in project workforce	% women employed; sex-disaggregated employment records	Monthly	PIU Social Officer; Contractor HR	AIIB quarterly report; PIU monthly gender dashboard
GRM / GBV cases	Number of GRM cases received, resolved, and pending disaggregated by type and gender of complainant	Monthly	GBV/SEAH Focal Person; GRM Manager	Monthly GRM summary report to PIU; AIIB semi-annual report
Women's consultation participation	% women in all consultation events; number of women-only FGDs held	Per consultation event	Community Liaison Officer; PIU Social Officer	SEP monitoring log; AIIB semi-annual report
Gender-sensitive infrastructure	Checklist compliance score for toilets, lactation rooms, accessible facilities, safety lighting, GBV signage	Monthly site inspection	Independent Engineer; PIU	Site inspection report; AIIB semi-annual report
GBV/SEAH awareness activities	Number of IEC distributions and training sessions; % workers with signed Code of Conduct	Monthly during construction	GBV/SEAH Focal Person; Contractor HSE Manager	ESMP progress report
Community health outreach	Number of outreach events; women and vulnerable beneficiaries reached; mobile health service deployments	Quarterly	RSDK Medical Director; CLO	AIIB quarterly and annual report
Sex-disaggregated beneficiary data	Number of project beneficiaries with sex-disaggregated data; Quality-of-Service Achievement Index for women	Semi-annual	PIU Social Officer; RSDK Medical Records	Annual ESF Compliance Report to AIIB

c. Reporting Channels

Gender indicators shall be incorporated into the following standard reporting mechanisms:

- Monthly ESMP Progress Report, compiled by the PIU Social Officer and submitted to the PIU and RSDK Direksi.
- Quarterly AIIB Progress Report, prepared by the PIU and reviewed by the PMU prior to submission to AIIB; must include a dedicated gender section.
- Semi-annual ESMP Compliance Report, reviewed by the Independent Engineer; includes gender infrastructure checklist and GRM case summary disaggregated by gender.
- Annual ESF Compliance Report, approved by the RSDK Board and Kemenkes prior to submission to AIIB; includes the Quality-of-Service Achievement Index and annual gender outcome review findings.

The PIU shall also disclose a summary of gender monitoring outcomes to affected communities at least once per year, using community-appropriate formats and channels, in accordance with the AIIB Directive on Information Disclosure.

d. Adaptive Management

This GAP is subject to review and revision at the following decision points: (i) completion of the DED phase; (ii) commencement of construction; (iii) commencement of hospital operations; and (iv) any time a material gender-specific risk is identified that is not adequately addressed by the current plan. Revisions shall be submitted to AIIB for review and re-disclosed to stakeholders within 30 days of finalization.

Annex F – Heritage Impact Assessment Framework

A. INTRODUCTION

1) Background

This Heritage Impact Assessment Framework (HIAF) has been developed to provide an indicative framework for undertaking a Heritage Impact Assessment (HIA), where required, as part of the proposed redevelopment of RSUP Dr. Kariadi. The Environmental and Social Impact Assessment (ESIA) identified that the proposed demolition of Gedung Elang and construction of the Management Unit and Service of Excellence (SoE) may affect the nationally designated heritage building within the RSDK complex, which was registered as a National-Level Cultural Heritage Property *(Bangunan Cagar Budaya Peringkat Nasional)* under the Decree of the Minister of Education and Culture of the Republic of Indonesia No. 370/M/2017. For clarity, Gedung Elang is proposed for demolition as part of the Project, whereas the nationally designated heritage building will be retained and protected. The HIA is therefore intended to assess the potential effects of the proposed demolition and redevelopment on the retained heritage building and other cultural heritage resources, and to determine appropriate project-specific protection and mitigation measures. The ESIA also identified the potential for impacts on the surrounding heritage setting and archaeological resources, including a wartime bunker currently under assessment as a Potential Cultural Heritage Property *(Objek Diduga Cagar Budaya).* This framework establishes the indicative scope, methodology, and management approach for a future HIA to further assess heritage significance, evaluate potential impacts, and develop appropriate heritage protection and mitigation measures prior to demolition and major construction activities.

2) Purpose and Objectives

The purpose of this HIAF is to establish an indicative framework for undertaking a Heritage Impact Assessment (HIA) to systematically assess the potential effects of the proposed development on cultural heritage resources and support heritage-sensitive project planning, design, and implementation.

The objectives of the HIA are to:

- Identify and verify cultural heritage resources and their heritage attributes within the Project Area of Influence (AoI);
- Assess the cultural significance and sensitivity of heritage resources;
- Evaluate direct, indirect, cumulative, and setting-related impacts arising from the proposed development;
- Assess potential impacts on structural integrity, archaeological resources, heritage setting, and visual character;
- Develop recommendations to avoid or mitigate adverse impacts; and
- Provide technical recommendations to support project design, construction planning, and long-term heritage management.

3) Scope

The HIA should, where applicable, address the following components:

- The physical and spatial interface between buildings proposed for demolition and cultural heritage resources to be retained and protected;
- Nationally registered cultural heritage properties;
- Potential Cultural Heritage Properties *(Objek Diduga Cagar Budaya);*
- Archaeological resources and subsurface cultural remains;
- Heritage setting, visual relationships, and historic urban character;
- Tangible and, where relevant, intangible cultural heritage;
- Project activities including demolition, excavation, piling, foundation works, utility installation, construction, and operation; and
- Direct, indirect, cumulative, and induced impacts throughout the Project lifecycle.

The scope presented in this framework is indicative and should not be regarded as exhaustive. During the HIA screening and scoping process, the competent cultural heritage authorities including BPK Central Java and/or the Directorate of Cultural Heritage, as applicable to the national-level registration of the RSDK heritage property retain the authority to determine whether a Heritage Impact Assessment is required and to define the appropriate scope, level of detail, specialist inputs, and assessment requirements, taking into consideration the significance of the heritage resource, the characteristics of the proposed development, and applicable statutory requirements. Additional assessment of components may therefore be required beyond those presented in this framework.

4) Relationship to ESIA, ESMP and CHMP

The HIA is intended to complement the ESIA by providing a more detailed technical assessment of cultural heritage resources where additional investigation is considered necessary. Findings from the HIA should inform the refinement of project design and provide the technical basis for heritage-specific mitigation measures incorporated into the Environmental and Social Management Plan (ESMP).

Where required, the findings and recommendations of the HIA should also inform the preparation or refinement of the Cultural Heritage Management Plan (CHMP). While the HIA focuses on identifying heritage values, assessing potential impacts, and developing technical recommendations, the CHMP translates these recommendations into project-specific management measures, monitoring programmes, construction procedures, stakeholder engagement activities, and reporting mechanisms throughout project implementation.

5) Methods

The HIA should adopt a significance-based and risk-based assessment approach appropriate to the scale and sensitivity of the Project. The assessment may include, as appropriate:

- Literature review and archival research;
- Heritage walkover survey;
- Heritage attribute identification and verification;
- Baseline photographic documentation;
- Structural condition assessment and crack mapping;
- Heritage significance assessment;
- Heritage setting and visual impact assessment;
- Structural vulnerability and vibration sensitivity assessment;
- Archaeological assessment;
- Stakeholder consultation;
- Development of mitigation recommendations; and
- Preparation of the HIA report and integration of findings into the ESMP and, where required, the CHMP.

B. HIA IMPLEMENTATION FRAMEWORK

1) Baseline Assessment

Activities	Key Outputs
Heritage walkover survey	Identified and documented heritage resources within the Project AoI.
Identification of heritage attributes	Verified heritage attributes.
Baseline photographic documentation	Comprehensive photographic record of existing conditions.
Structural condition assessment	Documented structural condition and existing defects.
Crack mapping	Baseline crack mapping for future structural monitoring.
Heritage setting assessment	Documented existing heritage setting and spatial relationships.
Stakeholder consultation	Stakeholder inputs incorporated into the baseline assessment.

2) Heritage Risk and Impact Assessment

Activities	Key Outputs
Structural vulnerability assessment	Identified structural risks associated with the proposed development.

Vibration sensitivity assessment	Established acceptable vibration thresholds and monitoring requirements.
Assessment of excavation-induced ground movement	Evaluated potential impacts from excavation and foundation works.
Archaeological assessment	Assessed archaeological potential and precautionary requirements.
Dust and façade assessment	Identified risks to heritage materials and façade condition.
Visual and heritage setting assessment	Evaluated potential impacts on heritage setting and visual integrity.
Assessment of natural lighting and airflow alteration	Identified potential changes to the historic environmental setting.
Cumulative impact assessment	Determined the overall significance of cumulative heritage impacts.

3) Mitigation and Design Review

Activities	Key Outputs
Development of heritage protection measures	Recommended measures for protecting retained heritage resources during demolition of Gedung Elang and construction process.
Review of demolition methodology	Heritage-sensitive demolition methodology.
Assessment of compatibility and reversibility of proposed interventions.	"Recommendations on the compatibility and reversibility of interventions affecting heritage resources."
Review of foundation methodology	Low-impact foundation recommendations.
Development of structural and vibration monitoring programme	Structural monitoring framework.
Development of construction methodology	Development of construction procedures that support cultural heritage conservation
Design review	Recommendations for design refinement and heritage compatibility.
Consultation with heritage authorities	Agreed technical recommendations.

4) Reporting and Integration

Activities	Key Outputs
Preparation of Heritage Impact Assessment Report	Comprehensive HIA findings and recommendations documented.

Integration into ESMP	Heritage mitigation measures incorporated into the ESMP.
Recommendations for CHMP	Recommended operational heritage management measures for project implementation.
Stakeholder consultation and disclosure	Consultation outcomes documented and reflected in the HIA.
Submission to relevant authorities (where required)	HIA recommendations submitted for regulatory consideration, where applicable.

C. DELIVERABLES

The HIA should produce, as appropriate, the following outputs:

- Heritage Baseline Assessment;
- Heritage Inventory and Attribute Register;
- Statement of Heritage Significance;
- Structural Condition Assessment including crack mapping and photographic documentation;
- Structural Vulnerability Assessment;
- Vibration Sensitivity Assessment;
- Heritage Setting and Visual Impact Assessment;
- Archaeological Assessment;
- Heritage Impact Assessment Report;
- Heritage Mitigation Recommendations;
- Recommendations for integration into the ESMP; and
- Recommendations for preparation or refinement of the Cultural Heritage Management Plan (CHMP), where required.

The HIA should be completed prior to demolition and major construction activities and should provide the principal technical basis for heritage risk management throughout project implementation. The findings and recommendations of the HIA should be incorporated into the ESMP and, where required, implemented through the CHMP, which serves as the operational framework for translating HIA recommendations into project-specific mitigation measures, monitoring programs, construction procedures, stakeholder engagement activities, and reporting requirements throughout the Project lifecycle.

Annex G – Cultural Heritage Management Plan Framework

A. INTRODUCTION

1) Background

RSDK is a national general hospital under the Ministry of Health, located at Jalan Dr. Sutomo No. 16, South Semarang District, Semarang City, Central Java. The hospital is a tertiary health facility and national referral center with a capacity of 1,181 beds and serves as the primary teaching hospital (Rumah Sakit Pendidikan Penyelenggara Utama / RSPPU) affiliated with the Faculty of Medicine, Diponegoro University (UNDIP).

To enhance service capacity and quality, RSDK plans to redevelop the MCU, CDC, and SoE buildings as part of its Master Development Plan under Ministerial Health Decree (KMK) No. HK.01.07.MENKES/1816/2024. This redevelopment entails the demolition of Gedung Elang (Cardiac Installation) and the construction of a new multi-storey building.

The RSDK complex has been registered as National-Level Cultural Heritage Building under Ministerial Decree No. 370/M/2017, pursuant to Law No. 11 of 2010 on Cultural Heritage. This designation mandates that all construction activities within and around the complex consider and protect the existing heritage values.

This Cultural Heritage Management Plan Framework (CHMPF) should be read together with the Heritage Impact Assessment Framework (Annex F). While Annex F establishes the framework for undertaking the HIA, this CHMPF provides the indicative operational framework for implementing the findings and recommendations arising from the HIA during project planning, construction, and operation.

2) Purpose and Objectives

The purpose of this CHMPF is to establish an indicative framework for managing cultural heritage risks and implementing heritage protection measures throughout the RSDK Redevelopment Project. The CHMPF is prepared for the following purpose and objectives are to:

- Provide guidance for the management of cultural heritage resources throughout the pre-construction, construction, and operational phases of the RSDK Redevelopment Project;
- Establish procedures for protecting heritage buildings from adverse impacts arising from demolition, piling, excavation, and construction activities;
- Integrate cultural heritage protection requirements into the ESMP and contractor construction procedures;
- Establish reporting mechanisms and emergency response procedures for cultural heritage finds (including the Chance Find Procedure);
- Ensure compliance with Indonesian cultural heritage regulations and AIIB ESS1 requirements; and

- Provide the operational framework for implementing HIA recommendations throughout the Project lifecycle.

3) Scope

This CHMPF covers:

- The entire RSDK complex within the project Area of Influence (AoI);
- The national-level heritage building (Main Heritage Building) adjacent to Gedung Elang, which will be retained and protected during RSDK Redevelopment Project;
- The historic wartime bunker structure located in the northern section of the complex;
- Potential subsurface archaeological finds in excavation and piling areas;
- Potential ACM in buildings scheduled for demolition; and
- The visual setting and historic character of the hospital complex as a whole.

4) Relationship to ESIA and ESMP

This CHMPF is an appendix to the ESIA for the RSDK Redevelopment Project and should be read together with the HIAF provided in Annex F. This CHMPF provides an indicative implementation framework that shall be refined following completion of the HIA undertaken in accordance with Annex F. The findings and recommendations of the HIA shall provide the technical basis for refining and finalising the project-specific CHMP prior to demolition and major construction activities. The CHMPF therefore serves as:

- An interim guide for cultural heritage management until the full CHMP is available;
- The basis for integrating heritage requirements into the project ESMP; and
- A reference for the preparation of the Contractor ESMP (C-ESMP) by the implementing contractor.

5) Methodology

This CHMPF was prepared based on:

- Review of the RSDK Redevelopment Project ESIA (Draft v0.1, May 2026);
- The Heritage Impact Assessment Framework (HIAF) provided in Annex F;
- The Final Report of the Kariadi Hospital Heritage Study (2025), including structural condition assessments of the heritage buildings;
- Applicable Indonesian cultural heritage regulations and standards (Law No. 11/2010, Government Regulation No. 1/2022, PUPR Ministerial Regulation No. 19/2021);

- AIIB Environmental and Social Framework (ESF), Environmental and Social Standard 1 (ESS1) on Cultural Heritage; and

The best international practices in cultural heritage management for construction projects.

2) REGULATORY AND INSTITUTIONAL FRAMEWORK

1) National Cultural Heritage Regulations

The management of cultural heritage resources in this project is governed by the following legislation:

Regulation	Title	Relevance
Law No. 11 of 2010	Cultural Heritage Law	Legal basis for the protection, development, and utilization of cultural heritage; mandatory research before construction (Art. 79); procedures for chance finds (Art. 24–26)
Government Regulation No. 1 of 2022	Procedures for Cultural Heritage Management	National register, designation, conservation, and supervision of cultural heritage buildings
Ministerial Decree No. 370/M/2017	Designation of RSDK as a National-Level Cultural Heritage Site	Legal basis for the heritage status of the complex; triggers protection and permitting obligations
PUPR Ministerial Regulation No. 19/2021	Technical Guidelines for the Preservation of Cultural Heritage Buildings	Technical guidelines for conservation, repair, and construction around heritage buildings
Law No. 5 of 2017	Cultural Advancement	Protection of cultural values and expressions, including intangible heritage
Semarang City Bylaw No. 14/2011 as amended by No. 5/2021	Semarang City Spatial Plan 2011–2031	RSDK is located within a Strategic Social and Cultural Zone; reinforces protection of the heritage area

2) AIIB ESS1 Requirements on Cultural Heritage

The Asian Infrastructure Investment Bank (AIIB), through its Environmental and Social Framework (ESF), Environmental and Social Standard 1 (ESS1), requires:

- Identification and assessment of project impacts on tangible and intangible cultural heritage resources;
- Consultation with relevant authorities and communities on cultural heritage matters prior to design and construction decisions;
- Implementation of mitigation measures proportional to the level of risk and the significance of the heritage values;
- Application of the Chance Find Procedure for all subsurface works; and
- Regular documentation and reporting on CHMP implementation.

3) Institutional Responsibilities

Institution	Role and Authority

Regional Cultural Heritage Preservation Center (BPK) Central Java	Regional cultural heritage authority; responsible for verifying building conditions, providing technical recommendations, receiving notifications of chance finds, and approving work methods in the vicinity of heritage buildings
Semarang City Office of Culture and Tourism (Disbudpar)	City-level coordination role in overseeing the implementation of cultural heritage regulations within Semarang
Directorate of Cultural Heritage Preservation and Museums, Ministry of Education and Culture	National authority for nationally registered heritage; approves significant interventions to designated buildings
RSDK (Project Proponent)	Project owner; responsible for ensuring heritage compliance throughout all project phases; coordinates subsequent HIA study
Implementing Contractor	Responsible for implementing heritage procedures in the field; prepares C-ESMP including a heritage management plan; reports all incidents and finds to the Cultural Heritage Specialist
Construction Supervision Consultant (CSC)	Oversees implementation of heritage procedures by the contractor; verifies vibration monitoring and structural condition data; reports deviations
Cultural Heritage Specialist (CH Specialist)	Appointed heritage expert; responsible for undertaking the HIA in accordance with Annex F, providing technical recommendations, supervising works in heritage-sensitive areas, and supporting preparation and implementation of the CHMP

2) CULTURAL HERITAGE BASELINE

1) Historical Overview of the RSDK Complex

RSDK was established in 1925 during the Dutch colonial period as the Centrale Burgerlijke Ziekeninrichting (CBZ) Semarang, the central civilian hospital serving the civilian population and colonial government in the Dutch East Indies. The hospital complex was designed in accordance with the European colonial-tropical healthcare architectural tradition of the late 19th to early 20th century, emphasising natural ventilation, daylighting, and a dispersed pavilion layout.

Following Indonesian independence, the hospital was renamed RSDK in honour of dr. Kariadi, a national hero physician who died on 15 October 1945. The complex underwent several phases of expansion over the following decades, gradually transforming its original spatial composition and reducing the physical distance between historic and modern structures.

2) Cultural Heritage Inventory within the Area of Influence

No.	CH Type	Name / Location	Status	Description	Project Relevance
1	Heritage Building	Main Heritage Building, 49S X:434564 Y:9226799	National-Level Cultural Heritage (Ministerial Decree 370/M/2017)	1925 colonial-era building (CBZ Semarang). Possesses very high historical, architectural, and social significance. Exhibits significant structural vulnerability (no RC columns, red brick foundation ~120 cm depth, timber roof deflection 80 mm exceeding the 33 mm allowable limit).	Directly adjacent to Gedung Elang (for demolition); separation < 1 m at several points. VERY HIGH RISK.
2	Archaeological Structure /	Wartime Bunker, 49S X:434618	Undesignated; potential	Underground bunker structure from the late Dutch colonial period (~1939) or	Closest to Medical Center Building (~50 m). Risk of

	Undesignated Building	Y:9227068 (northern WWTP area)	cultural heritage	WWII. Discovered during WWTP construction. Features: thick brick masonry walls, enclosed underground configuration. Indicates likelihood of further subsurface finds.	disturbance from excavation and piling. MEDIUM RISK.
3	Surrounding Heritage Buildings	GKI Reformed Church, RSU William Booth, Deputy Governor's Residence (former Oei Tiong Ham Residence)	Semarang City Heritage Buildings	Heritage receptors in the vicinity of the project area; part of the historic urban context of South Semarang.	Indirect impacts: vibration, dust, construction traffic, visual disturbance. LOW–MEDIUM RISK.
4	Potential ACM	Gedung Elang and other existing buildings within the demolition area	Unconfirmed (further survey required)	Buildings from the 1970s–1990s likely contain ACM in ceilings, pipe insulation, and roof cladding. Phase 1 and Phase 2 asbestos surveys are mandatory prior to demolition.	Directly within the demolition area. Risk of exposure to workers and patients if not managed properly. MANDATORY PRE-CONSTRUCTION SURVEY.
5	Intangible Heritage	Institutional values, collective memory, and cultural associations with the RSDK complex	Cultural and social value	The institutional identity of RSDK as a historic health institution; memorial value of dr. Kariadi as a national hero; community traditions and practices associated with the hospital.	Changes to the visual character of the heritage area may affect these values. Must be considered in the architectural design of new buildings.

3) Structural Condition of the Heritage Building

Based on the Final Report of the Kariadi Hospital Heritage Study (2025), the main heritage building exhibits a number of structural vulnerabilities relevant to the planned construction activities:

- Absence of reinforced concrete column systems, ring beams, and T-section sloof beams in parts of the existing structure;
- Foundation system consisting of red brick masonry to a depth of approximately 120 cm;
- Structural characteristics that do not meet the applicable Seismic Design Category D criteria;
- Variable reinforced concrete quality, with a measured minimum compressive strength of fc' 19.03 MPa (equivalent to K-236.86 kg/cm²) and a coefficient of variation (CV) ranging from 8.79% to 27.41%;
- Excessive deflection in the timber roof truss system, with a measured maximum deflection of 80 mm, exceeding the allowable limit of 33 mm; and
- Floor slab deflection exceeding allowable serviceability limits.

These vulnerabilities indicate a high sensitivity to vibration-generating activities, adjacent demolition, piling, excavation, and heavy equipment movements associated with the redevelopment project.

2) RISK IDENTIFICATION AND IMPACT PATHWAYS

1) Cultural Heritage Risk Matrix

Code	Impact Pathway	Mechanism	Receptor	Risk Level	Mitigation Goal
R-1	Physical damage to heritage building from demolition and piling vibration	PPV from heavy equipment, hammers, and bore piles transmitted to brick foundations; structural deflection and cracking	Main Heritage Building	VERY HIGH	Continuous PPV monitoring; threshold limits; non-impact methods
R-2	Physical damage from ground movement due to excavation	Deep excavation and basement works may cause ground movement, differential settlement, and cracking in adjacent heritage foundations	Main Heritage Building	HIGH	Crack survey (crack mapping); movement monitoring; controlled dewatering
R-3	Physical damage from direct contact during demolition	Demolition of Gedung Elang at < 1 m from heritage building; risk of dust, debris, and mechanical impact	Main Heritage Building	VERY HIGH	Controlled demolition methods; 2 m exclusion zone; facade protection
R-4	Visual and heritage setting degradation	New building mass and height visually incompatible with the scale and historic character of the heritage building	Main Heritage Building; area setting	MEDIUM	Architectural design review by BPK Central Java; visually recessive design; HIA study
R-5	Disturbance to the historic bunker structure	Utility excavation and piling in the vicinity of the bunker may cause unintended damage	Bunker Structure	MEDIUM	Buffer zone; baseline documentation; integration into CFP
R-6	Loss of subsurface archaeological finds	Deep excavation and piling may permanently destroy unidentified archaeological remains	Potential archaeological finds	MEDIUM	Mandatory Chance Find Procedure; archaeological watching brief
R-7	ACM exposure to workers and hospital users	Demolition of ACM-containing buildings without proper procedures	Construction workers; patients; hospital staff; visitors	HIGH (if unmanaged)	Mandatory asbestos survey before construction; Asbestos Management Plan (AMP); licensed contractor

		disperses hazardous asbestos fibers			
R-8	Indirect impacts on surrounding heritage buildings	Vibration, dust, and construction traffic affect the GKI Church, RSU William Booth, and other heritage buildings in the AoI	Heritage buildings in AoI (GKI, William Booth, Oei Tiong Ham Residence)	LOW–MEDIUM	Vibration and dust controls; traffic management; coordination with building managers

2) MANAGEMENT AND MITIGATION MEASURES

1) Mitigation Hierarchy

All mitigation measures in this CHMPF follow the hierarchy: Avoid > Minimize > Rehabilitate > Compensate. Given the irreversible nature of impacts on cultural heritage, the highest priority is placed on avoidance.

2) Pre-Construction: Studies and Preparation

a) Subsequent Heritage Impact Assessment (HIA)

A HIA shall be undertaken in accordance with the Heritage Impact Assessment Framework (Annex F) prior to the issuance of the demolition permit (PBG Bongkar) and commencement of major construction activities. The indicative scope, methodology, implementation process, and deliverables of the HIA are provided in Annex F.

Responsibility: CH Specialist, coordinated by RSDK / Project PIU

Deadline: To be completed prior to issuance of the demolition permit (PBG Bongkar)

b) Baseline Crack Survey (Crack Mapping)

Prior to the commencement of demolition and piling activities, comprehensive baseline documentation of the heritage building's condition must be undertaken:

- Mapping of all existing cracks on all facades and interior elements of the heritage building (photography and drawings);
- Installation of tell-tales at critical points;
- Dimensional and structural level measurements; and
- Documentation of foundation conditions and surrounding soil.

3) Construction: Physical Protection of the Heritage Building

a) Buffer Zones and Controlled Demolition Methods

Given the separation of less than one metre between Gedung Elang and the heritage building at several points, demolition procedures must comply with the following requirements:

- A minimum exclusion zone of 2 metres from the heritage building facade must be marked and maintained throughout demolition activities;
- A demolition Method Statement must be prepared by the contractor and approved by BPK Central Java before works commence;
- Demolition within 5 metres of the heritage building must be undertaken manually (hand demolition), not by heavy machinery;
- Anti-dust and anti-vibration hoarding (protective barriers) must be installed along the entire demolition-heritage interface;
- High-impact demolition activities are prohibited during strong winds or adverse weather conditions that may affect the heritage building; and
- Visual inspection of the heritage building must be conducted daily during the demolition phase.

b) PPV Vibration Monitoring

A continuous vibration monitoring system must be installed in accordance with ISO 4866. Threshold requirements are as follows:

Structure Category	Alert Threshold	Action Threshold	Required Action
Main Heritage Building (historic brick masonry, shallow foundation)	2 mm/s PPV	5 mm/s PPV	Alert: reduce work intensity, increase monitoring frequency. Action: STOP works immediately; inspect building; notify BPK Central Java before resuming
Historic Bunker and Other Aged Structures	3 mm/s PPV	8 mm/s PPV	Alert: reduce intensity; carry out visual inspection. Action: STOP; investigate; report to BPK Central Java
Heritage Buildings in the AoI (surrounding receptors)	5 mm/s PPV	10 mm/s PPV	Alert: review work methods. Action: stop and investigate; consult with building owners

c) Dust Control and Facade Protection

Construction and demolition dust can cause physical and chemical damage to architectural elements of the heritage building. Required controls include:

- Regular water spraying (minimum 2×/day, or more frequently on windy days) on all demolition areas;
- Installation of protective breathable sheeting on heritage building facades exposed to demolition dust;
- Solid hoarding along the entire demolition-heritage interface;
- Visual monitoring of the heritage facade at least once per week; and

- Periodic dust removal from heritage building surfaces.

d) Non-Impact Foundation Methods

Within a 20-metre radius of the heritage building, the following foundation methods are PROHIBITED:

- Drop hammer piling;
- Diesel hammer piling; and
- Vibratory hammer piling generating PPV > 2 mm/s at the heritage building.

Foundation methods PERMITTED within a 20-metre radius of the heritage building:

- Bored pile / auger pile;
- Mini pile with hydraulic press (hydraulic jack) system;
- Continuous Flight Auger (CFA) pile; and
- Other methods that have received written approval from BPK Central Java and the CH Specialist.

2) CHANCE FIND PROCEDURE (CFP)

The Chance Find Procedure (CFP) must be applied to all subsurface excavation works within the RSDK complex. The CFP must be communicated to all excavation supervisors before subsurface works commence. Details of the CFP is described in the Annex G.

2) STAKEHOLDER ENGAGEMENT

1) Heritage Consultation Strategy

- Consultation with heritage stakeholders is conducted in a structured and ongoing manner throughout the entire project lifecycle. The consultation strategy draws on AIIB ESS10 (Stakeholder Engagement) and the consultation obligations under Law No. 11/2010 on cultural heritage management.

2) Stakeholders and Consultation Approach

Stakeholder	Key Heritage Issue	Consultation Approach	Frequency
BPK Central Java	Verification of heritage status; approval of work methods; find notifications; technical recommendations	Formal written notification before demolition; technical meetings; regular field coordination	Mandatory before demolition; monthly during construction
Semarang City Disbudpar	City-level coordination; oversight of local heritage regulations	Official notification letters; coordination meetings	Minimum quarterly
Ministry of Education and Culture / Directorate of	Approval for significant interventions to nationally registered heritage	Formal submission for any intervention that may alter the physical integrity of the heritage building	As required (before significant design decisions)

Cultural Heritage Preservation			
Community surrounding the hospital (Barusari Village RT 1/RW 5 and vicinity)	Construction impacts on the historic environment; maintenance of area character	Public consultation as part of the ESIA process; accessible GRM mechanism	Pre-construction; annually during construction
Managers of surrounding heritage buildings (GKI, RSU William Booth, Deputy Governor's Residence)	Vibration, dust, and traffic impacts on surrounding heritage buildings	Notification before high-risk activities; access to vibration monitoring results	Before high-risk activities; upon any incident
Academics and Semarang Heritage Community	Public interest in the preservation of the historic character of the hospital area	Engagement in ESIA public consultation; access to monitoring reports	Per ESIA public consultation schedule

3) Heritage Grievance Redress Mechanism (GRM)

- A Heritage-Specific Grievance Mechanism is available as part of the overall project GRM. Heritage-related grievances may be submitted through:
- A physical complaint box at the project site;
- A dedicated GRM telephone number and email address made publicly available;
- An online application / form (if available); and
- Meetings with the project Liaison Officer.
- All heritage-related grievances must be addressed within 15 working days following the procedure: receipt > verification > investigation > response > documentation. Grievances unresolved within 30 days may be escalated to BPK Central Java or AIIB in accordance with the GRM mechanism.

2) ROLES AND RESPONSIBILITIES

Party	Function in CHMP	Key Duties	Accountability
RSDK / Project Proponent	Primary owner of heritage compliance responsibility	Appoints CH Specialist; secures budget; coordinates the implementation of the HIA (in accordance with Annex F) and oversees refinement of the CHMP.; leads consultation with heritage authorities; reports to AIIB	Accountable to: Ministry of Health, AIIB, BPK Central Java, and the public. Escalation to the Director of RSDK for significant violations.
Project Implementation Unit (PIU)	Coordinates CHMP implementation	Ensures heritage requirements are included in contractor contracts; integrates CHMP into the construction schedule; receives and distributes monitoring reports	Reports to the Director of RSDK

CH Specialist (Cultural Heritage Specialist)	Field heritage technical authority	Undertakes the HIA (in accordance with Annex F) and prepares the final CHMP based on the approved HIA recommendations; supervises works in heritage zones; manages CFP; reviews method statements; leads consultation with BPK Central Java; prepares monthly heritage reports	Independent; reports directly to PIU and AIIB. Has authority to halt works if there is an immediate risk to the heritage building.
Implementing Contractor	Implements heritage procedures in the field	Prepares Heritage Sub-Plan within C-ESMP; follows all CHMP procedures; trains workers; reports all incidents and finds; undertakes crack mapping and vibration monitoring	Accountable to PIU and CSC. Repeated violations may constitute grounds for contractual penalties.
Construction Supervision Consultant (CSC)	Supervises implementation and independent verification	Verifies daily contractor compliance with heritage procedures; reviews vibration monitoring data; issues Non-Conformance Reports (NCR) for deviations; recommends remedial action	Reports to PIU; distributes NCRs to contractor and CH Specialist
BPK Central Java	Regulatory authority and external oversight	Receives notification before demolition; undertakes field verification; approves work methods; responds to CFP finds; provides technical recommendations	Independent authority; BPK Central Java recommendations are binding for activities affecting cultural heritage

2) MONITORING AND REPORTING

1) Heritage Monitoring Program

ID	Monitoring Parameter	Method	Frequency	Responsible Party	KPI Indicator
M-1	Heritage Structure Vibration (PPV)	ISO 4866-based seismograph / geophone; sensors at critical foundation and wall points	Continuous during high-risk activities	Contractor; verified by CSC	Zero exceedances of the action level (5 mm/s) without immediate stop action
M-2	Heritage Structural Condition (Crack Mapping)	Visual inspection; tell-tales; photography; crack measurement	Weekly during demolition; fortnightly during active construction	CH Specialist	No new cracks with width > 0.3 mm without investigation and reporting
M-3	Dust and Heritage Facade Condition	Visual facade inspection; PM10 monitoring at nearest point to heritage building	Weekly	Contractor; verified by CSC	PM10 < 230 µg/m³ at the heritage boundary; no heavy dust accumulation on facade
M-4	Heritage Buffer Zone and Exclusion Zone	Daily field inspection	Daily	CSC Site Inspector	Exclusion zone maintained; no recorded violations without NCR
M-5	Chance Find Procedure Implementation	CFP documentation verification; find register	Per event; monthly (training verification)	CH Specialist	Zero unreported finds; 100% of excavation supervisors have received CFP training

M-6	Asbestos Fiber Exposure (ACM)	Air fiber monitoring in workers' breathing zones (optical / electron microscopy)	During demolition activities involving ACM areas	Licensed ACM contractor; verified by hospital OHS	Asbestos fiber concentration < NAB (0.1 f/cc chrysotile); zero unprotected exposure incidents
M-7	Historic Bunker, Condition and Buffer Zone	Visual inspection; photographic documentation	Monthly; per event if activities within 50 m radius	CH Specialist	Buffer zone intact; no recorded disturbance; BPK Central Java notified if required

2) Reporting Schedule

Report Type	Main Content	Frequency / Deadline	Distribution
Daily Heritage Inspection Report	Field inspection results; buffer zone compliance; incidents / finds	Daily (during high-risk activities)	CSC → Contractor → Project archive
Weekly Heritage Condition Report	Crack mapping results; PPV vibration data; facade condition; progress on corrective actions	Weekly (every Friday)	Contractor → CSC → CH Specialist → PIU
Monthly Heritage Report	Heritage monitoring summary; CHMP implementation status; CFP events; significant findings; plan for following month; budget status	Monthly (by the 5th of the following month)	CH Specialist → PIU → RSDK Director → AIIB (via ESIA Monitoring Report)
Heritage Incident Report	Incident description; cause; heritage impact; immediate actions; corrective actions; lessons learned	Within 48 hours of the incident	CH Specialist → PIU → RSDK Director → BPK Central Java → AIIB
Post-Construction Heritage Report	Final condition of heritage buildings; before-and-after comparison; mitigation effectiveness; operational phase recommendations	Within 3 months of construction completion	CH Specialist → PIU → BPK Central Java → AIIB

3) Corrective Action Procedures

- If heritage monitoring indicates a deviation from established thresholds or KPIs, the following corrective action procedure must be followed:
- The CSC or CH Specialist issues a Non-Conformance Report (NCR) within 24 hours;
- The Contractor must respond to the NCR with a Corrective Action Plan (CAP) within 5 working days;
- The CAP must be approved by the CH Specialist before works resume;
- CAP implementation is verified by the CSC in the field;
- NCRs and CAPs are documented in the monthly heritage report; and
- In the event of repeated violations (> 3 NCRs for the same issue), the PIU may apply contractual sanctions in accordance with the terms of the contract agreement.

2) IMPLEMENTATION SCHEDULE AND BUDGET

1) CHMP Implementation Schedule

Code	Activity	Responsible Party	Schedule	Output
P-1	Appointment of CH Specialist	PIU / RSDK	Before HIA	Appointment letter for a qualified CH Specialist
P-2	Subsequent Heritage Impact Assessment (HIA), comprehensive study	CH Specialist	Before PBG Bongkar	HIA Report incorporating recommendations for refinement of the CHMP; submitted to BPK Central Java for review
P-3	Finalisation of Cultural Heritage Management Plan (CHMP)	CH Specialist; PIU / RSDK	Following completion of HIA	Project-specific CHMP incorporating HIA findings and recommendations.
P-4	Baseline Crack Mapping and documentation of initial heritage building condition	CH Specialist; Structural Engineer	Before demolition commences	Baseline condition report; tell-tales installed; photographic documentation
P-5	Formal notification to BPK Central Java	RSDK / PIU	Before demolition commences	Written notification letter; proof of receipt by BPK Central Java
P-6	Heritage training for construction workers and supervisors	CH Specialist; Contractor	Before mobilization	Attendance records; training materials; competency test
P-7	Installation of PPV vibration monitoring system	Contractor; Structural Engineer	Before demolition	Seismograph installed; certified calibration
C-1	Implementation of CFP for all excavation works	Contractor; CH Specialist; CSC	Throughout excavation activities	CFP communicated; find register maintained
C-2	Vibration monitoring and periodic crack mapping	Contractor; CH Specialist; CSC	Continuous during construction	Weekly monitoring reports; corrective actions if required
C-3	Air quality monitoring (asbestos) during demolition	Licensed ACM Contractor	During ACM demolition activities	Air monitoring reports; no exceedances of NAB
C-4	Monthly Heritage Reports to PIU and AIIB	CH Specialist	Monthly	Monthly heritage reports; integrated into ESIA Monitoring Report
O-1	Post-Construction Heritage Phase Report	CH Specialist; PIU	3 months after construction completion	Post-construction heritage report; operational phase recommendations
O-2	Long-term Conservation Plan for Heritage Building	RSDK; CH Specialist; BPK Central Java	Operational phase	Conservation plan; routine heritage building maintenance procedures

2) Indicative CHMP Budget

No.	Cost Component	Estimated Cost (IDR)	Notes
1	Subsequent Heritage Impact Assessment (HIA)	IDR 500 million – IDR 900 million	CH Specialist, surveys, BPK Central Java consultation, reporting

2	Asbestos Survey (Phase 1 + Phase 2) and Asbestos Management Plan	IDR 150 million – IDR 350 million	Licensed ACM contractor; analytical laboratory
3	PPV Vibration Monitoring System (installation + operation)	IDR 250 million – IDR 400 million	Seismograph equipment; calibration; data logging; analysis
4	Baseline and Periodic Crack Mapping of Heritage Building	IDR 100 million – IDR 200 million	Structural survey; documentation; tell-tales; periodic reports
5	ACM Removal and Disposal (if found)	IDR 200 million – IDR 500 million (contingency)	Dependent on volume of ACM found; licensed contractor
6	Heritage Documentation (archive, professional photography, technical drawings)	IDR 80 million – IDR 150 million	Documentation before and during construction
7	Consultation and Coordination with BPK Central Java and relevant agencies	IDR 50 million – IDR 100 million	Travel, meetings, official correspondence
8	Heritage Training for Workers and Supervisors	IDR 30 million – IDR 60 million	Training materials; instructors; documentation
9	Archaeological Watching Brief (if required)	IDR 80 million – IDR 150 million	Archaeologist present during initial bulk excavation
10	CHMP Reporting and Administration	IDR 75 million – IDR 150 million	Monthly reports, incident reports, post-construction report
	TOTAL ESTIMATED CHMP COST	IDR 1.49 billion – IDR 2.91 billion	Exclusive of ACM removal cost (contingency)

- Note: This budget is indicative and will be updated upon completion of the subsequent HIA and ACM survey. The final budget allocation must be reflected in the Project Bill of Quantities (BOQ) and Procurement Documents.

Annex H – Chance Find Procedure (CFP)

1. **Introduction**

1.1 Purpose

This Chance Find Procedure (CFP) sets out the practical steps that every person on site must follow if archaeological remains, historical artefacts, human remains, or other objects of potential cultural heritage value are uncovered during the RSDK Redevelopment works in Semarang, Jawa Tengah. The protocol is designed to be straightforward enough that an excavator operator, a site foreman, or a visiting inspector can act on it without ambiguity.

The CFP does three things. First, it stops work quickly enough to avoid destroying something that cannot be replaced. Second, it gets the right people to the site before the find is disturbed. Third, it creates a paper trail that satisfies both Indonesian heritage law and the lender's safeguard requirements.

1.2 Project Context

RSDK was established in 1925 during the Dutch colonial era and has been formally registered as a National-Level Cultural Heritage Property under Decree of the Minister of Education and Culture No. 370/M/2017. The hospital complex sits on land that has been continuously occupied for roughly a century, meaning any below-grade excavation carries a real possibility of encountering buried structures, wartime materials, or other remains associated with the site's long history.

A colonial-era bunker was reportedly discovered during earlier IPAL excavation works on the complex. Other subsurface remains may exist but have not yet been systematically surveyed. For that reason, the ESIA treats all below-grade works across the project footprint as carrying at least moderate archaeological risk.

1.3 Scope of Application

This protocol applies without exception to every activity that breaks ground within the RSDK project boundary, including but not limited to:

- Bore piling and deep foundation works.
- Utility and drainage trenching.
- Bulk earthworks, cut-and-fill, and site grading.
- Demolition involving below-grade elements (basements, foundations, underground tanks).
- Landscaping or hardscaping that involves soil disturbance deeper than 0.3 m.
- Any temporary works requiring excavation (dewatering wells, shoring, test pits).

The protocol also applies to areas within the construction exclusion buffer established around the undesignated colonial-era bunker identified during the ESIA baseline assessment.

1.4 Objectives

The core objectives of this CFP are to:

- Protect previously unidentified subsurface archaeological or cultural heritage remains from irreversible damage during construction.
- Comply with Indonesian heritage protection law (UU 11/2010) and the AIIB ESS1 cultural heritage requirements.
- Provide clear, unambiguous instructions so that every worker on site knows what to do when something unexpected turns up.
- Ensure that finds are properly recorded, reported, and (where necessary) conserved before works resume.

2. Legal and Policy Framework

The CFP draws its authority from two parallel streams: Indonesian national law on cultural heritage and the environmental and social safeguard requirements of the project's international lender.

2.1 Indonesian Legislation

Law No. 11 of 2010 on Cultural Heritage (UU Cagar Budaya)

This is the principal statute governing the discovery, registration, preservation, and management of cultural heritage objects and sites in Indonesia. It requires that any person who discovers a cultural heritage object must report the find to the relevant government authority. Intentional destruction, removal, or concealment of heritage objects is a criminal offence.

Government Regulation No. 1 of 2022 (PP 1/2022)

Implements UU 11/2010 by detailing the procedures for national registration and preservation of cultural heritage, including notification requirements for unexpected discoveries during construction works.

Permen PUPR No. 19/2021

Provides technical guidelines for the preservation of cultural heritage buildings and structures, directly relevant to construction activity on or adjacent to nationally registered heritage properties such as RSDK.

2.2 International Safeguard Requirements

AIIB Environmental and Social Standard 1 (ESS1)

Requires that all projects financed by AIIB include provisions for chance finds of cultural heritage during construction. The standard expects a documented procedure, worker training, prompt notification of the relevant heritage authority, and integration of heritage management into the project's overall environmental and social management plan.

IFC Performance Standard 8 (PS8), Cultural Heritage

While PS8 is not directly binding on this project, it provides widely accepted good-practice benchmarks for chance find procedures in infrastructure development and has informed the design of this protocol.

2.3 Competent Heritage Authorities

The primary statutory authority for cultural heritage matters within the project area is:

Balai Pelestarian Kebudayaan (BPK) Jawa Tengah (formerly BPCB Jawa Tengah), the regional heritage preservation office under the Ministry of Education, Culture, Research, and Technology. BPK Jawa Tengah is the authority that must be notified of any chance find within 24 hours.

The Dinas Kebudayaan dan Pariwisata Kota Semarang (Disbudpar) may also need to be informed depending on the nature and significance of the find. The Cultural Heritage Specialist will advise on a case-by-case basis.

3. KEY DEFINITIONS

Term	Definition
Chance Find	Any previously unidentified object, structure, or assemblage of potential archaeological, historical, palaeontological, or cultural significance that is encountered unexpectedly during construction works.
Cultural Heritage Object	Any movable or immovable object, or assemblage of objects, that possesses historical, scientific, educational, religious, or artistic value, whether or not formally registered under UU 11/2010.
Exclusion Zone	A clearly demarcated area with a minimum 10 m radius from the outer edge of the find, within which all construction activity must cease immediately pending assessment.
Archaeological Watching Brief	The systematic monitoring of ground-disturbance works by a qualified archaeologist, carried out to identify and record finds as they emerge in real time.
Cultural Heritage (CH) Specialist	A qualified professional with demonstrated experience in archaeological fieldwork and heritage management in the Indonesian context, appointed by the ESIA Consultant or PIU.
BPK Jawa Tengah	Balai Pelestarian Kebudayaan Jawa Tengah, the competent statutory heritage authority for the project area.
PIU	Project Implementation Unit, the body responsible for overall project management and compliance on behalf of RSDK.
CESMP	Construction Environmental and Social Management Plan, the contractor's site-specific implementation plan for all ESMP commitments.
Finds Register	The formal log maintained on site in which every chance find is recorded with a unique reference number, location, date, description, photographs, and resolution status.
Human Remains	Any skeletal or cremated human remains, or burial-associated objects. Discovery of human remains triggers additional legal obligations and requires immediate police notification alongside heritage authority notification.

4. ROLES AND RESPONSIBILITIES

Getting the chain of communication right is what makes or breaks a chance find procedure. Everybody on site needs to know their part, and that part needs to be small enough to remember under pressure.

Role	Responsibilities
All Site Workers (including machine operators)	Recognise potential finds (Section 5). Stop work immediately. Do not move, remove, or further expose the find. Secure the immediate area and report to the Excavation Supervisor within minutes.
Excavation Supervisor / Foreman	Confirm that all work within the immediate vicinity has stopped. Mark and fence off the exclusion zone (minimum 10 m radius). Notify the Contractor Site Manager and make a preliminary record (photographs, GPS location, brief description).
Contractor Site Manager	Confirm that the exclusion zone is in place and enforced. Notify the Cultural Heritage (CH) Specialist and the PIU E&S Officer within 2 hours. Ensure the find is physically protected (cover with tarpaulin if rain is expected; post a watchman if the site cannot be secured). Enter the find in the Finds Register.
Cultural Heritage (CH) Specialist	Arrive at the site and carry out a preliminary field assessment. Advise whether the find is likely to be of genuine heritage significance or is a modern intrusion. Prepare the BPK Jawa Tengah notification package if the find is assessed as potentially significant. Advise on whether and when works can safely resume, and under what conditions.
PIU E&S Safeguards Officer	Ensure that the correct notifications reach BPK Jawa Tengah within 24 hours. Coordinate with the CH Specialist. Report the find in the next monthly ESIA monitoring report, or immediately if the find is assessed as major. Liaise with the AIIB safeguards team as required.
BPK Jawa Tengah Inspector	Carry out a formal field inspection. Determine whether the find qualifies for registration under UU 11/2010. Issue clearance for works to resume, or direct further investigation and conservation measures.
RSDK Project Director	Ensure that the PIU has the resources and authority to implement the protocol. Escalate to the AIIB if BPK Jawa Tengah clearance is delayed or if the find is assessed as nationally significant.

5. What Might Be Found

Site workers are not expected to be archaeologists. They are expected to notice when something looks unusual and to stop before they destroy it. The following categories cover the most likely types of finds at the RSDK site, given its colonial-era history and continuous occupation since 1925.

5.1 Subsurface Structural Remains

Foundations, walls, floors, drainage channels, tunnels, or other built elements that do not appear on current site plans. At RSDK, these could include remnants of earlier hospital buildings, service infrastructure, or wartime defensive structures similar to the bunker already identified on the complex.

5.2 Artefacts and Objects

Pottery, glass, metal objects (tools, medical instruments, munitions), coins, personal items, ceramic tiles, inscribed stone, or any manufactured item that appears old or out of place. Colonial-era Dutch

ceramics, bricks with maker's marks, and early-twentieth-century medical equipment are plausible finds at this site.

5.3 Human Remains

Skeletal material, cremation deposits, or burial-associated objects. Discovery of human remains is the most sensitive category and triggers additional notification requirements (see Section 7.5).

5.4 Geological or Palaeontological Material

Fossils, unusual geological formations, or evidence of past land use (e.g., charcoal layers, shell middens). While less likely in the RSDK urban setting, they cannot be ruled out.

5.5 Wartime or Military Materials

Unexploded ordnance (UXO), ammunition, military equipment, or personal effects from the Japanese occupation period (1942–1945) or the subsequent independence struggle. If UXO is suspected, the find is treated as a safety emergency and the bomb disposal protocol takes precedence over the heritage procedure. Only after the area has been declared safe by the relevant military or police bomb disposal unit does the heritage assessment proceed.

6. Recognition Guidance For Site Workers

During the toolbox talk and site induction, every worker will be shown examples of the following indicators. The rule is simple: if you are not sure, stop and ask.

6.1 Visual Indicators

- An unexpected change in soil colour, texture, or compaction (e.g., a patch of darker soil in otherwise uniform fill).
- A line of bricks, stones, or morite that does not match known utility routes.
- Fragments of pottery, glass, or metal that look old or are embedded in undisturbed soil.
- Bone fragments or anything that could be bone.
- Concrete, masonry, or metalwork in an unexpected location or at an unexpected depth.

6.2 What Not to Do

- Do not dig further to "see what it is."
- Do not pick up, move, clean, or pocket any objects.
- Do not wash, brush, or scrape the find.
- Do not drive heavy equipment over the area.
- Do not allow photographs to be posted on social media before the CH Specialist has been consulted.

7. Step-By-Step Procedure

The following procedure must be followed every time a potential chance find occurs. No exceptions, no shortcuts.

7.1 Step 1, Stop Work Immediately

The person who notices the find (or the machine operator's spotter) must halt all ground-disturbing activity within the immediate area. This means shutting down excavators, stopping trenching, and pulling personnel back from the find location. The work stoppage applies to every activity that could disturb the find or its surrounding context, not just the activity that exposed it.

Time target: Work stops within minutes of the find being noticed. No further ground disturbance whatsoever.

7.2 Step 2, Secure the Area

The Excavation Supervisor demarcates an exclusion zone of at least 10 metres from the outer visible edge of the find, using hazard tape, barriers, or cones. If the find is large or its full extent is unclear, the zone should be wider. A watchman or designated worker is posted to prevent entry until the CH Specialist arrives.

Time target: Exclusion zone in place within 30 minutes.

7.3 Step 3, Record and Report

The Excavation Supervisor takes the following immediate actions:

- Photograph the find and its surroundings from multiple angles. Include a scale reference (tape measure, hard hat, or any object of known size) and a north arrow if possible.
- Record the GPS coordinates (most smartphones will do this), depth below existing ground level, and a brief written description of what was found and under what circumstances.
- Notify the Contractor Site Manager by phone or radio.

Time target: Initial record completed and Contractor Site Manager notified within 2 hours of discovery.

7.4 Step 4, Notify the CH Specialist and PIU

The Contractor Site Manager notifies the CH Specialist and the PIU E&S Safeguards Officer. The notification should include the photographs, coordinates, and preliminary description prepared in Step 3. The CH Specialist will advise on urgency and travel to the site as soon as practicable.

Time target: CH Specialist and PIU notified within 2 hours of the Contractor Site Manager being informed.

7.5 Step 5, Preliminary Field Assessment

The CH Specialist carries out an initial assessment of the find at the site. This is not a full excavation; it is a rapid evaluation to determine:

- Whether the find is genuine (i.e., not modern debris or a known utility).
- The likely type and approximate age of the find.
- Whether BPK Jawa Tengah notification is required (the default assumption is yes, unless the CH Specialist is confident the find is not culturally significant).
- Whether the find can be adequately protected in situ while surrounding works continue, or whether a wider work stoppage is needed.

Special case, Human Remains: If the find includes or is suspected to include human remains, the PIU must also notify the local police (Polsek or Polrestabes Semarang) and BPK Jawa Tengah immediately. No remains may be moved or further exposed until both authorities have attended the site and given written clearance.

Special case, Suspected UXO: If unexploded ordnance is suspected, the site is treated as a safety emergency. Evacuate personnel to a safe distance (minimum 100 m), notify the police immediately, and do not re-enter the area until military or police bomb disposal has cleared it. The heritage assessment proceeds only after the area is declared safe.

7.6 Step 6, Notify BPK Jawa Tengah

If the CH Specialist assesses the find as potentially significant (or if there is any doubt), the PIU E&S Safeguards Officer sends a formal notification to BPK Jawa Tengah. The notification must include:

- Date and time of discovery.
- Precise location (GPS coordinates and a marked site plan).
- Photographs of the find in its original context.
- Preliminary description and the CH Specialist's initial assessment.
- Confirmation that work has stopped and the exclusion zone is in place.
- A request for BPK Jawa Tengah to inspect the find at the earliest opportunity.

Time target: BPK Jawa Tengah notified within 24 hours of discovery. This is a hard deadline under UU 11/2010 and the AIIB safeguard requirements.

7.7 Step 7, BPK Jawa Tengah Inspection and Determination

A BPK Jawa Tengah inspector visits the site, examines the find, and makes one of the following determinations:

- Not significant. The find is assessed as having no heritage value. BPK Jawa Tengah issues clearance for works to resume. The find is still recorded in the Finds Register for completeness.

- Significant but manageable. The find is recorded, documented, and (where feasible) recovered under archaeological supervision. BPK Jawa Tengah may direct specific recovery, conservation, or relocation measures. Works resume once BPK is satisfied that the find has been adequately dealt with.
- Highly significant. BPK Jawa Tengah may require an extended investigation, a formal archaeological excavation, or permanent in-situ preservation. The PIU and AIIB must be informed immediately, as this may affect the project schedule and design.

7.8 Step 8, Resume Works

Construction works within the exclusion zone may only resume after one of the following conditions is met:

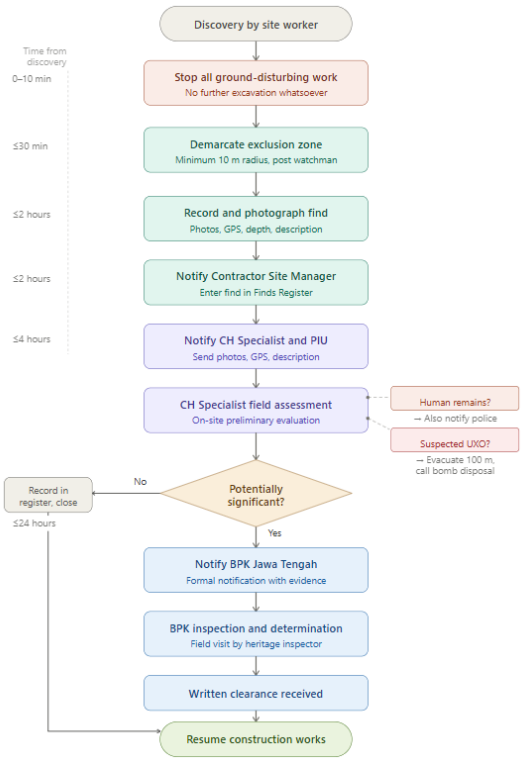
- BPK Jawa Tengah has issued written clearance.
- The CH Specialist has confirmed in writing that the find is not of heritage significance and that BPK Jawa Tengah notification was not required.

The resumption decision is recorded in the Finds Register, signed by the CH Specialist and the Contractor Site Manager, and copied to the PIU.

8. Procedure Flowchart

The diagram below summarizes the CFP response chain. A printed, laminated copy of this flowchart must be posted at every site office, equipment compound, and excavation works area.

CFP procedure flowchart for the RSDK



The flowchart should depict the following sequence:

- Discovery by worker → Immediate work stoppage
- Excavation Supervisor demarcates exclusion zone (10 m minimum)
- Preliminary recording (photographs, GPS, description)
- Contractor Site Manager notified (≤ 2 hours)
- CH Specialist and PIU E&S Officer notified (≤ 2 hours after Site Manager)
- CH Specialist preliminary assessment at site
- Decision: Significant? → Yes: Notify BPK Jawa Tengah (≤ 24 hours) / No: Record and close out
- BPK Jawa Tengah inspection and determination
- Written clearance received → Works resume

9. Notification Timeline Summary

Timeframe	Action	Responsible Party
Immediate (0–10 min)	Stop all ground-disturbing works in the immediate area	Worker / Machine Operator
Within 30 minutes	Demarcate exclusion zone (≥10 m radius); secure the find	Excavation Supervisor
Within 2 hours	Photograph, record GPS, describe find; notify Contractor Site Manager	Excavation Supervisor
Within 4 hours	Notify CH Specialist and PIU E&S Safeguards Officer; enter in Finds Register	Contractor Site Manager
Within 24 hours	Formal notification to BPK Jawa Tengah (if find is assessed as potentially significant)	PIU E&S Safeguards Officer
As needed	Notify Polsek/Polrestabes (if human remains) or bomb disposal (if suspected UXO)	PIU / Contractor Site Manager
Upon clearance	Resume works only after written BPK Jawa Tengah clearance or CH Specialist sign-off	Contractor Site Manager

10. Finds Register

A Finds Register must be maintained on site from the first day of earthworks. Every chance find, regardless of apparent significance, is entered in the register. The register is a controlled document and must be available for inspection by BPK Jawa Tengah, the PIU, and the AIIB at any time.

10.1 Minimum Data Fields

Field	Description
Find Reference Number	Sequential unique identifier (e.g., RSDK-CF-001)
Date and Time of Discovery	When the find was first noticed
Location	GPS coordinates, depth below ground level, and reference to site plan grid
Discoverer	Name and role of the person who made the discovery
Description	Brief narrative description of the find as initially observed
Photographs	Reference numbers of photographs taken at discovery and during assessment
CH Specialist Assessment	Summary of the preliminary field assessment and recommendation
BPK Notification	Date and method of notification; name of BPK contact; reference number of notification letter
BPK Determination	Outcome of BPK inspection (not significant / significant / highly significant)
Recovery / Conservation	Actions taken (e.g., artefact recovered, structure documented, in-situ preservation)
Clearance to Resume	Date and signatory of written clearance; any conditions attached
Status	Open / Closed

A blank Finds Register template is attached as Appendix A to this protocol.

11. Archaeological Watching Brief

For the initial bulk excavation phases of the redevelopment, the ESIA recommends that a qualified archaeologist be present on site to observe ground-disturbance works as they happen. This is known as an archaeological watching brief.

The watching brief is not a substitute for the CFP; it runs alongside it. The archaeologist monitors the works, identifies finds as they emerge, and provides real-time guidance to the excavation team. The watching brief is especially important during the early stages of earthworks, when the subsurface conditions are least understood.

11.1 When a Watching Brief Is Required

- All below-grade works within 25 m of the known bunker location.
- All piling works that penetrate below the existing basement or slab level for the first time.
- Initial bulk excavation for foundations across the project footprint.
- Any excavation that reveals colonial-era fill, rubble, or structural remains.

The CH Specialist may extend or reduce the scope of the watching brief based on what is encountered during the works.

12. Training and Awareness

A protocol is only as good as the people who carry it out. Training is mandatory, not optional.

12.1 Site Induction

Every person who sets foot on the construction site for the first time must receive a CFP briefing as part of their site induction. The briefing covers:

- What a chance find looks like (with photographs of comparable finds from similar sites).
- What to do immediately upon discovery (stop, secure, report).
- What not to do (dig further, move objects, post on social media).
- Who to contact and how (names, phone numbers, radio channels).

Induction attendance must be recorded and signed. Workers who have not completed the CFP induction are not permitted to work on below-grade activities.

12.2 Toolbox Talks

A refresher toolbox talk on the CFP is delivered at least once per month and at the start of any new excavation phase. Additional talks are triggered whenever a chance find actually occurs (to reinforce the procedure with a real example) or when new teams of workers arrive on site.

12.3 Signage

Laminated copies of the CFP flowchart (Section 8) and the emergency contact list (Section 14) must be posted at:

- Every site office.
- Every equipment compound.
- Every active excavation works area.

Signage must be in both Bahasa Indonesia and English.

13. Reporting and Documentation

13.1 Monthly Reporting

All chance finds, including those assessed as not significant, are reported in the monthly ESIA monitoring report. The report includes:

- Number and type of finds during the reporting period.
- Status of each find (open, under assessment, closed).
- Summary of BPK Jawa Tengah correspondence and determinations.
- Any amendments or lessons learned that affect the CFP.

- Confirmation that training and signage are up to date.

13.2 Incident Reporting

If a find is assessed by BPK Jawa Tengah as highly significant, or if there is any damage to a find before the exclusion zone was established, the PIU must notify the AIIB E&S team within 48 hours. This notification is separate from the monthly report and follows the AIIB incident reporting protocol.

13.3 Record Retention

The Finds Register, all photographs, notification correspondence, BPK clearance letters, and training records must be retained for the duration of the project and for a minimum of five years after construction completion. Digital copies must be stored in the PIU's project document management system.

14. Emergency Contact List

The following contacts must be kept current and posted at all site offices and excavation areas. The Contractor Site Manager is responsible for updating the list whenever personnel change.

Role / Organisation	Contact Person	Phone / Email
Contractor Site Manager	[Name]	[Phone]
HSE Manager	[Name]	[Phone]
Cultural Heritage Specialist	[Name]	[Phone / Email]
PIU E&S Safeguards Officer	[Name]	[Phone / Email]
RSDK Project Director	[Name]	[Phone / Email]
BPK Jawa Tengah	[Duty Officer]	[Phone / Email]
Disbudpar Kota Semarang	[Contact]	[Phone / Email]
Polrestabes Semarang	[Duty Officer]	[Phone]
AIIB E&S Safeguards Team	[Name]	[Email]

15. Review and Amendment

This protocol is a living document. It will be reviewed and, if necessary, updated:

- At the start of each major construction phase.
- After every chance find event, to incorporate lessons learned.
- Whenever there is a change in key personnel (Site Manager, CH Specialist, PIU E&S Officer).
- Whenever BPK Jawa Tengah or the AIIB provides feedback that requires procedural changes.
- At a minimum, every 12 months during the construction period.

All revisions are recorded in the Document Control table (Section 1) and the updated version is redistributed to all parties on the distribution list.

16. Chance Find Report Form (CFP) Forms

This form is completed by the site supervisor who discovers an archaeological find. The form is submitted to the CH Specialist within 4 hours of the discovery.

CHANCE FIND REPORT FORM | No. CFP-RSDK-____/____/20__	
Date & Time of Discovery	
Name of Finder	
Position / Role	
Exact Location (Coordinates / Grid)	
Depth (below ground surface)	
Description of Find	
Condition of Find (intact / broken / fragment)	
Immediate Actions Taken	
Date & Time Reported to Site Manager	
Date & Time Reported to CH Specialist	
Name of CH Specialist Contacted	
Photographs Attached (Yes / No, number of photos)	
Signature of Finder	
Signature of Site Manager	

Daily Heritage Inspection Form

DAILY HERITAGE INSPECTION FORM | Date: _____ Inspector: _____		
Inspection Item	**Status (OK / NCR)**	**Notes**
2-metre exclusion zone around heritage building maintained		
Bunker buffer zone maintained		
No heavy machinery operating within 20 m of heritage building		
Dust protection hoarding properly installed		
Water spraying carried out minimum 2× today		
PPV vibration monitoring system operating normally		
No new cracks identified		
Tell-tales in normal condition (no movement detected)		
CFP communicated to all excavation supervisors today		
No archaeological finds today (Yes = no finds)		

Monthly Heritage Report Template

The Monthly Heritage Report covers the following sections:

- Executive Summary: CHMP implementation status for the current month.
- PPV Vibration Monitoring Data: trends, maximum values, incidents exceeding alert level.
- Crack Mapping Status: changes in condition, comparison photographs.
- Heritage Buffer and Exclusion Zone Status: compliance, NCRs issued.
- ACM Status: progress on survey, removal, and disposal.
- Chance Find Events: list of finds, actions taken, disposition.
- Coordination with BPK Central Java: correspondence, site visits, decisions.
- Non-Conformance Reports (NCR) and Corrective Action Plans (CAP): resolution status.
- Field heritage photographic documentation.
- Plan for activities in the following month.
- Annexes: monitoring data, photographs, regulatory correspondence.

Pre-Construction Heritage Checklist

No.	Item	Status	Completion Date
1	CH Specialist appointed with required qualifications	☐ Completed ☐ Pending	
2	Subsequent Heritage Impact Assessment (HIA) completed	☐ Completed ☐ Pending	
3	HIA submitted to BPK Central Java for review	☐ Completed ☐ Pending	
4	HIA recommendations integrated into DED	☐ Completed ☐ Pending	
5	Formal notification to BPK Central Java sent and acknowledged	☐ Completed ☐ Pending	
6	Asbestos Survey Phase 1 completed	☐ Completed ☐ Pending	
7	Asbestos Survey Phase 2 (sampling) completed	☐ Completed ☐ Pending	
8	Asbestos Management Plan (AMP) prepared and approved	☐ Completed ☐ Pending	
9	Baseline Crack Mapping of heritage building completed	☐ Completed ☐ Pending	
10	Tell-tales installed at critical points	☐ Completed ☐ Pending	
11	PPV vibration monitoring system installed and calibrated	☐ Completed ☐ Pending	

No.	Item	Status	Completion Date
12	Demolition Method Statement approved by BPK Central Java	☐ Completed ☐ Pending	
13	Heritage exclusion zones marked in the field	☐ Completed ☐ Pending	
14	Dust protection hoarding installed	☐ Completed ☐ Pending	
15	All excavation supervisors have attended CFP training	☐ Completed ☐ Pending	
16	CFP Form available at all excavation locations	☐ Completed ☐ Pending	
17	Licensed ACM contractor mobilized	☐ Completed ☐ Pending	
18	Heritage Sub-Plan within contractor C-ESMP approved	☐ Completed ☐ Pending	
19	Heritage GRM activated and publicized	☐ Completed ☐ Pending	

Annex I – Andalalin Summary

1. Purpose and Context

The original AMDAL for RSDK was completed in 2020, with the public hearing held on 20 September 2019. That study captured the traffic conditions at the time but did not account for the scale of the GMS-DC & SoE redevelopment now underway. The hospital is about to get substantially bigger, and the roads around it are already congested.

This Andalalin refresh, commissioned under contract 113-AMS-2026 and led by the Andalalin Consultant Lead, updates the traffic picture for the new reality. It covers everything from how many extra trips the expanded facility will generate through to whether the existing car park can absorb the demand, and what traffic management looks like during both construction and full operation.

The refresh is required under PermenHub 17/2021 and feeds directly into the ESIA-ESMP (as Annex J) being prepared for the AIIB-financed TRUST Project. Quantitative outputs from the Andalalin refresh will be incorporated into v1.0 of the ESIA, targeted for 21 June 2026.

2. GMS-DC Trip Generation Model

The Gedung Medik Sentral and Diagnostic Center (GMS-DC) is a 7-storey building with one basement level, covering 30,519 m2 of floor area. It consolidates the IGD (target: 100 beds, up from 58), operating theatres (36 rooms), Cathlab (6 units), ICU/ICCU/HCU (120 beds), NICU/SCN/PICU (61 beds), plus the full diagnostic suite for laboratory and radiology. A separate Service of Excellent (SOE) building adds outpatient clinics, hemodialysis, rehabilitation, and inpatient wards.

The trip generation model takes its input from the Feasibility Study service projections, which show substantial growth across all major service lines over the 2028-2037 planning horizon:

Service Line	2028 Baseline	2037 Projection	Growth
Cathlab procedures/year	9,846	16,001	+63%
Laboratory tests/year	1.95 million	3.16 million	+62%
Patologi Klinik	1.74 million	2.83 million	+63%
Patologi Anatomi	40,000	65,000	+63%
ICU beds (occupancy rate)	46 beds (84.58%)	Expanded	Capacity uplift
ICCU beds (occupancy rate)	Near-full (98.85%)	Expanded	Capacity uplift

These numbers translate directly into more people coming to the hospital every day: more patients, more visitors, more staff, more ambulances, more supply trucks. The trip generation model will quantify the incremental daily and peak-hour vehicle trips attributable to the expanded facility, disaggregated by mode (private car, motorcycle, ambulance, public transport, service/logistics vehicles).

The model outputs feed into the peak-hour loading analysis and the parking demand revision described in the following sections.

3. Peak-Hour Traffic Volume

3.1 Affected Road Network

Two roads carry the bulk of hospital traffic. Jl. Dr. Sutomo runs along the northern perimeter of the RSDK complex, directly fronting the planned GMS-DC building and the Polrestabes Kota Semarang. Jl. Dr. Kariadi provides the secondary access corridor. Both roads are already under pressure: the 2020 AMDAL consultation recorded community complaints about congestion, and residents near RW.05 in Kelurahan Barusari specifically flagged the area in front of Polrestabes as being very congested even before the redevelopment.

3.2 Baseline Traffic Counts

The M1 transitional-season baseline survey, scheduled for May 2026, will produce fresh intersection-level traffic counts at key points along Jl. Dr. Sutomo and Jl. Dr. Kariadi. These counts will capture current peak-hour volumes (typically 07:00-09:00 and 16:00-18:00) across all vehicle classes and will serve as the denominator against which the GMS-DC trip generation increment is measured.

Until the M1 data is available, the Andalalin refresh works from the 2020 ANDAL baseline and from Dinas Perhubungan historical traffic data for the corridor. The preliminary assessment indicates that the roads are already operating near capacity during morning and evening peaks.

3.3 Projected Loading

The Andalalin refresh will overlay the GMS-DC trip generation onto the baseline traffic counts to produce a projected level-of-service analysis for each approach leg at the principal intersections. This analysis will identify whether any intersection or road segment drops below an acceptable level of service and, if so, what physical or operational interventions are needed.

4. Parking Demand Revision

The expanded facility will bring in more people, and those people need somewhere to park. The Andalalin refresh re-estimates the total parking demand for the post-GMS-DC hospital complex and compares it against the existing capacity in the two main parking zones:

Parking Zone	Description	Assessment Focus
Parkir A1/A2	Existing parking areas adjacent to the current hospital buildings	Whether current capacity absorbs the incremental demand from GMS-DC service growth
Parkir A	Additional parking capacity in the broader hospital precinct	Overflow capacity analysis; need for new structured parking or demand management measures

The GMS-DC masterplan includes a basement parking level for logistics and service circulation, but the net impact on visitor and staff parking is the central question. If the numbers do not work, the Andalalin will recommend specific interventions, which could range from additional structured parking to shuttle services, motorcycle-parking expansion, or demand-side measures like public transport access enhancement and telemedicine adoption to reduce physical visits.

The parking analysis also needs to account for construction-phase disruption: temporary loss of parking spaces during building works, relocation of motorcycle parking, and the knock-on effects on surrounding streets where overflow parking currently spills into residential areas.

5. Construction-Phase Traffic Management Plan

Building a major hospital facility inside an active hospital campus, on a congested urban corridor, while keeping the IGD, ICU, and ICCU running without interruption is, to put it plainly, difficult. The construction-phase Traffic Management Plan addresses the specific challenges that come with this context.

5.1 Key Constraints

- Ambulance access to IGD must remain permanently unobstructed. A delayed ambulance response in a tertiary referral hospital is not an acceptable trade-off for construction efficiency.
- The hospital sits directly opposite Polrestabes Kota Semarang, meaning heavy vehicle movements interact with police facility traffic and the general public using that corridor.
- Schools in Sub-district of Semarang Selatan generate pedestrian and school-bus traffic during morning and afternoon peaks.
- Street vendors (PKL) along Jl. Dr. Sutomo and Jl. Dr. Kariadi depend on pedestrian footfall from hospital visitors. Construction-phase access changes directly affect their livelihoods.

5.2 Planned Measures

Measure	Detail
Dedicated haulage route	Approved by Dinas Perhubungan Kota Semarang; construction vehicles follow a fixed route to avoid residential streets
Off-peak material hauling	Heavy material transport, concrete transit, and debris removal restricted to 22:00-05:00 WIB
School-hour exclusion	No heavy vehicles during 07:00-08:00 and 13:00-14:00 (school arrival and departure windows)
Emergency lane protection	Physically segregated, permanently unobstructed access lanes for ambulances, isolated from construction gates; inspected daily
Traffic marshals	Trained flaggers at every active site exit during all working hours; pedestrian safety and clinic visitor right-of-way prioritised
Community notification	Minimum 7-day advance notice before any access route change; community contact person available for complaints
Debris hauling	Demolition debris (~705 m3 in Phase 1) hauled to licensed facility in Genuk (~15 km), estimated one truck trip per day

The Temporary Traffic Management Plan (TTMP) will be formalised as a standalone document requiring Dinas Perhubungan approval before the contractor can mobilise vehicles, equipment, or staff to the construction site. Performance is tracked through daily emergency lane inspections, traffic marshal attendance records, incident/near-miss logs, and community notification dissemination records.

The target is straightforward: zero construction vehicle incidents on Jl. Dr. Sutomo and Jl. Dr. Kariadi for the duration of the construction phase.

6. Operational-Phase Traffic Management Plan

Once the GMS-DC & SoE is commissioned and operational, the traffic picture shifts from construction disruption to permanent capacity increase. The hospital will be serving more patients across more service lines, and the circulation patterns around the complex will change for good.

6.1 What Changes

The completed building reconfigures how vehicles and pedestrians move around the hospital perimeter. New vehicle access points, updated security perimeters, and redesigned landscaping will alter the flow patterns along Jl. Dr. Sutomo and Jl. Dr. Kariadi. Whether this is a net positive or negative for surrounding communities depends entirely on the final design and how well it is managed.

6.2 Operational Mitigation Strategy

- Andalalin-based Traffic Management Plan coordinated with Dishub Kota Semarang and Dishub Provinsi Jawa Tengah
- Public transport access enhancement: Halte BRT Kariadi is less than 100m from the hospital, and Trans Semarang corridor integration can absorb a portion of visitor trips
- Parking demand management: structured parking, motorcycle consolidation, and employee-mode-shift incentives
- Telemedicine and tele-radiology readiness (Smart Hospital strategy) to reduce physical patient trips
- Fleet electrification assessment for RSDK transport and ambulance vehicles (Scope 3 GHG co-benefit)
- Post-construction PKL livelihood monitoring for a minimum of 12 months after operational handover, to confirm whether circulation changes have adversely affected street vendor livelihoods

7. Data Gaps and Next Steps

The ESIA-ESMP is currently at v0.1, and several quantitative inputs are not yet available. The Andalalin refresh will close these gaps as follows:

Data Item	Source	Expected Timeline
Fresh traffic counts (peak-hour, all vehicle classes)	M1 baseline survey	May 2026
GMS-DC trip generation outputs	Andalalin model (EGI)	June 2026 (v1.0)
Level-of-service analysis	Andalalin model (EGI)	June 2026 (v1.0)
Parking demand vs. capacity quantification	Andalalin model + DED	June-July 2026
TTMP formal document	Contractor + Dishub approval	Pre-mobilization
Operational TMP	Andalalin + DED + Dishub	Post-DED (July 2026)

The hard milestone is v1.0 on 21 June 2026, when the ESIA-ESMP goes to AIIB for safeguards review and to the Komisi Penilai AMDAL. By that date, the Andalalin outputs need to be quantified and integrated. The monthly Living Document cadence after v1.0 will incorporate updated monitoring data, construction-phase traffic observations, and any adjustments to the TMP as conditions evolve.

Source: ESIA-ESMP Draft v0.1 (05 May 2026), ANDAL RSDK 2020, Readiness Criteria (10 Feb 2026), Masterplan Rekap (21 April 2026). Prepared as part of AIIB TRUST Project environmental and social safeguards documentation.

Annex J – Integrated Phased Relocation Framework for Seven Vendors Affected by the GMS-DC Redevelopment

1. Purpose and Scope

This Integrated Phased Relocation Framework (IPRF) sets out the arrangements by which seven vendors operating within the RSUP Dr. Kariadi (RSDK) complex are relocated to permanent trading spaces inside the same complex in the course of the GMS-DC Redevelopment Project. It supersedes the two-vendor arrangement previously reflected in the ESIA-ESMP (v0.1) and reflects the design revision confirmed by the Director's briefing of 15 July 2026 and the canteen field survey of 30 July 2026, that adds five canteen operators in the Gedung Korpri canteen building .

The Framework has been prepared in accordance with the AIIB Environmental and Social Framework (2024), specifically Environmental and Social Standard 1 (ESS1) on assessment and management, and Environmental and Social Standard 2 (ESS2) on involuntary resettlement. It is issued as a Living Document and forms Annex J to the ESIA-ESMP submitted to AIIB for no-objection review.

2. Affected Vendors

Seven vendors are affected by the redevelopment: the two originally identified canteen operators in the IGD and Elang buildings, and five canteen operators in the Gedung Korpri canteen building recorded through the 30 July 2026 survey. All remain within the RSDK complex before and after relocation. There is no acquisition of private land, no involuntary population resettlement, and no relocation outside the hospital boundary. The Gedung Korpri building holds six 3×3 m canteen units (five occupied, one vacant) plus one shared washbasin unit; each unit is let at IDR 35 million per year, renewed every December.

Table 1 summarises the vendor inventory. The five Korpri operators were recorded on 30 July 2026; Bakso Salatiga (Bu Wuri) was closed at the survey and is to be re-surveyed. Personal identifiers, full business details and vulnerability status, including employees dependent on the canteens, will be completed through the Phase 0 census.

Table 1 | Inventory of the seven affected vendors and treatment under AIIB ESS2

No.	Vendor Reference	Current Location	New Location within RSDK	Displacement Trigger	ESS2 Treatment
1	**IGD Canteen**	IGD Building (Emergency Department)	Permanent trading space within GMS-DC	Demolition of IGD Building (Phase 2)	**Avoidance**
2	**Elang Canteen**	Elang Building (Inpatient Ward)	Permanent trading space within GMS-DC	Demolition of Elang Building (Phase 2)	**Avoidance**
3	**Kantin Sehat "Manfaat Berkah", Bu Emi**	Gedung Korpri canteen bldg (Unit)	ex-KFC premises (preferred) or Record Center parking-22	Redevelopment of Gedung Korpri (demolition)	Avoidance if relocated (Pathway A), pending RSDK decision; LRP if Pathway B

4	**Kantin Gado-Gado, Ibu Putri Hasini**	Gedung Korpri canteen bldg (Unit)	ex-KFC premises (preferred) or Record Center parking-22	Redevelopment of Gedung Korpri (demolition)		Avoidance if relocated (Pathway A), pending RSDK decision; LRP if Pathway B
5	**Warung Bu Ning, Ibu Supriyaningsih**	Gedung Korpri canteen bldg (Unit)	ex-KFC premises (preferred) or Record Center parking-22	Redevelopment of Gedung Korpri (demolition)		Avoidance if relocated (Pathway A), pending RSDK decision; LRP if Pathway B
6	**Warung Bu Retno**	Gedung Korpri canteen bldg (Unit)	ex-KFC premises (preferred) or Record Center parking-22	Redevelopment of Gedung Korpri (demolition)		Avoidance if relocated (Pathway A), pending RSDK decision; LRP if Pathway B
7	**Kantin Bakso Salatiga, Bu Wuri [re-survey]**	Gedung Korpri canteen bldg (Unit)	ex-KFC premises (preferred) or Record Center parking-22	Redevelopment of Gedung Korpri (demolition)		Avoidance if relocated (Pathway A), pending RSDK decision; LRP if Pathway B
—	(vacant canteen unit)	Gedung Korpri canteen bldg	—	—		No present tenant

ESS2 classification

For the IGD and Elang canteens, relocation to permanent GMS-DC space before the vacated premises are demolished achieves the Avoid step of the ESS2 mitigation hierarchy at the design stage. For the five Korpri operators, this Framework achieves Avoidance only where RSDK elects relocation (Pathway A); RSDK's decision between relocation and non-renewal is pending. A decision to allow the tenancies to lapse ahead of demolition (Pathway B) would constitute economic displacement under ESS2 and require the separate abbreviated RAP / Livelihood Restoration Plan.

The Korpri operators currently serve hospital staff only, because the canteen building lies inside a fingerprint-access-controlled zone; the ex-KFC premises lie outside that zone and require no fingerprint access, so relocation there would preserve, and could widen, the customer base rather than diminish it. Relocation to the more distant Record Center (~150 m) would be less favourable and would require assessment and top-up of any income shortfall. Accordingly, a conventional RAP or LRP is not required where the relocation pathway is followed and the 'no less favourable' test is met; it is required if RSDK elects non-renewal.

3. Guiding Principles

The Framework rests on six principles that are binding on all parties throughout the relocation process.

- Avoidance through sequencing. Replacement trading spaces are built and commissioned before any vendor is required to vacate. No demolition proceeds until all seven vendors are verified operational at their new locations.
- No trading gap. Each vendor moves directly from its current premises to a functional replacement space within the RSDK complex, with no interim closure period.

- No less favourable terms. Lease terms, area, utility provision, hours of operation and access to customers at the new site are equivalent to, or better than, pre-relocation conditions. For the Korpri operators, this test explicitly includes customer access: the ex-KFC site (no fingerprint) satisfies it and may improve trade, whereas Record Center would require a top-up for any shortfall. Operator requests for monthly rent payment and, in one case, a lower fee are to be considered by RSDK when setting the new terms.

- Informed consent. Each vendor is individually consulted, provided with written information in Bahasa Indonesia, and signs a Relocation Agreement. The 30 July 2026 baseline interviews were conducted without disclosing the relocation, as timing and location were not yet fixed; formal disclosure and consent are undertaken at Phase 1b once these are confirmed.

- Cost neutrality for vendors. The Project bears the direct costs of relocation, including transport, installation labour, utility hook-up and signage at the new premises.

- Verifiable performance. Post-relocation trading performance is monitored against a documented baseline, and a corrective response is triggered if a material shortfall arises.

4. Vendor Census and Baseline Documentation

A vendor census is completed during Phase 0 for all seven vendors before any works affecting the existing premises are authorised. The census establishes the baseline against which the success of the relocation is measured and identifies vulnerabilities that warrant tailored support.

4.1 Data captured

- Business profile: goods/services, hours, staffing and turnover indicators. Turnover is verified as net income after the IDR 35M/year tenancy fee, since survey figures are reported gross daily turnover.

- Vulnerability indicators, including single-earner households, elderly operators, persons with disabilities and vendors for whom the trading income is the principal or sole household income. The survey already flags several older women who are sole breadwinners (e.g. Bu Retno, Bu Ning, Ibu Putri) and two vulnerable women employed at Manfaat Berkah; the census records employees' livelihoods as well as operators'.

- Consent status and readiness to relocate. A cut-off date is fixed and communicated; because tenancies renew each December, the 2026 operators may differ in 2027, and eligibility is fixed by reference to those trading at the cut-off..

4.2 Custody and confidentiality

The completed census is held by the RSDK Environmental Management Unit (EMU) and released only in aggregated form for reporting purposes. Personal identifiers are not disclosed to third parties, including in AIIB reporting packages, except with the affected vendor's written consent.

5. Sequencing and Milestones

The relocation is delivered through sequential phases, each with a defined verification milestone. A prior gate applies to the Korpri operators: RSDK records its relocation-vs-non-renewal decision (recommended by Q4 2026). If non-renewal is elected, the LRP replaces this Framework for those operators.

Table 2 | Sequencing of the Integrated Phased Relocation

Phase	Indicative Timing	Actions	Vendor Group Affected	Verification Milestone
Phase 0 Pre-Displacement	Months 0–3	Vendor census (all vendors); baseline turnover/staffing/gender/vulnerability. Confirmation of replacement spaces in design. Individual disclosure and consent. RSDK records the Korpri relocation-vs-non-renewal decision.	All seven vendors (IGD, Elang, Tenants 1–5)	Signed Relocation Agreement for each vendor
Phase 1a Construction of Replacement Spaces	Months 3–30	GMS-DC constructed on current parking area; replacement trading spaces built out with utilities, ventilation and hygiene compliance. Vendors continue operating without disruption.	All seven vendors continue trading at current locations	Site inspection and Certificate of Proper Function (SLF)
Phase 1b Commissioning & Site Familiarisation	Months 30–36	Formal written relocation notice (≥ 30 days before the move; the relocation decision and draft Agreement communicated ≥ 6 months earlier, per §5.5). Guided site visits; confirmation of utilities, equipment fit and lease terms.	All seven vendors	Vendor Site Acceptance Form signed by each vendor
Phase 1c Relocation Execution	Months 36–39 *(sequenced group by group)*	Group A: five Korpri operators relocate to the ex-KFC premises (preferred) / Record Center-22. Group B: IGD and Elang canteens relocate to permanent GMS-DC spaces. RSDK provides transport, installation labour and utility hook-up at no cost.	All seven vendors relocate; continuity of trading maintained	Re-opening within 72 hours; GRM check-in on Day 7
Phase 2 Demolition of Vacated Structures	Month 39 onwards	Demolition of IGD, Elang and the Gedung Korpri building proceeds only after all relocating vendors are verified operational at new locations. No demolition while any relocating vendor remains in vacated premises.	Not applicable, vendors already operational at new sites	Written clearance from Vendor Relocation Focal Point
Phase 3 Post-Relocation Monitoring	Months 39–63	Monthly GRM check-ins (Months 1–6 post-relocation). Quarterly business performance review (Months 7–24). Corrective action triggered if turnover declines above 15% attributable to relocation.	All seven vendors	Semi-annual report to AIIB safeguards team

Stop-work trigger. Demolition of the IGD, Elang and affected sections of Gedung XXX may not proceed while any of the seven vendors remain in their original premises. The Vendor Relocation Focal Point issues a written clearance confirming that all seven vendors are operational at their new locations before demolition permits are released to the Contractor.

6. Relocation Agreements

Each relocating vendor signs an individual Relocation Agreement with RSDK before vacating. It is prepared in Bahasa Indonesia and issued no less than 30 days before the move (with the relocation decision and draft terms communicated no less than six months earlier, per §5.5). As a minimum, the Agreement records:

- The location and characteristics of the replacement trading space (area, utilities, ventilation, access). For the Korpri operators this states whether the ex-KFC or Record Center site applies, and confirms customer-access conditions.
- The lease terms at the new site, rent or trading fee, duration, renewal mechanism and service obligations, confirmed no less favourable than the current arrangement. Operator requests for monthly payment or a reduced fee are addressed here.

7. Transition Support

Transition support is provided by RSDK at no cost to any of the seven vendors and is designed to compress the physical move into a period of no more than 72 hours per vendor. The support package covers:

- Transport of equipment, inventory and fixtures from the vacated premises to the replacement space.
- Installation labour for kitchen fittings, refrigeration, shelving and utility appliances.
- Connection of electricity, water, wastewater and refuse collection at the new site.
- Provision of transitional signage and wayfinding to redirect customers to the new location.
- Inclusion of the new location in the hospital directory and the internal patient- and visitor-information system.
- Where relocation is scheduled during a period of unavoidable low-trade, a discretionary transition payment equivalent to two to three days of average turnover, on evidence of loss.

8. Roles and Responsibilities

Institutional responsibility for the Framework is allocated as shown in Table 3. A Vendor Relocation Focal Point is designated within the RSDK Administration & EMU and is accountable for day-to-day coordination with the seven vendors, the Contractor and the PMSC.

Table 3 | Roles and responsibilities for the Integrated Phased Relocation

Entity	Primary Responsibilities	Reporting Obligation
PIU (Kemenkes)	Overall accountability for ESS2 compliance; approval of the Vendor Relocation Focal Point; endorsement of Relocation Agreements.	Quarterly progress report to AIIB
RSDK Administration & EMU	Day-to-day implementation; designation of a Vendor Relocation Focal Point; provision of transport, installation labour and utility hook-up; custody of census and Agreements.	Monthly report to PIU during Phases 1c–3
PMSC / CMC	Independent verification of site readiness; confirmation of no-demolition status until all relocating vendors are operational; review of monitoring data.	Verification note appended to monthly report
Contractor	Adherence to the no-demolition rule pending clearance; coordination of dust, noise and access with vendor operations; support on utility connections.	Weekly reporting to PMSC during Phases 1c–2
Affected Vendors	Participation in census and consent; timely acceptance of replacement spaces; use of the GRM for any complaint or shortfall.	Feedback through GRM and monthly check-ins
AIIB Safeguards	Oversight of ESS2 compliance; review of Framework updates and no-objection to critical milestones (incl. any LRP if Pathway B).	Receives quarterly and semi-annual reports

9. Grievance Redress Mechanism

Any concern, dispute or complaint raised by a vendor in connection with the relocation is handled through the Project Grievance Redress Mechanism (GRM) described in the Stakeholder Engagement Plan (Annex C). Three principles govern the handling of vendor grievances:

- Accessibility. Grievances can be raised in person, by telephone, through WhatsApp or in writing, in Bahasa Indonesia, and where relevant with the assistance of a trusted third party.
- Timeliness. Every grievance is acknowledged within three working days and resolved within 14 working days; more complex cases are escalated to the PIU with an updated resolution schedule.
- No retaliation. No vendor is disadvantaged in any respect on the ground of having raised a grievance. Confidentiality is maintained on request.

Grievances raised by any of the seven vendors are logged in the central GRM register, tagged as relocation-related and reported quarterly to the AIIB safeguards team as part of the Project's standard reporting cycle.

10. Monitoring and Corrective Action

Post-relocation performance is measured against the six indicators listed in Table 4. Reporting frequency is intensive during the first six months at the new site and then relaxes to a quarterly cycle up to Month 24. A corrective action is triggered where a turnover restoration ratio falls persistently

below 0.85 and the shortfall is attributable to the relocation; in such cases the Project remains responsible for identifying and implementing an appropriate remedy, up to and including further support to the vendor concerned.

Table 4 |Monitoring indicators for the Integrated Phased Relocation

Indicator	Definition and Measurement	Target	Frequency
Trading gap duration	Consecutive days a vendor cannot trade because of relocation	Zero days	Per vendor, at re-opening
Turnover restoration ratio	Monthly turnover at new site ÷ pre-relocation baseline	≥ 1.00 within 6 months	Monthly, then quarterly
Lease-terms comparability	Rent, area, duration and service obligations vs baseline	No less favourable	Once, at signing
Vendor satisfaction	Structured interview after 3 and 12 months	≥ 80% satisfied or better	Two rounds
GRM cases raised and closed	Relocation-related complaints logged and resolved within 14 days	100% closed within 14 days	Monthly
Corrective action triggered	Formal response where turnover declines above 15% attributable to relocation	Response within 30 days	Ad hoc

11. Reporting

The Framework is reported through the Project's standard reporting architecture, with the following specific instruments:

- A monthly Vendor Relocation Progress Note prepared by the RSDK EMU during Phases 1c to 3, submitted to the PIU and PMSC.
- A quarterly summary appended to the Project's AIIB Environmental and Social Progress Report.
- A semi-annual Vendor Livelihood Restoration Verification issued during Phase 3 and copied to the AIIB safeguards team.
- A closure report at Month 24 confirming that the objectives of the Framework have been met or, where they have not, documenting the residual issues and the corrective response.

12. Status and Living-Document Cadence

Pending items requiring PIU or RSDK confirmation are recorded openly and are not fabricated. At the date of this version, the outstanding items are: (i) RSDK's decision between relocation (Pathway A, this Framework) and non-renewal (Pathway B, LRP) for the five Korpri operators, recommended by Q4 2026; (ii) confirmation of the Gedung Korpri building name and the layout/specification of the ex-KFC replacement trading spaces (and Record Center as fallback); (iii) completion of the Phase 0 census, including re-survey of Bakso Salatiga (Bu Wuri), verification of net income, employee profiles, and the future tenant of the vacant unit; and (iv) the confirmed Certificate of Proper Function (SLF) date for

the replacement trading spaces. A further item is to reconcile the notice period (≥ 6-month decision communication vs ≥ 30-day move notice) and the rent-affordability requests recorded in the survey.

Annex K – Waste water Treatment, hazardous toxic waste and radioactive waste

Hospital Wastewater Treatment

Pengolahan Limbah Cair Rumah Sakit

KEMENTERIAN KESEHATAN DIREKTORAT JENDERAL KESEHATAN LANJUTAN RSUP Dr. KARIADI		
	NAMA SOP	: PENGOLAHAN LIMBAH CAIR RUMAH SAKIT
	NOMOR SOP	: OT.00.02/I.V.1.14/107/2014
	TGL. PEMBUATAN	: 12 DESEMBER 2014
	TGL. REVISI	: 28 APRIL 2025 REVISI KE- 4
	HALAMAN	: 1 /2
	TANGGAL EFEKTIF	: 28 APR 2025
	DISAHKAN OLEH	: Direktur Utama dr. Agus Akhmadi,M.Kes NIP 196406020202407101
PENGERTIAN : Pengolahan limbah cair rumah sakit adalah proses menghilangkan atau mengurangi polutan (zat pencemar) yang terdapat dalam limbah cair yang berasal dari rumah sakit		**KUALIFIKASI PELAKSANA :** 1. Petugas mampu dan mengerti melakukan tugas harian pengolahan air limbah 2. Petugas mengerti system pengolahan air limbah Instalasi Pengolahan Air Limbah (IPAL) 3. Petugas mampu membuat laporan kegiatan harian
DASAR HUKUM : 1. Peraturan Pemerintah Nomor 22 Tahun 2021 tentang Penyelenggaraan Perlindungan dan Pengelolaan Lingkungan Hidup 2. Peraturan Menteri Kesehatan Nomor 2 Tahun 2023 tentang Peraturan Pelaksanaan Peraturan Pemerintah Nomor 66 Tahun 2014 Tentang Kesehatan Lingkungan		
KETERKAITAN : 1. SOP Nomor HK.00.01/I.IV.1/265/2014 Revisi ke-4 tanggal 4 Februari 2022 tentang Pengambilan Sampel Limbah Cair 2. SOP Nomor OT.02.02/I.IV.4.3/08/2017 Revisi ke-2 tanggal 4 Februari 2022 tentang Penggantian Ikan Pada Air Limbah 3. SOP Nomor HK.00.01/I.IV.4.3/07/2015 Revisi ke-3 tanggal 25 Juli 2022 tentang Klorinasi Air Bersih dan Air Limbah		**PERALATAN / PERLENGKAPAN :** 1. *Flowmeter inlet* dan *outlet* 2. Gelas ukur lumpur aktif aerasi 3. Bangunan pengolahan air limbah (bak equalisasi, bak aerasi 1 dan 2, bak sedimentasi, bak penampung lumpur, bak desinfektan, bak pengering lumpur dan bak uji biologi) 4. Bak pengumpul limbah berupa pompa *submersible* dan perlengkapan 5. Pengolahan limbah sentral : pompa *submersible* dan *blower* aerasi
PERINGATAN : Apabila SOP tidak dilaksanakan maka pengolahan limbah cair rumah sakit tidak berjalan dengan baik		**PENCATATAN DAN PENDATAAN :** Pencatatan dilakukan di Instalasi Pengolahan Air Limbah (IPAL)
UNIT TERKAIT : Semua Unit di RSUP Dr. Kariadi		**UNIT PENGOLAH :** Instalasi Pemeliharaan Sarana dan Sanitasi Rumah Sakit

KEMENTERIAN KESEHATAN
DIREKTORAT JENDERAL KESEHATAN LANJUTAN
RSUP Dr. KARIADI

NAMA SOP	:	PENGOLAHAN LIMBAH CAIR RUMAH SAKIT
NOMOR SOP	:	OT.00.02/I.V.1.14/107/2014
TANGGAL REVISI	:	28 APRIL 2025 REVISI KE 4
HALAMAN	:	2/2

NO	Aktivitas	Pelaksana				Mutu Baku			Keterangan
		Ketua Tim Sanitasi	Petugas Sanitasi / Sanitarian	Petugas Ruangan	Dinas Lingkungan Hidup	Kelengkapan	Waktu	Output	
1.	Mengatur dan merencanakan jadwal piket serta kegiatan harian untuk setiap bulannya					Jadwal kerja pegawai sanitasi dan program kerja	30 menit	Jadwal piket IPAL dan instruksi rencana kegiatan	
2.	Melakukan cuci tangan sesuai prosedur					Sabun dan air mengalir / handscrub	2 menit	Terjaga kebersihan tangan	
3.	Menggunakan APD (masker & sarung tangan) sesuai dengan ketentuan					Masker dan sarung tangan	3 menit	Terjaga Keamanan	
4.	Melakukan monitoring dan pencatatan kuantitas / debit harian *inlet* dan *outlet* limbah cair					*Form* dan alat tulis	5 menit	Laporan	
5.	Melakukan monitoring dan pencatatan kualitas harian pH dan suhu					*Form* dan alat tulis	10 menit	Laporan	
6.	Mengatur dan menghidupkan mesin blower untuk memenuhi kebutuhan udara di kolam aerasi					*Control Panel blower*	5 menit	Blower hidup bergantian	
7.	Melakukan pemeriksaan *sludge volume indeks* (SVI) pada bak aerasi					Gelas ukur dan gayung	10 menit	Hasil SVI	
8.	Melaksanakan pembuangan lumpur jika diketahui hasil *sludge volume indeks* (SVI) tinggi					Valve Lumpur	30 Menit	Lumpur aktif dikeringkan	
9.	Menambahkan kaporit kedalam bak desinfeksi sesuai dosis					Kaporit	20 Menit	Sisa chlor terpenuhi	
10.	Melakukan pengawasan pada jaringan air limbah					*Form* dan alat tulis	60 Menit	Tidak terjadi kebocoran	
11.	Melakukan pengawasan Bak Pengumpul dan otomatis pompa (radar) pada Bak Pengumpul					*Form* dan alat tulis	60 Menit	Pompa hidup normal	
12.	Melakukan sampling outlet air limbah dan melakukan pemeriksaan di laboratorium kesehatan lingkungan setiap satu minggu sekali					Botol sampling, alat uji & alat ukur sesuai parameter	30 Menit	Laporan	
13.	Melakukan pendampingan sampling *outlet* dan *inlet* air limbah oleh laboratorium rekanan terakreditasi setiap satu bulan sekali					Jadwal sampling	60 Menit	Berita acara sampling dan laporan	
14.	Melaporkan kepada petugas sanitasi (order) jika terjadi jaringan tidak lancar / buntu di ruangan					*Form* order	5 Menit	Perbaikan jaringan	
15.	Melaporkan seluruh kegiatan pengolahan limbah cair setiap 3 bulan dan 6 bulan sekali					Data harian	120 Menit	Tanda terima pelaporan	

CATATAN PERUBAHAN :
1. disesuaikan dengan format baru
2. disesuaikan dengan kondisi lapangan

Hazardous and Toxic Waste Management
Pengelolaan Limbah Berbahaya dan Beracun

KEMENTERIAN KESEHATAN
DIREKTORAT JENDERAL KESEHATAN LANJUTAN
RSUP Dr. KARIADI

Kemenkes RS Kariadi

NAMA SOP	: PENGELOLAAN LIMBAH BAHAN BERBAHAYA DAN BERACUN (B3)
NOMOR SOP	: HK.00.01/I.IV.1/30/2014
TGL. PEMBUATAN	: 14 MARET 2014
TGL. REVISI	: 28 APRIL 2025 REVISI KE- 5
HALAMAN	: 1/3
TANGGAL EFEKTIF	: 28 APR 2025
DISAHKAN OLEH	: Direktur Utama dr. Agus Ahmadi, M.Kes NIP 196540620202407101

PENGERTIAN :

Pengelolaan limbah Bahan Berbahaya dan Beracun (B3) adalah serangkaian langkah-langkah atau tahapan yang sistematis dan terstruktur untuk menangani limbah B3 sejak dari tahap penghasilan, penyimpanan, pengumpulan, pengangkutan, pemanfaatan, pengolahan, hingga penimbunan

DASAR HUKUM :

1. Peraturan Pemerintah Nomor 22 Tahun 2021 tentang Penyelenggaraan Perlindungan dan Pengelolaan Lingkungan Hidup
2. Peraturan Pemerintah Nomor 45 Tahun 2023 tentang Keselamatan Radiasi Pengion dan Keamanan Sumber Radioaktif
3. Peraturan Menteri Kesehatan Nomor 2 Tahun 2023 tentang Peraturan Pelaksanaan Peraturan Pemerintah Nomor 66 tahun 2014 tentang Kesehatan Lingkungan
4. Peraturan Direktur Utama RSUP Dr. Kariadi Nomor HK.02.03/I.IV/391/2019 tanggal 23 Januari 2019 tentang Kebijakan Instalasi Pemeliharaan Sarana dan Sanitasi RSUP Dr. Kariadi

KETERKAITAN :

1. SOP Nomor HK.00.01/I.IV.1/04/2012 Revisi ke 4 tanggal 4 Februari 2022 tentang Pembuangan Darah dan Komponennya
2. SOP Nomor HK.00.01/I.IV.1/34/2012 Revisi ke 4 tanggal 4 Februari 2022 tentang Penyimpanan Limbah B3
3. SOP Nomor HK.00.01/I.IV.1/74/2012 Revisi ke 6 tanggal 4 Februari 2022 tentang Pembuangan Sampah Infeksius

PERINGATAN :

Apabila SOP tidak dilaksanakan maka prosedur pengelolaan limbah Bahan Berbahaya dan Beracun (B3) tidak berjalan dengan baik

UNIT TERKAIT :

Semua ruangan

KUALIFIKASI PELAKSANA :

1. Petugas mampu melakukan cuci tangan dengan benar
2. Petugas mampu mengoperasionalkan komputer
3. Petugas mampu memilah sampah sesuai karakteristik sampah
4. Petugas mampu menggunakan spill kit tumpahan Bahan Berbahaya dan Beracun (B3) maupun ceceran darah

PERALATAN / PERLENGKAPAN :

1. Plastik sampah
2. Alat Pelindung Diri (APD)
3. Tempat sampah *bin* kuning
4. Timbangan Pintar
5. *Form* Berita acara
6. *Log book*
7. Manifest
8. Handphone
9. Nota angkut
10. Komputer

PENCATATAN DAN PENDATAAN :

1. Dokumen manifest pengangkutan limbah oleh pihak ketiga
2. Berita acara penginiman sampah dari ruangan
3. *Loogbook* penginman sampah dari ruangan

UNIT PENGOLAH :

Instalasi Pemeliharaan Sarana dan Sanitasi Rumah Sakit

*OFFICIAL USE ONLY

KEMENTERIAN KESEHATAN DIREKTORAT JENDERAL KESEHATAN LANJUTAN RSUP Dr. KARIADI	NAMA SOP	: PENGELOLAAN LIMBAH BAHAN BERBAHAYA DAN BERACUN (B3)	
	NOMOR SOP	: HK.00.01/I.IV.I/30/2014	
	TANGGAL REVISI	: 28 APRIL 2025	REVISI KE : 5
	HALAMAN	: 3/3	

NO	Aktivitas	Pelaksana				Mutu Baku			Keterangan
		Tenaga Kesehatan di ruangan	Petugas HK	Petugas Sanitasi	Pihak ke III Pengelolaan sampah	Kelengkapan	Waktu	Output	
10.	Melakukan scan label Limbah di aplikasi *Me-SMILE*					*Handphone*	15 menit	Data berat sampah pada dokumen manifest	
11.	Melakukan pencatatan jumlah sampah B3 yang sesuai hasil scan label limbah di berita acara dan ditandatangani oleh petugas sanitasi					Berita acara	15 menit	Data berat sampah pada dokumen manifest	
12.	Petugas menandatangani berita acara penerimaan sampah infeksius					Berita acara	10 menit	Data berat sampah pada dokumen manifest	
13.	Melakukan pencucian *bin* sampah infeksius di sentral pencucian sampah setelah melakukan pengiriman sampah di TPS B3					Bin warna kuning, sabun cuci	10 menit	Terjaga kebersihan bin	
14.	Melakukan pencatatan jumlah sampah dan isi data jumlah sampah harian yang dihasilkan di nota angkut					Nota angkut	5 menit	Arsip dokumen	
15.	Menindaklanjuti hasil penimbangan sampah harian melalui aplikasi *ME-SMILE* untuk diserahkan ke pihak ketiga					*Handphone*	10 menit	Data berat sampah pada aplikasi *Me - SMILE*	
16.	Melaporkan hasil jumlah sampah infeksius harian yang dihasilkan di SPEED KLHK					Nota angkut, komputer	10 menit	Terlapornya data berat sampah harian di SPEED KLHK	
17.	Menerima manifest limbah B3 dari KLHK					Komputer	10 menit	Dokumen manifest	

CATATAN PERUBAHAN :
1. disesuaikan dengan format baru
2. disesuaikan dengan peraturan Permenkes nomor 27tahun 2017 tentang pedoman pengendalian infeksi

Hazardous Waste Storage
Penyimpanan Limbah Bahan Berbahaya

KEMENTERIAN KESEHATAN DIREKTORAT JENDERAL KESEHATAN LANJUTAN RSUP Dr. KARIADI		
	NAMA SOP	: PENYIMPANAN LIMBAH BAHAN BERBAHAYA DAN BERACUN (B3)
	NOMOR SOP	: HK.00.01/I.IV.1/34/2012
	TGL. PEMBUATAN	: 9 Januari 2012
	TGL. REVISI	: 27 AGUSTUS 2025 REVISI KE- 5
	HALAMAN	: 1/3
	TANGGAL EFEKTIF	: 27 AUG 2025
	DISAHKAN OLEH	: Direktur Utama dr. Agus Akhmadi,M.Kes NIP 919640620202407101

PENGERTIAN :

Penyimpanan limbah Bahan Berbahaya dan Beracun (B3) adalah tata cara menempatkan limbah bahan berbahaya beracun di tempat penyimpanan sementara (TPS) yang memenuhi standar keselamatan , keamanan dan lingkungan sebelum diangkut untuk diolah atau dimusnakhkan

DASAR HUKUM :

1. Peraturan Menteri Kesehatan Nomor 2 Tahun 2023 tentang Peraturan Pelaksanaan Peraturan Pemerintah Nomor 66 Tahun 2014 tentang Kesehatan Lingkungan
2. Keputusan Direktur Utama RSUP Dr. Kariadi Nomor HK.02.03/I.IV/662/2022 tanggal 5 April 2022 tentang Instalasi Pemeliharaan Sarana dan Sanitasi di RSUP Dr. Kariadi
3. Peraturan Direktur Utama RSUP Dr. Kariadi Nomor HK.02.03/I.IV/663/2022 tanggal 5 April 2022 tentang Kebijakan Pengelolaan Limbah / Sampah (Padat, Cair dan B3) RSUP Dr. Kariadi

KETERKAITAN :

SOP Nomor HK.00.01/I.IV.1/30/2014 Revisi ke-5 tanggal 28 April 2025 tentang Pengelolaan Limbah Bahan Berbahaya dan Beracun (B3)

PERINGATAN :

Apabila SOP tidak dilaksanakan maka prosedur penyimpanan limbah Bahan Berbahaya dan Beracun (B3) tidak berjalan dengan baik

UNIT TERKAIT :

Semua Unit di RSUP Dr. Kariadi

KUALIFIKASI PELAKSANA :

1. Petugas mampu melakukan cuci tangan dengan benar
2. Petugas mampu mengoperasionalkan komputer
3. Petugas mampu memilah sampah sesuai karakteristik sampah
4. Petugas mampu menggunakan *spill kit* tumpahan Bahan Berbahaya dan Beracun (B3) maupun ceceran darah

PERALATAN / PERLENGKAPAN :

1. Timbangan digital
2. Form berita cara
3. *Safety box*
4. Bin tempat sampah infeksius
5. Alat pelindung diri

PENCATATAN DAN PENDATAAN :

1. Dokumen manifest pengangkutan limbah oleh pihak ketiga
2. Berita acara pengiriman sampah dari ruangan
3. *Logbook* pengiriman sampah dari ruangan

UNIT PENGOLAH :

Instalasi Pemeliharaan Sarana dan Sanitasi Rumah Sakit

KEMENTERIAN KESEHATAN
DIREKTORAT JENDERAL KESEHATAN LANJUTAN
RSUP Dr. KARIADI

Kemenkes RS Kariadi

NAMA SOP	: PENYIMPANAN LIMBAH BAHAN BERBAHAYA DAN BERACUN (B3)
NOMOR SOP	: HK.00.01/I.IV.I/34/2012
TANGGAL REVISI	: 27 AGUSTUS 2025 REVISI KE - 5
HALAMAN	: 3/3

NO	Aktivitas	Pelaksana				Mutu Baku			Keterangan
		House keping	Petugas Sanitasi	Pihak ke III Pengelolaan sampah	Kementerian Lingkungan Hidup	Kelengkapan	Waktu	Output	
9.	Lakukan pengiriman limbah B3 ke pihak ke III yang ditunjuk oleh rumah sakit					Memakai alat pelindung diri	3 jam	Petugas menggunakan alat pelindung diri masker, *handscoon* dan apron	
10.	Catat semua jumlah / jenis limbah B3 yang dikirim ke pihak ke III yang ditunjuk oleh rumah sakit					Dokumen manifest pengiriman sampah b3	10 menit	Laporan jumlah sampah dalam bentuk manifest limbah	
11.	Lakukan dokumentasi ke dalam *logbook* dan manifest limbah B3 yang dikirim ke pihak ke III yang ditunjuk oleh rumah sakit					*Logbook* limbah	15 menit	Laporan jumlah sampah	
12.	Melakukan pelaporan secara rutin setiap 3 bulan sekali					Manifest limbah	3 bulan sekali	Laporan limbah b3	

CATATAN PERUBAHAN :
1. disesuaikan dengan format baru
2. disesuaikan dengan peraturan Permenkes nomor 27 tahun 2017 tentang pedoman pengendalian infeksi

Emergency Response at Temporary Shelters (TPS)
Tanggap Darurat di Tempat Penampungan Sementara (TPS)

KEMENTERIAN KESEHATAN DIREKTORAT JENDERAL KESEHATAN LANJUTAN RSUP Dr. KARIADI		
	NAMA SOP	: TANGGAP DARURAT DI TEMPAT PENAMPUNGAN SEMENTARA (TPS) BAHAN BAHAYA BERACUN (B3)
	NOMOR SOP	: HK.00.01/I.IV.1/35/2012
	TGL. PEMBUATAN	: 9 JANUARI 2012
	TGL. REVISI	: 22 SEPTEMBER 2025 REVISI KE - 4
	HALAMAN	: 1/3
	TANGGAL EFEKTIF	: 22 SEP 2025
	DISAHKAN OLEH	: Direktur Utama dr. Agus Akhmadi,M.Kes NIP 919640620202407101

PENGERTIAN :	**KUALIFIKASI PELAKSANA :**
Kegiatan penampungan sementara (TPS) Bahan Bahaya Beracun (B3) adalah serangkaian tindakan yang harus dilakukan secara cepat dan tepat untuk mengatasi kejadian tak terduga yang dapat membahayakan kesehatan, keselamatan, atau lingkungan yang disebabkan oleh limbah B3 di TPS B3	1. Petugas mampu melaksanakan prosedur tanggap darurat di TPS B3 2. Petugas mampu melaksanakan prosedur pelaporan apabila ada keadaan darurat di TPS B3
DASAR HUKUM :	
1. Peraturan Pemerintah Nomor 21 Tahun 2008 tentang Penyelenggaraan Penanggulangan Bencana 2. Peraturan Pemerintah Nomor 22 Tahun 2021 tentang Penyelenggaraan Perlindungan dan Pengelolaan Lingkungan Hidup 3. Peraturan Menteri Kesehatan Nomor 27 Tahun 2007 tentang Pedoman Pencegahan dan Pengendalian Infeksi di Fasilitas Pelayanan Kesehatan 4. Peraturan Menteri Lingkungan Hidup dan Kehutanan Nomor 6 Tahun 2021 tentang Cara dan Persyaratan Pengelolaan Limbah Berbahaya dan Beracun 5. Peraturan Menteri Kesehatan Nomor 2 Tahun 2023 tentang Peraturan Pelaksanaan Peraturan Pemerintah Nomor 66 Tahun 2014 Tentang Kesehatan Lingkungan 6. Keputusan Direktur Utama RSUP Dr. Kariadi Nomor HK.02.03/I.IV/662/2022 tanggal 5 April 2022 tentang Instalasi Pemeliharaan Sarana dan Sanitasi di RSUP Dr. Kariadi	
KETERKAITAN :	**PERALATAN / PERLENGKAPAN :**
SOP Nomor HK. 00.01/I.IV.4.3/03/2017 Revisi ke- 2 tanggal 27 Agustus 2025 tentang Pembersihan Lingkungan Rumah Sakit yang Terintegrasi	1. *Eye wash* 2. Karbon Aktif 3. Susu 4. Larutan *NaCl* 5. Form Pelaporan Kejadian KAK dan Kartu Pengantar Berobat
PERINGATAN :	**PENCATATAN DAN PENDATAAN :**
Apabila SOP tidak dilaksanakan maka prosedur tanggap darurat di tempat penampungan sementara (TPS) B3 tidak berjalan dengan baik	Pencatatan dan pendataan kejadian tanggap darurat karena terpapar cairan B3 dapat menggunakan form pelaporan kecelakaan akibat kerja dari Tim K3RS
UNIT TERKAIT :	**UNIT PENGOLAH :**
Instalasi Pemeliharaan Sarana dan Sanitasi Rumah Sakit	Tim K3RS RSUP Dr. Kariadi

KEMENTERIAN KESEHATAN
DIREKTORAT JENDERAL KESEHATAN LANJUTAN
RSUP Dr. KARIADI

Kemenkes RS Kariadi

NAMA SOP	: TANGGAP DARURAT DI TEMPAT PENAMPUNGAN SEMENTARA (TPS) BAHAN BAHAYA BERACUN (B3)
NOMOR SOP	: HK.00.01/I.IV.1/35/2012
TANGGAL REVISI	: 22 SEPTEMBER 2025 REVISI KE - 4
HALAMAN	: 2/3

NO	Aktivitas	Pelaksana					Mutu Baku			
		Petugas yang Terpapar B3 pada mata	Rekan Kerja Petugas	Ka. Ruang/ Ka. Tim/ Pengawas	Dokter Jaga IGD	Tim K3RS	Kelengkapan	Waktu	Output	Keterangan
1.	Meminta tolong bantuan teman terdekat							1 Menit	Penanganan paparan B3 sesuai prosedur	
2.	Teman terdekat segera mendampingi dan membantu proses dekontaminasi paparan B3							1 Menit	Penanganan paparan B3 sesuai prosedur	
3.	Bila bahan kimia terhirup								Penanganan paparan B3 sesuai prosedur	
4.	Maka membawa korban ke lingkugan dengan udara bersih							5 Menit	Penanganan paparan B3 sesuai prosedur	
5.	Bila bahan kimia masuk mata								Penanganan paparan B3 sesuai prosedur	
6.	Mencuci bersih dengan air mengalir pada *eyewash* terus menerus selama 15 - 20 menit						Eyewash	15 - 20 Menit	Penanganan paparan B3 sesuai prosedur	
7.	Bila bahan kimia tertelan								Penanganan paparan B3 sesuai prosedur	
8.	Meminumkan karbon aktif untuk menurunkan konsentrasi zat kimia dengan cara adsorpsi						Karbon aktif	15 Menit	Penanganan paparan B3 sesuai prosedur	
9.	Meminumkan susu untuk menetralkan dan mengadsorpsi asam atau basa kuat dan *fenol*						susu	15 Menit	Penanganan paparan B3 sesuai prosedur	
10.	Jika keracunan sudah agak lama, Maka korban dibuat muntah untuk mengosongkan lambung, dengan pemberian larutan *NaCl* (garam dapur) hangat. Tetapi hal ini tidak diperbolehkan untuk korban yang masih pingsan atau keracunan deterjen, bensin, BTX (*Benzene, Toluen, Xylene*), *CCl4*						Larutan *NaCL*	15 menit	Penanganan paparan B3 sesuai prosedur	
11.	Mengisi form pelaporan kecelakaan akibat kerja dari K3						Form Pelaporan Kejadian KAK	10 Menit	Form pelaporan terisi	

Disposal of Infectious Liquid Waste from Patient Rooms and Morgue Blood Waste
(Pembuangan Limbah Cair Rumah Padat Infeksius & Darah Kamar Jenazah)

KEMENTERIAN KESEHATAN DIREKTORAT JENDERAL KESEHATAN LANJUTAN RSUP Dr. KARIADI		
	NAMA SOP	: PEMBUANGAN LIMBAH CAIR, PADAT INFEKSIUS DAN DARAH DI KAMAR JENAZAH
	NOMOR SOP	: OT.02.02/I/IV.4.3/07/2019
	TGL. PEMBUATAN	: 30 SEPTEMBER 2019
	TGL. REVISI	: 22 SEPTEMBER 2025 REVISI KE - 2
	HALAMAN	: 1/3
	TANGGAL EFEKTIF	: 22 SEP 2025
	DISAHKAN OLEH	: Direktur Utama dr. Agus Akhmadi,M.Kes NIP 919640620202407101

PENGERTIAN :	**KUALIFIKASI PELAKSANA :**
Kegiatan pembuangan limbah cair, padat infeksius dan darah di kamar jenazah adalah kegiatan pengelolaan limbah cair dan padat infeksius di kamar jenazah untuk menjaga kesehatan dan keselamatan	1. Petugas mampu melakukan pembuangan limbah padat infeksius dan darah dengan benar 2. Petugas mampu melakukan pengelolaan limbah padat infeksius dan darah dengan benar 3. Petugas mampu melakukan pengelolaan Limbah Cair
DASAR HUKUM :	
1. Peraturan Menteri Kesehatan Nomor 27 Tahun 2017 tentang Pedoman Pencegahan dan Pengendalian Infeksi di Fasilitas Pelayanan Kesehatan 2. Peraturan Menteri Kesehatan Nomor 2 Tahun 2023 tentang Peraturan Pelaksanaan Peraturan Pemerintah Nomor 66 Tahun 2014 Tentang Kesehatan Lingkungan 3. Keputusan Direktur Utama RSUP Dr. Kariadi Nomor HK.02.03/I.IV/662/2022 tanggal 5 April 2022 tentang Instalasi Pemeliharaan Sarana dan Sanitasi di RSUP Dr. Kariadi 4. Peraturan Direktur Utama RSUP Dr. Kariadi Nomor HK.02.03/D.X/1835/2025 tanggal 6 Mei 2025 tentang Pengawasan dan Pemantauan Kualitas Lingkungan RSUP Dr. Kariadi	
KETERKAITAN :	**PERALATAN / PERLENGKAPAN :**
SOP Nomor HK. 00.01/I.IV.4.3/03/2017 Revisi ke- 2 tanggal 27 Agustus 2025 tentang Pembersihan Lingkungan Rumah Sakit yang Terintegrasi	1. Plastik kuning 2. APD 3. Tempat sampah bin kuning 4. Timbangan digital 5. Form berita acara
PERINGATAN :	**PENCATATAN DAN PENDATAAN :**
Apabila SOP tidak dilaksanakan maka pembuangan limbah cair, padat infeksius dan darah di kamar jenazah tidak berjalan dengan baik	Pencataatan di catat di ruang limbah B3
UNIT TERKAIT :	UNIT PENGOLAH :
Semua ruangan dan *house keeping*	Instalasi Pemeliharaan Sarana dan Sanitasi Rumah Sakit

KEMENTERIAN KESEHATAN
DIREKTORAT JENDERAL KESEHATAN LANJUTAN
RSUP Dr. KARIADI

Kemenkes RS Kariadi

NAMA SOP	: PEMBUANGAN LIMBAH CAIR, PADAT INFEKSIUS DAN DARAH DI KAMAR JENAZAH
NOMOR SOP	: OT 02/I/IV.4.3/07/2019
TANGGAL REVISI	: 22 SEPTEMBER 2025 REVISI KE - 2
HALAMAN	: 3/3

NO	Aktivitas	Pelaksana				Mutu Baku			Keterangan
		Tenaga Kesehatan	Petugas House Keeping (HK)	Petugas Sanitasi	Pihak ke-III Pengelola Sampah	Kelengkapan	Waktu	Output	
5.	Melakukan pencucian bin sampah infeksius di sentral pencucian sampah setelah melakukan pengiriman sampah di TPS B3					Bin warna kuning, sabun cuci	10 Menit	Menjaga kebersihan bin	
6.	Melakukan penimbangan sampah infeksius yang dikirim dari ruangan dan di catat dalam *log book* dan lembar berita acara					Timbangan digital, *log book*, berita acara	15 Menit	Data berat sampah pada *log book* dan berita acara	
7.	Melakukan penimbangan sampah infeksius oleh pihak ke III yang akan dikelola yang telah di tunjuk oleh RS					Timbangan digital, dokumen manifest	15 Menit	Data berat sampah pada dokumen manifest	
8.	Melakukan pencatatan jumlah sampah ke dalam *log book* dan menandatangani dokumen *manifest*					*Log book*, dokumen manifest	5 Menit	Arsip dokumen	
9.	Menerima manifest limbah B3 yang dikelola oleh pihak ke III Melakukan pengarsipan dan membuat laporan harian					Manifest lembar ke 2 dan 3	5 Menit	Arsip dokumen dan pelaporan	
10.	Mengirim Sampah infeksius yang telah terkumpul di TPS Limbah B3 ke pihak ke III yang telah ditunjuk oleh RS setiap harinya					Truk pengangkut	10 Jam	Sampah medis terolah	

CATATAN PERUBAHAN :

disesuaikan dengan format baru

Radioactive Waste Management Procedures for Nuclear Medicine Inpatient Isolation Therapy Activities
Tata Laksana Pengelolaan Limbah Radioaktif Pada Kegiatan Terapi Rawat Inap Isolasi Kedokteran Nuklir

KEMENTERIAN KESEHATAN DIREKTORAT JENDERAL KESEHATAN LANJUTAN RSUP Dr. KARIADI	NAMA SOP	: TATA LAKSANA PENGELOLAAN LIMBAH RADIOAKTIF PADA KEGIATAN TERAPI RAWAT INAP ISOLASI KEDOKTERAN NUKLIR
	NOMOR SOP	: HK.00.01/I.I.4411/50/2016
	TGL. PEMBUATAN	: 16 NOVEMBER 2016
	TGL. REVISI	: 27 AGUSTUS 2025 REVISI KE - 2
	HALAMAN	: 1/2
	TANGGAL EFEKTIF	: 27 AUG 2025
	DISAHKAN OLEH	: Direktur Utama dr. Agus Akhmadi, M.Kes NIP 919640620202407101

PENGERTIAN :	**KUALIFIKASI PELAKSANA :**
Tata laksana pengelolaan limbah radioaktif pada kegiatan terapi rawat inap isolasi kedokteran nuklir adalah rangkaian kegiatan yang bertujuan untuk mengumpulkan, mengolah, mengangkut, menyimpan, dan membuang limbah yang mengandung zat radioaktif secara aman dan sesuai dengan peraturan perundang-undangan.	Petugas mampu mengatur pembuangan limbah terapi ablasi rawat inap sebelum dialirkan ke limbah rumah sakit agar aman untuk petugas dan lingkungan
DASAR HUKUM : 1. Peraturan Pemerintah Nomor 61 Tahun 2013 tentang Pengelolaan Limbah Radioaktif 2. Keputusan Direktur Utama Nomor HK.02.03/I.I/805/2022 tanggal 10 Mei 2022 tentang Pelayanan Instalasi Radiologi Rumah Sakit Umum Pusat Dr. Kariadi 3. Keputusan Direktur Utama RSUP Dr. Kariadi Nomor HK.02.03/I.IV/662/2022 tanggal 5 April 2022 tentang Instalasi Pemeliharaan Sarana dan Sanitasi di RSUP Dr. Kariadi	
KETERKAITAN :	**PERALATAN / PERLENGKAPAN :**
SOP Nomor HK.OT.00.02/I.IV.1.14/107/2014 Revisi ke- 4 tanggal 28 April 2025 tentang Pengelolaan Limbah Cair Rumah Sakit	1. Survey meter 2. Monitor kontaminasi 3. Lembar dokumentasi 4. APD berlapis Pb 5. Personal dosimeter baca langsung 6. Buku kartu dosis pekerja radiasi 7. Pompa pemindah limbah
PERINGATAN :	**PENCATATAN DAN PENDATAAN :**
Apabila SOP tidak dilaksanakan maka tata laksana pengelolaan limbah radioaktif pada kegiatan terapi rawat inap isolasi kedokteran nuklir tidak berjalan dengan baik	Laporan
UNIT TERKAIT :	**UNIT PENGOLAH :**
1. Tim Petugas Proteksi Radiasi dan Tim Keselamatan dan Kesehatan Kerja (K3) RSUP Dr. Kariadi 2. Seluruh Unit Kerja Terkait di RSUP Dr.Kariadi	Instalasi Pemeliharaan Sarana dan Sanitasi Rumah Sakit

KEMENTERIAN KESEHATAN DIREKTORAT JENDERAL KESEHATAN LANJUTAN RSUP Dr. KARIADI			NAMA SOP	: TATA LAKSANA PENGELOLAAN LIMBAH RADIOAKTIF PADA KEGIATAN TERAPI RAWAT INAP ISOLASI KEDOKTERAN NUKLIR			
			NOMOR SOP	: HK.00.01/I.4.11/50/2016			
			TGL. PEMBUATAN	: 16 NOVEMBER 2016			
			TGL. REVISI	: 27 AGUSTUS 2025	REVISI KE - 2		
			HALAMAN	: 2/2			
NO	Aktivitas	Pelaksana	Mutu Baku			Keterangan
		Tim PPR	Kelengkapan	Waktu (waktu efektif menit)	Output	
1.	Limbah Radioaktif Material Padat					
a.	Melakukan pengukuran paparan radiasi dan kontaminasi pada bahan limbah radioaktif menggunakan survey meter paparan dan monitor kontaminasi dengan mengenakan APD berlapis Pb (timbal) lengkap		Survey meter, APD	30 menit	Paparan radiasi terpantau	
b.	Mengklasifikasikan material padat yang berupa bahan habis pakai yang nilai paparan radiasi dan kontaminasinya memenuhi tingkat klirens diperlakukan sebagai limbah medis, sedang yang tidak memenuhi tingkat klirens ditampung dan diluruhkan sampai tercapai tingkat klirens.		Bahan habis pakai	30 menit	Material padat terklasifikasi	
c.	Membuang material padat yang berupa muntahan ke dalam kloset kamar pasien, dan bekas muntahan dilakukan dekontaminasi peralatan dan ruangan.		APD dan alat kebersihan	30 menit	Material padat terbuang	
d.	Menyalurkan material padat berupa feses melalui kloset menuju bak penampungan.		Bak penampungan	30 menit	Material padat tersalurkan ke bak penampungan	
2.	Limbah Radioaktif Material Cair					
a.	Melakukan pengukuran paparan radiasi dan kontaminasi pada bahan limbah radioaktif menggunakan survey meter paparan dan monitor kontaminasi dengan mengenakan APD berlapis Pb lengkap.		Survey meter dan APD	30 menit	Paparan radiasi terpantau	
b.	Menyalurkan material cair berupa urin melalui kloset menuju bak penampungan.		Bak penampungan	30 menit	Material cair tersalurkan ke bak penampungan	
c.	Mengdekontaminasi material cair berupa urin yang terdapat diluar closet, cairan urin disalurkan ke dalam closet sedang bahan habis pakai dekontaminasi diperlakukan sebagai limbah padat radioaktif.		Bahan dekontaminasi	30 menit	Material cair terdekontaminasi	
3.	Mengeluarkan Limbah Radioaktif dari Bak Penampungan					
a.	Melakukan perhitungan dan pengukuran tingkat klirens pada bak penampungan limbah radioaktif menggunakan survey meter paparan dan monitor kontaminasi dengan menggunakan APD berlapis Pb lengkap.		Survey meter dan APD	30 menit	Tingkat klirens pada bak penampungan terpantau	
b.	Melihat standar nilai kosentrasi, apabila aktivitas memenuhi tingkat klirens yang ditetapkan BAPETEN, maka diperlakukan sebagai limbah non radioaktif		Tabel standar nilai konsentrasi	30 menit	Tingkat klirens sesuai ketetapan BAPETEN	

CATATAN PERUBAHAN :
1. disesuaikan dengan format baru
2. disesuaikan dengan kondisi lapangan

Radioactive Waste Storage and Handling in Decay Tanks
Penyimpanan dan Penanganan Limbah Radioaktif di dalam Tangki Peluruhan

KEMENTERIAN KESEHATAN DIREKTORAT JENDERAL KESEHATAN LANJUTAN RSUP Dr. KARIADI		
	NAMA SOP	: PENYIMPANAN DAN PENANGANAN LIMBAH RADIOAKTIF DI DALAM TANGKI PELURUHAN
	NOMOR SOP	: HK.00.01/I.I.4.11/103/2014
	TGL. PEMBUATAN	: 12 Desember 2014
	TGL. REVISI	: 27 AGUSTUS 2025 REVISI KE - 3
	HALAMAN	: 1/2
	TANGGAL EFEKTIF	: 27 AUG 2025
	DISAHKAN OLEH	: Direktur Utama dr. Agus Akhmadi,M.Kes NIP 919640620202407101

PENGERTIAN :	KUALIFIKASI PELAKSANA :
Penyimpanan dan penanganan limbah radioaktif di dalam tangki peluruhan adalah proses mengelola limbah yang mengandung zat radioaktif dengan cara menyimpannya dalam tangki khusus untuk periode waktu tertentu	Petugas mampu menyimpan limbah radioaktif dalam tanki peluruhan
DASAR HUKUM : 1. Peraturan Pemerintah Nomor 61 Tahun 2013 tentang Pengelolaan Limbah Radioaktif 2. Peraturan Pemerintah Nomor 22 Tahun 2021 tentang Penyelenggaraan Perlindungan dan pengelolaan Lingkungan Hidup. 3. Peraturan Mentri Kesehatan Nomor 2 Tahun 2023 tentang Peraturan Pelaksanaan Peraturan PemerintahNomor 66 Tahun 2014 tentang Lingkungan Hidup 4. Keputusan Direktur Utama RSUP Dr. Kariadi Nomor HK.02.03/I.IV/662/2022 tanggal 5 April 2022 tentang Instalasi Pemeliharaan Sarana dan Sanitasi di RSUP Dr. Kariadi	
KETERKAITAN :	**PERALATAN / PERLENGKAPAN :**
SOP Nomor HK.00.01/1.I.4.II/50/2016 Revisi ke 2 tanggal 27 Agustus 2025 tentang Tata Laksana Pengelolaan Limbah Radioaktif pada Kegiatan Terapi Rawat Inap Isolasi Kedokteran Nuklir	1. Tempat penyimpanan limbah radioaktif 2. Survey meter dan monitor kontaminasi 3. Tangki peluruhan 4. Dokumen pengarsipan 5. Kertas label / etiket 6. ATK
PERINGATAN :	**PENCATATAN DAN PENDATAAN :**
Apabila SOP tidak dilaksanakan maka penyimpanan dan penanganan limbah radioaktif di dalam tangki peluruhan tidak berjalan dengan baik	Pencatatan etiket / label radioaktif diberlakukan sama dengan limbah medis infeksius
UNIT TERKAIT :	**UNIT PENGOLAH :**
1. Tim Petugas Proteksi Radiasi dan Tim K3 RSUP Dr. Kariadi Semarang 2. Seluruh Unit Kerja Terkait di RSUP Dr. Kariadi Semarang	Instalasi Pemeliharaan Sarana dan Sanitasi Rumah Sakit

KEMENTERIAN KESEHATAN DIREKTORAT JENDERAL KESEHATAN LANJUTAN RSUP DR. KARIADI				NAMA SOP	: PENYIMPANAN DAN PENANGANAN LIMBAH RADIOAKTIF DI DALAM TANGKI PELURUHAN		
				NOMOR SOP	: HK.00.01/I.I.4.11/103/2014		
				TGL. REVISI	: 27 AGUSTUS 2025		REVISI KE - 3
				HALAMAN	: 2/2		

NO	Aktivitas	Pelaksana		Mutu Baku			Keterangan
		Tim PPR	Sanitasi	Kelengkapan	Waktu (waktu efektif menit)	Output	
1.	Mengumpulkan semua material yang berisi atau terkontaminasi dengan zat radioaktif dalam tangki peluruhan			Tangki peluruhan	30 Menit	Material terkumpul	
2.	Tangki peluruhan ditempatkan jauh dari masyarakat umum dan personil rumah sakit serta terkunci			Kunci tangki	30 Menit	Masyarakat aman	
3.	Memberikan tanda radiasi pada area tempat tangki peluruhan			Tanda radiasi	30 Menit	Area bebas dari radiasi	
4.	Menyiapkan dua tangki peluruhan yang besar, masing-masing diberi tanda radiasi yang menampung material dibuang dalam periode tiga bulan			Tangki peluruhan, tanda radiasi	30 Menit	Material terbuang	
5.	Mengisi tangki satu lainnya dalam periode tiga bulan			Tangki peluruhan	30 Menit	Tangki terisi, material terbuang	
6.	Memakai tangki kedua untuk peluruhan			Tangki peluruhan	30 Menit	Tangki kedua terisi, material terbuang	
7.	Pada akhir periode tiga bulan, tangki dua yang telah dipakai meluruhkan dikosongkan, kemudian dipakai untuk menampung sampah aktif selama tiga bulan berikutnya			Tangki peluruhan	30 Menit	Sampah tertampung	
8.	Menjadikan tangki yang satu sebagai peluruhan			Tangki peluruhan	30 Menit	Tangki terisi, material terbuang	
9.	Melanjutkan proses seterusnya secara bergantian			Tangki peluruhan	30 Menit	Tangki terisi, material terbuang	
10.	Mengukur limbah yang berada ditangki dua (peluruhan) sampai pada tingkat latar agar dianggap tidak radioaktif			Alat ukur	30 Menit	Limbah radioaktif terukur	
11.	Menyalurkan limbah yang telah sesuai dengan tingkat kiloro / paparan background ke tangki limbah sentral untuk dilakukan pengolahan limbah lebih lanjut			Saluran limbah	10 Menit	Limbah radioaktif aman tidak mencemari lingkungan	

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