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Rural Economic Transformation Project — Additional Financing (RETRAP-AF, P175263 / P181083)

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

STANDALONE ESMP

Rehabilitation of the Ivory Coast Border – Toe Town – Zwedru Road (85 km)
B'hai Jorzon (km 0) – Toe Town – Zwedru · Grand Gedeh County, Liberia

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LIST OF ACRONYMS AND ABBREVIATIONS

Acronym / abbreviation	Meaning
A1–A10	The ten works-period actions of the BMP
ALARP	As Low As Reasonably Practicable
ANFO	Ammonium nitrate / fuel oil (bulk explosive)
AQ	Air-quality monitoring station prefix (AQ-01 to AQ-20)
BD / SG / WR / AQ / NV / LR / SE / CS / CU / CI	Receptor-prefixed management (mitigation) codes of ESIA Chapter 10 — biodiversity, soils/geology, water, air, noise, land/resettlement, socio-economy, community safety, cultural heritage, cumulative (Table 2.2 of this ESMP)
BFS	Biodiversity Field Survey
BMP	Biodiversity Management Plan
BoQ	Bill of Quantities
C1–C11	Construction-threat codes of the BFS and the BMP (not conditions)
C-ESMP / CESMP	Contractor's Environmental and Social Management Plan (written CESMP in the ESIA and the works contract)
CGRC	Community Grievance Redress Committee
CH	Critical Habitat
CH-West / CH-East	The two pangolin Critical Habitat polygons (km 38–44; km 46–50)
CLO	Community Liaison Officer
CLSG	Côte d'Ivoire–Liberia–Sierra Leone–Guinea interconnection (transmission line)
CoC	Code of Conduct
CR	Critically Endangered (IUCN)
CSZ	Chimpanzee Sensitivity Zone
dBA / dB(A)	A-weighted decibel
DBH	Diameter at Breast Height
dB(L)	Linear (unweighted) decibel — air-overpressure measurement
DLP	Defects Liability Period
DO	Dissolved oxygen
EC	Electrical conductivity
EHS	Environmental, Health and Safety (WBG Guidelines)
EN	Endangered (IUCN)
EO	Environmental Officer (of the Contractor)
EPA	Environmental Protection Agency of Liberia
EPML	Environment Protection and Management Law (2002/2003)
EPRP	Emergency Preparedness and Response Plan
E&S	Environmental and social
ESCP	Environmental and Social Commitment Plan
ESF	World Bank Environmental and Social Framework
ESHS	Environmental, Social, Health and Safety
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
ESMIS	Environmental and social management information system
ESMP	Environmental and Social Management Plan
ESMS	Environmental and Social Management System
ESS (ESS1 to ESS10)	Environmental and Social Standard of the World Bank Environmental and Social Framework
FDA	Forestry Development Authority
FGD	Focus Group Discussion
G1–G6	The six BMP gates before a front enters segment S3 or S6 (BMP Table 8.2)
GBV	Gender-Based Violence
GHG	Greenhouse gas
GIS	Geographic Information System

Acronym / abbreviation	Meaning
GPS	Global Positioning System
GRC	Grievance Redress Committee
GRM	Grievance Redress Mechanism (project grievance mechanism)
GRS	Grievance Redress Service (World Bank)
GW	Groundwater monitoring station (GW-01 to GW-05)
HIV	Human immunodeficiency virus
HR	Human resources
ICCO/CET	International Consolidated Contractors Offshore S.A.L. / Consolidated Engineering and Trading Co. S.A.L. — the design-and-build Joint Venture (the Contractor)
IIU	Infrastructure Implementation Unit of the Ministry of Public Works (the Employer; also written IIU/MPW)
ILO	International Labour Organization
IMP	ESIA impact-register code (IMP-01 to IMP-46; beneficial IMP-B01 to IMP-B08)
IW	Inland wetland (IW-001 to IW-031)
LAeq	A-weighted equivalent continuous sound level
Lmax	Maximum A-weighted sound level during the measurement period
LMP	Labor Management Procedures
LR	Land and resettlement management code (LR-01 to LR-04)
LTI / LTIF	Lost-time injury / lost-time injury frequency
MIA	Ministry of Internal Affairs
MME	Ministry of Mines and Energy
MoA	Ministry of Agriculture
MOU	Memorandum of Understanding
MPW	Ministry of Public Works
MSDS	Material safety data sheet
NCR	Non-conformance report
NOI	Notice of Intent
NS	Noise monitoring station (NS-01 to NS-20)
OHS	Occupational Health and Safety
O&M	Operation and maintenance
PAC	Project-Affected Community
PAP	Project-Affected Person
PBF	Priority Biodiversity Feature
PFMU	Project Financial Management Unit
PIU	Project Implementation Unit
PM10 / PM2.5	Particulate matter of 10 / 2.5 micrometres aerodynamic diameter or less
PMU	Project Management Unit (Ministry of Agriculture)
PPE	Personal protective equipment
PPV	Peak particle velocity (blast vibration)
PWD	Persons with disabilities
QA/QC	Quality assurance / quality control
RAP	Resettlement Action Plan
RETRAP	Rural Economic Transformation Project
RoW / ROW	Right-of-Way
RSK	Risk-register head of the ESIA (Section 9.8 and Appendix X), coded RSK-01 to RSK-41 (41 codes for the 43 heads of ESIA Table X.1 — Table 2.2)
SCNL	Society for the Conservation of Nature of Liberia
SDS	Social Development Specialist (of the MoA-PMU)
SE	Socio-economy management code prefix of ESIA Chapter 10 (SE-01 to SE-04); the Supervising Engineer is written in full in this plan
SEA/SH	Sexual Exploitation and Abuse / Sexual Harassment

Acronym / abbreviation	Meaning
SECRAMP	Southeastern Corridor Road Asset Management Project
SEP	Stakeholder Engagement Plan
SMS	Short message service (mobile text message)
SO	Social Officer (of the Contractor)
SQ	Laboratory certificate code for the noise stations (SQ-01 to SQ-20 = NS-01 to NS-20)
SS	Soil monitoring station (SS-01 to SS-12); SS-001 to SS-006 are the sacred-sites register
STI	Sexually transmitted infection
SW	Surface-water monitoring station (SW-01 to SW-03)
TMP	Traffic Management Plan
TPH	Total petroleum hydrocarbons
TSS	Total suspended solids
UL	University of Liberia
UTM	Universal Transverse Mercator (coordinate system; Zone 29N)
WB / WBG	World Bank / World Bank Group
WCF	Wild Chimpanzee Foundation
WHO	World Health Organization

1. INTRODUCTION

This document is the standalone Environmental and Social Management Plan (ESMP) for the Rehabilitation of the Ivory Coast Border – Toe Town – Zwedru Road (85 km), Grand Gedeh County, Liberia, financed under the Rural Economic Transformation Project (RETRAP) Additional Financing (P175263/P181083). It is the Employer's governing management plan: it converts every mitigation, enhancement and risk-control commitment of the Revised and Updated Environmental and Social Impact Assessment (ESIA, November 2026) into an implementable programme in which each measure has an owner, a performance standard, a timeframe, an indicative cost, and is monitored under the monitoring plan of Section 4. The Employer is the Infrastructure Implementation Unit (IIU) of the Ministry of Public Works (MPW); the works are executed by the ICCO/CET Joint Venture under a Design-and-Build contract; the plan was prepared by Royal Environmental Group Liberia Inc. (RE-GROUP), licensed and certified by the Environmental Protection Agency (EPA).

1.1 Purpose and Scope

The ESMP has four purposes: (i) to secure compliance with the Environment Protection and Management Law (EPML, 2002/2003), the EPA ESIA Procedural Guidelines (2022), the Project's environmental permits and the applicable World Bank Environmental and Social Standards (ESSs); (ii) to operationalise the ESIA Chapter 10 mitigation so that the residual significances stated there are achieved — with this plan implemented, no residual impact is Major; residual significance is Minor or Negligible for all receptors except eight biodiversity codes that remain Moderate on the ESIA scale (BD-02, BD-03, BD-04, BD-05, BD-07, BD-08, BD-10 and CI-01; ESIA Table 10.11), two of them (BD-05 and BD-10) reducing to Minor once the Biodiversity Management Plan (BMP) A6 and A7 structures are certified; (iii) to establish the monitoring, reporting, training, grievance and non-compliance machinery through which performance is verified and corrected; and (iv) to provide the contractual reference from which the Contractor's ESMP (C-ESMP) and the supervision regime derive. It covers pre-construction/mobilisation, construction (≈3 years, beginning at the Zwedru end), operation and maintenance, and decommissioning, across the full corridor (GPS centreline 83.75 km) and all ancillary facilities: 16 borrow pits (BP1–BP17, no BP10), the Suaken and Ziah Town quarries, the Suaken crusher–asphalt–batching complex, the Zuoyou Town camp (≈4 acres), the mechanical site, haul routes and diversions. The ESIA assesses, and this ESMP covers, the full 85 km; the rehabilitation works presently programmed under the works contract comprise approximately 75 km (Toe Town–Zwedru), the remaining 10 km border leg (B'hai Jorzon–Toe Town) being subject to Government of Liberia funding (ESIA Section 3.16), and the measures of this plan apply to the border leg in full when it proceeds, under the same or a separate instrument (Table 8.3, note). This is the standalone ESMP identified in the ESIA at Section 11.1. Its legal, institutional and permit basis is set out in Chapter 2 of the ESIA and summarised at Section 1.3.

1.2 Relationship to the Updated ESIA and Companion Instruments

This ESMP sits within a defined family of instruments and must be read with them.

- **Revised and Updated ESIA (November 2026) — the assessment umbrella.** Chapter 9 identifies and assesses the impacts of planned activities (register IMP-01 to IMP-46; beneficial IMP-B01 to IMP-B08) and summarises the unplanned-event risks (Section 9.8; register at Appendix X, risk heads RSK-01 to RSK-41); Chapter 10 specifies mitigation by receptor set (management codes by receptor: SG soils and geology, WR water resources, AQ air quality, NV noise and vibration, BD biodiversity, LR land and resettlement, SE socio-economy, CS community safety, CU cultural heritage, CI cumulative and induced impacts; enhancement measures) and states residual significance (Table 10.11); Chapter 11 summarises this ESMP. This ESMP operationalises those chapters and alters no finding.
- **C-ESMP (the Contractor's ESMP, written CESMP in the ESIA and the works contract)** — the Contractor's site-specific operationalisation, finalised within the contractual window that runs from

the commencement date (24 August 2026), reviewed and approved by the Supervising Engineer, then submitted to the IIU/MPW for review and approval and subsequently shared with the World Bank, in every case before the commencement of the relevant works. At the date of this issue the C-ESMP is in preparation and has not been approved, and no civil works have commenced; detailed design is progressing from the Zwedru terminus westward and has been completed for approximately the first 10 km from Zwedru, with the ancillary-site screening of Section 3.7 and the biodiversity provisions of Section 3.9 applied at each design review (ESIA Section 3.16); no works activity may proceed ahead of its approved relevant provisions. Its constituent plans include, but are not limited to: the Biodiversity Compliance Plan (reproducing BMP Tables 3.1, 7.1 and 7.2 — gate G1; Section 3.9), the Occupational Health and Safety (OHS) Plan (Section 3.10), the Waste Management Plan (Section 3.6), the Traffic Management Plan (Section 3.11), the Emergency Preparedness and Response Plan (EPRP; Section 3.16), the Camp Management Plan (Section 3.8), the influx management plan and the Security Management Plan (Section 3.11), the water-management plan (Section 3.3), the Restoration and Rehabilitation Plan (Section 3.17), the Blasting Management Plan (if blasting is adopted; Annex F) and the site-specific plans for each ancillary facility — the quarry and borrow-pit ESMPs of Table 8.1 — including any facility not yet identified at this issue, which is fully assessed and costed in the C-ESMP before it is used (Sections 1.5 and 3.7). Every constituent plan follows the approval chain stated above and is costed in Table 8.1 or within the sub-plan allowances of Table 8.3. The C-ESMP is updated at least every six months as a contractual obligation (Section 1.5).

- **BMP** — the standalone Environmental and Social Standard 6 (ESS6) Critical Habitat response, reproduced in full in the ESIA as Appendix T and disclosed with it. It binds the works through ten actions (A1 to A10); six of them (A1, A2, A3, A4, A5 and A8 — BMP Table 6.3) are the conditions on which the residual conclusion rests, and six gates (G1 to G6 — BMP Table 8.2) must be accepted before a front enters segment S3 (km 18–20) or S6 (km 38–50). Section 3.9 carries the headline controls; the BMP governs the detail and prevails in any difference. The register of governing versions of all Project documents is Table 1.1 of the ESIA.
- **Resettlement Action Plan (RAP, Final V2, 23 July 2025)** — authoritative for compensation and resettlement of the 860 project-affected persons (PAPs); its compensation-before-works condition is restated here as a hard gate (Section 3.14).
- **Labour Management Procedures (LMP, P175263)** — governs all direct, contracted and primary-supply workers, the separate workers' grievance mechanism and the Code of Conduct (Section 3.10).
- **Stakeholder Engagement Plan (SEP, P175263, as updated)** — governs engagement and disclosure; this ESMP adopts, and does not replace, the established RETRAP grievance redress mechanism (Section 7).
- **Comment-Response Matrix and Document Control Record** — the separate companion document that records the revision history of this ESMP, the disposition of every review comment received on the package and, at its Annex A, the consolidated index of the commitments of this plan.

RE-GROUP, the consultant that prepared the ESIA, this ESMP and the BMP, holds no implementation, supervision or monitoring responsibility under this ESMP once the instruments are approved and disclosed. Where a measure requires specialist input — laboratory re-analysis, the ichthyological survey, independent audit — the IIU procures it through the Supervising Engineer or its own budget, and RE-GROUP is engaged only if the IIU so decides under a separate instruction. Responsibilities in the tables of this plan are therefore assigned to the Contractor, the Supervising Engineer, the IIU, the Ministry of Agriculture Project Management Unit (MoA-PMU), the statutory agencies and the specialist service providers that they procure (the external RAP monitor, the GBV service providers, the accredited laboratories and the survey specialists) only.

1.3 Legal, Institutional and Permit Basis

The policy, legal and institutional framework of the Project — the national instruments, the World Bank Environmental and Social Standards, the project-level instruments (the Environmental and Social Commitment Plan, ESCP; the Environmental and Social Management Framework, ESMF; the SEP, the LMP and the RAP), the institutional roles and responsibilities (ESIA Table 2.5 and the implementation and supervision organogram at ESIA Figure 2.3), the permits and approvals register (ESIA Table 2.6) and the adopted buffers and setbacks (ESIA Table 2.8) — is set out in Chapter 2 of the ESIA and is not repeated in this ESMP. The permit conditions flow into the C-ESMP and are enforced under Section 6: no facility may be established or operated, and no works front opened, before the relevant permit is in hand. The ESCP commitments are obligations of the Project Implementation Unit (PIU) — the MoA-PMU and the IIU — to the World Bank; their implementation status is reviewed by the PIU in its own monitoring and reporting and by the Bank in supervision, with adaptive management agreed between them, and this ESMP gives effect to them through the measures of Sections 3 to 7 without restating them.

Within that framework the division of labour under this ESMP is as follows. The Contractor implements the mitigation measures and operates the monitoring that the tables assign to it, through the C-ESMP and its constituent plans. The Supervising Engineer reviews and approves the C-ESMP, its constituent plans, method statements and site-specific plans before they are submitted to the IIU/MPW for review and subsequently shared with the World Bank; supervises the Contractor daily; verifies the monitoring; issues non-conformance reports and stop-work instructions; and certifies restoration. The IIU, as Employer and the PIU for this road, holds this plan, reviews and approves the C-ESMP on the Supervising Engineer's review and approval, gate-keeps the conditions precedent, administers the contract and reports quarterly to the EPA and the World Bank. The MoA-PMU coordinates RETRAP reporting and its Social Development Specialist holds the confidential sexual exploitation and abuse / sexual harassment (SEA/SH) channel. The EPA regulates under the permits — issued before the commencement of the relevant activity — and inspects; the Forestry Development Authority (FDA) issues the tree-felling permit, co-signs the Class A marking and, with the Liberia National Police, enforces the wildlife law; the Ministry of Mines and Energy (MME) licenses materials extraction and explosives; and the World Bank provides overall technical support and guidance, and recommends additional measures for strengthening the management framework and implementation performance. There is no parallel biodiversity line: biodiversity compliance runs through the same chain (ESIA Section 2.8).

1.4 How to Use this ESMP

Section 2 maps the assessed impacts and risks to their managing provisions and keys the code families used across the Project documents. Section 3 is the core: seventeen thematic sub-plans, each with a narrative and a mitigation table that states, for every measure, the standard or target, the responsibility, the timing or phase and the indicative cost. Section 4 is the monitoring plan: the impact-detection programme keyed to the 2026 station network (AQ, NS, GW, SW, SS) in Table 4.1; the compliance monitoring of every Section 3 measure — parameter or indicator, method or means of verification, frequency, responsible agency and cost — in Table 4.2; the performance indicators in Table 4.3; and, for biodiversity, the BMP supervision checks (BMP Table 7.1). Section 5 sets the capacity context and the training programme, Section 6 the reporting, review and non-compliance machinery, Section 7 the adopted grievance mechanism and Section 8 the indicative budget with labelled provenance — by line, by carrier and by project phase. Annex E verifies, by measure group and by BMP action, condition and gate, that every ESIA Chapter 10 measure and every BMP action, condition and gate is carried in this plan; Annex F states the required contents and approval gate of the conditional Blasting Management Plan. The annex lettering continues from the BMP, whose Annexes A to D are incorporated by reference. The Contractor builds the C-ESMP from Sections 3 to 5; supervision runs against Sections 4 and 6; communities use Section 7. This plan is the update of the 2024 ESIA's integrated ESMP of 19 management areas (Earthtime, 2024, Ch. 11): all 19 areas are carried forward in full, refreshed to the

2026 evidence base and reorganised into the seventeen themes of Section 3, with gender-based violence (GBV)/SEA/SH consolidated at Section 3.12, trafficking-in-persons prevention within the labour provisions of Section 3.10, and climate-change management delivered through the drainage, erosion and emergency provisions (ESIA Sections 6.1 and 9.8; Appendix X).

1.5 Update and Revision Protocol

Revision of this ESMP (the IIU). This ESMP is a live instrument of the Employer. It is formally reviewed, and where necessary revised by the IIU (the PIU for this road), on the following triggers: (i) after the first full year of construction, once both seasons have been monitored; (ii) on any material change of design, realignment or construction method that takes the works outside the envelope assessed in the ESIA — including a new ancillary site outside the registered sites, any decision to blast, which activates the Blasting Management Plan (Annex F) and risk RSK-17, and any design-schedule package that changes the measures, quantities or costs of this plan materially; (iii) on a change of the institutional or organisational arrangements; (iv) after any serious incident whose root-cause analysis shows that a measure of this plan must change; (v) on any revision of the BMP under its Section 1.6; and (vi) at the annual management review (Section 6.6). Where a change also affects the assessment, the ESIA is revised or an addendum is issued. Revisions are approved by the IIU, notified to the EPA under the permits and cleared with the World Bank where they affect an ESCP commitment; no revision may weaken a measure of Sections 3 or 4 without the written concurrence of the EPA and the World Bank.

Update of the C-ESMP (the Contractor). The C-ESMP is the Contractor's contractual instrument and is updated by the Contractor independently of any revision of this ESMP: at least every six months as a contractual obligation, and in addition whenever a method statement changes, a new ancillary site within the assessed envelope is proposed, a design-schedule package is accepted, a blasting requirement is confirmed, or a non-conformance or incident requires a changed procedure. Each update is reviewed and approved by the Supervising Engineer before it is submitted to the IIU/MPW for review and subsequently shared with the World Bank; the Contractor may not implement a changed procedure before that approval. Every update confirms the adequacy of the cost of each measure and includes the site-specific assessment, mitigation, monitoring and costing of any ancillary facility or quantity that was not fully known when this ESMP was issued (Section 3.7).

Design-schedule reconciliation and the management information system. Within 30 days of the Engineer's acceptance of each design-schedule package (retaining walls and slope stabilisation; cross-drainage; culverts and crossings), the measures, quantities, costs and Bill-of-Quantities mapping of this ESMP are reconciled against the accepted designs, a revised issue of this ESMP is produced where the change is material, and the reconciliation is reported in the monthly environmental and social report, so that the costs of this plan and the Bills of Quantities can be checked against the final designs (ESIA Section 3.14). The works contract is priced as lump-sum activities and sub-activities in its Schedule of Priced Activities (Table 8.5) and carries no measured Bill of Quantities for the cross-drainage, culvert, retaining-wall and slope works at this issue; those quantities are produced with the design-schedule packages, and the reconciliation maps every measure of this plan to the itemised Bill of Quantities as it is produced. The IIU does not yet operate a dedicated Environmental and Social Management Information System (ESMIS) for this road. The ESMIS referred to in this plan is the register-based system that the IIU's Environmental and Social Specialists establish before the commencement of civil works, under the management-systems line of Table 8.1 (the IIU environmental and social management system, ESMS), and operate thereafter: a controlled register of document versions, approvals and training on changes; the monitoring database referenced to the 2026 stations; and the registers of permits, non-conformances, incidents, grievances and training from which Section 6 reports. The ESCP requires such a system (ESIA Section 11.2); it is the Project's record of compliance, and the Contractor's C-ESMP records feed it monthly.

2. SUMMARY OF IMPACTS AND RISKS MANAGED

This section maps the assessed impacts and risks to the mitigation programme so that traceability — from the ESIA Chapter 9 impact register (IMP), Chapter 10 measure sets (receptor-prefixed) and the Section 9.8 / Appendix X risk register (RSK) to the Section 3 sub-plans — is explicit and auditable. The residual significances of ESIA Table 10.11 apply unchanged: all residuals are Minor or Negligible except the eight biodiversity codes that remain Moderate (BD-02, BD-03, BD-04, BD-05, BD-07, BD-08, BD-10 and CI-01), with CS-04's Moderate residual reduced to Minor by the embedded engineering package. Table 2.2 keys the code families used across the ESIA, the Biodiversity Field Survey (BFS), the BMP and this ESMP; the same key is carried in the ESIA as Table 1.2.

Table 2.1: Receptor groups mapped to impact codes, risk codes and managing sub-plans

Receptor group	ESIA Ch 9 impacts (IMP)	ESIA Ch 10 measure set	ESIA §9.8 risks (RSK)	ESMP section
Air quality	IMP-01–03, 37 (part)	AQ-01–AQ-03	RSK-09	3.1
Noise and vibration	IMP-04–07, 37 (part)	NV-01–NV-03	RSK-17	3.2
Water resources	IMP-08–11, 45	WR-01–WR-05	RSK-01, 02, 07, 08, 38	3.3; 3.4
Soils and materials	IMP-12–14	SG-01–SG-05	RSK-04, 05, 06	3.4; 3.5; 3.7
Waste and hazardous materials	IMP-10 (part)	SG-04; WR-03	RSK-02, 08	3.6
Ancillary facilities and landscape	IMP-13, 16, 26, 34	SG-02, SG-05	RSK-06, 17, 40, 41	3.7; 3.8; 3.17
Biodiversity incl. Critical Habitat and induced access	IMP-15–22, 39, 40, 42, 44	BD-01–BD-10; CI-01	RSK-10–15	3.9 (detail: BMP)
Land, livelihoods, resettlement	IMP-23–26, 30	LR-01–LR-04	RSK-36, 37	3.14
Community wellbeing, influx, services	IMP-27–29, 31, 41, 46	SE-01–SE-04; CS-03; CI-02	RSK-28–32, 34	3.8; 3.11; 3.15
Community safety and traffic	IMP-35, 36, 38	CS-01, CS-02, CS-04	RSK-24, 35	3.11
SEA/SH	(risk-based)	ESCP 4.3 package	RSK-25	3.12
Workforce and OHS	(risk-based)	SE-02	RSK-16–23, 26, 27, 39	3.10; 3.16
Cultural heritage	IMP-32, 33	CU-01–CU-03	RSK-33	3.13
Operation and maintenance	IMP-37, 38, 41–43	NV-03; CS-04; BD-05, BD-08	RSK-13, 24	3.9; 3.11; 3.17
Beneficial impacts	IMP-B01–B08	Enhancement measures of ESIA §10.11 (for IMP-B01–B08)	—	3.10; 3.11; 3.15

Table 2.2: Cross-document code key (ESIA — BFS — BMP — ESMP)

Code family	Meaning	Defined in / used in
IMP-01 … IMP-46	ESIA adverse-impact register codes	ESIA Chapter 9 (register, Section 9.2) and Chapter 10; ESMP Table 2.1 and §3
IMP-B01 … IMP-B08	ESIA beneficial-impact codes	ESIA Section 9.3 and §10.11; ESMP Table 2.1
SG, WR, AQ, NV, BD, LR, SE, CS, CU, CI (-01 …)	ESIA receptor-prefixed management (mitigation) codes — soils/geology, water, air, noise, biodiversity, land/resettlement, socio-economy, community safety, cultural heritage, cumulative; the management codes AQ-01 to AQ-03 are distinct from the air-quality stations AQ-01 to AQ-20	ESIA Chapter 10 (Table 10.11); ESMP Table 2.1 and §3
RSK-01 … RSK-41	Unplanned-event and project risk heads (RSK-17 blasting; RSK-24 community traffic; RSK-33 chance finds / cultural heritage). The 41 codes index the 43 heads of ESIA Table X.1: the two blasting heads (fly-rock, vibration and air overpressure; blast-related cracking claims) are coded together as RSK-17 and the two outbreak heads (camp-origin;	ESIA Section 9.8 and Appendix X; ESMP Table 2.1 and §3

	community) as RSK-23, because each pair shares the same controls	
A1 … A10	BMP works-period actions (A1 demarcation; A2 hours and no blasting; A3 ancillary-siting freeze; A4 walkover and Class A protocol; A5 Code of Conduct and camp checks; A6 evidence-led structures; A7 Towah structure; A8 footprint restoration; A9 speed and signs; A10 community notice)	BMP Chapters 3–9, Tables 4.2–4.4 and 9.1; ESIA §10.6 and Appendix T; ESMP §3.9 and Annex E
Six BMP conditions	The six conditions on which the BMP residual conclusion rests — Actions A1, A2, A3, A4, A5 and A8 (not separately coded)	BMP Table 6.3; ESIA Table 11.5 item 2; ESMP Table 3.9 and Table E.2
G1 … G6	BMP gates to be accepted before a front enters S3 or S6	BMP Table 8.2; ESIA Table 11.5 item 2; ESMP Table 3.9 and Table E.2
C1 … C11 (threats)	Construction-threat codes of the BFS and the BMP (C1 right-of-way creep … C11 protected-species sighting) — not conditions	BFS Tables 8.2–8.3; BMP Chapter 4 (Tables 4.1 and 4.1A)
PC1–PC4, C1–C15, O1–O3 (activities)	Project activity codes of the ESIA impact screening (pre-construction, construction, operation) — distinct from the BFS/BMP threat codes C1–C11 above and from the former ESMP commitment identifiers C-01 to C-54, now retired to Annex A of the Comment-Response Matrix and Document Control Record	ESIA Table 3.7 and Tables 9.1–9.2
BFS A1–A5, M1–M8, R1–R5	The BFS's own numbering of its avoidance, minimisation and restoration measures (BFS Chapter 5); consolidated into BMP Actions A1–A10 — the BFS A-codes and the BMP A-codes do not correspond one-to-one	BFS Tables 5.1–5.3; BMP Chapter 4
I-01 … I-09	BFS baseline indicators (record of the 2025–26 survey); no key-performance-indicator programme is carried by the BMP or this ESMP	BFS Table 3.12
S1 … S7	Corridor management segments (S3 = km 18–20 CSZ; S6 = km 38–50 pangolin polygons)	BMP Table 3.3; BFS Table 8.3; ESIA Chapters 7–11
AQ-01–20 / NS-01–20 / GW-01–05 / SW-01–03 / SS-01–12	2026 baseline monitoring stations: air quality, noise, groundwater, surface water, soils (the laboratory certificate codes SQ-01 to SQ-20 correspond to the noise stations NS-01 to NS-20)	ESIA Chapter 6, Appendices F–J and §11.4; ESMP §4
BP1–BP17 (no BP10); RC2; Q-, CR-, C-, L-, D- (BMP Table 3.2)	Ancillary-site identifiers: borrow pits and the candidate crusher site of the ESIA register; the BMP overlay identifiers for quarries, crushers, camps, laydowns and detours	ESIA Section 3.8 (Tables 3.4–3.6); BMP Table 3.2
SS-001 … SS-006; IW-001 … IW-031	Sacred sites register (distinct from the soil stations SS-01–12); inland wetlands in the right-of-way	ESIA Sections 8.6 and 6.3; ESMP §3.3 and §3.13
P1 … P10	Gap-analysis priorities closed by the Revised and Updated ESIA	ESIA Tables 10.13 and 11.4
Chimpanzee Sensitivity Zone (CSZ) / CH polygons / Priority Biodiversity Feature (PBF)	Chimpanzee Sensitivity Zone (km 18–20; 3.14 km² with a 0.78 km² no-go core); pangolin Critical Habitat polygons CH-West (km 38–44) and CH-East (km 46–50); Priority Biodiversity Features	BFS Chapters 3–4; BMP Chapters 2–3; ESIA Chapter 7

3. ENVIRONMENTAL AND SOCIAL MITIGATION PROGRAMME

This section is the core of the ESMP: seventeen thematic sub-plans, each with a short narrative and a mitigation table stating, for every measure, the standard or target, the responsibility, the timing or phase and the indicative cost at 2026 prices. The monitoring of every measure — the parameter or indicator, the method or means of verification, the frequency, the responsible agency and the cost — is set out in Section 4 (Table 4.2), so that mitigation and monitoring are presented separately but row for row. Each indicative cost is an estimate for pricing the Bills of Quantities: the costed measures of each sub-plan sum to that sub-plan's allowance in Table 8.3, which is the Contractor-borne breakdown carried into the construction contract, and discrete items (management plans, monitoring equipment, the laboratory programme) cross-reference Table 8.1. Where a measure has no cost beyond the ordinary conduct of the works (a scheduling rule, a setting-out or procurement control, a design requirement), the table says so. The C-ESMP confirms the adequacy of every allowance and prices the ancillary facilities and quantities that are not fully known at this issue (Section 1.5). The integrated constraints map at Figure 3.1 — the Critical Habitat polygons, the Chimpanzee Sensitivity Zone (CSZ, km 18–20), the pangolin clusters (km 38–50), the 31 right-of-way (RoW) wetlands and nine creeks, cultural-heritage features, settlements and ancillary facilities — is the common spatial reference and must be loaded into the Contractor's geographic information system (GIS) and setting-out systems before any clearance.

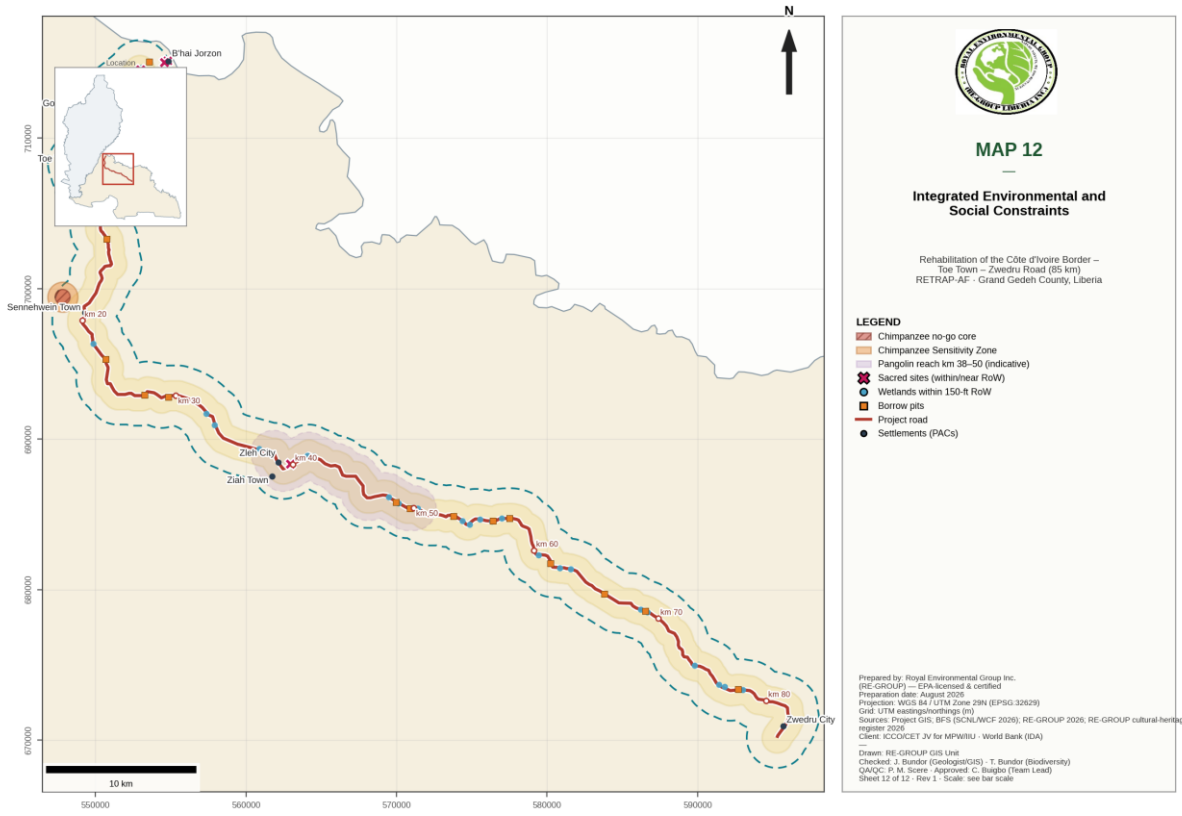


Figure 3.1: Integrated environmental and social constraints along the corridor — common spatial reference for the Section 3 mitigation programme (RE-GROUP, 2026)

3.1 Air Quality and Dust

The 2026 baseline is clean (PM2.5 5.78–7.34 µg/m³; PM10 5.55–7.63 µg/m³ at the 18 reporting stations of AQ-01–20; AQ-07 and AQ-12 under laboratory query), and dust was raised in all fourteen 2026 consultations; the December–March Harmattan is the critical period. Operationalises AQ-01 to AQ-03 (residual Minor) for IMP-01–03 and risk RSK-09.

Table 3.1: Air quality and dust — mitigation measures

Measure	Standard/target	Responsibility	Timing / phase	Indicative cost (US$, 2026 prices)
Water-bowser suppression on active works and unpaved haul routes through towns; frequency raised in dry season/Harmattan and on complaint	PM10 and PM2.5 at sensitive receptors within the Liberian EPA ambient standards and the WHO (2021) 24-hour guideline values applied in the ESIA (PM10 45 µg/m³; PM2.5 15 µg/m³), referenced to the 2026 baseline (Table 4.1); no sustained visible plume	Contractor Environmental Officer (EO)	Construction, daily	150,000
20 km/h haul limit through towns; friable loads covered; drop heights minimised; no burning of waste or vegetation	Zero uncovered loads; zero burning	Contractor	Construction	8,000
Plant controls: crusher/asphalt ≥500 m, batch plant ≥200 m from dwellings; dust suppression fitted; daylight-only; burner controls; maintenance; idling restrictions	EPA permit conditions; manufacturer specifications	Contractor plant manager	Plant operation	Plant dust controls 10,000; continuous monitors in Table 8.1
Stockpiles sheltered/dampened, away from receptors and drainage	No wind-blown loss	Contractor EO	Construction	7,000
Crop-damage compensation within 50 m of works; paving method statements limiting bitumen fumes	Claims settled per damage procedure	Contractor with IIU	Construction	5,000 allowance; claims settled at actual cost
Greenhouse-gas and plant-efficiency controls (AQ-03): aggregates and fill sourced from the registered pits and quarries nearest each front to cap haul distances; efficient plant utilisation, preventive maintenance and anti-idling rules; the fuel-based construction-phase GHG inventory kept in the C-ESMP and reported quarterly (ESIA Section 9.5)	Haul distances within the registered-source plan; plant maintained to manufacturer schedules; inventory current	Contractor plant manager and procurement; EO (inventory)	Construction	No additional cost (sourcing, procurement and maintenance rule within works rates)

3.2 Noise and Vibration

Baseline daytime noise is 46.3–55.0 dBA (stations NS-01–20); receptors include the Zleh Town school, Zai Town clinic and Zwedru hospital cluster where works begin. Operationalises NV-01/NV-02 (residuals Minor/Negligible) for IMP-04–07 and conditional blasting risk RSK-17; CSZ noise rules are ecological controls under Section 3.9.

Table 3.2: Noise and vibration — mitigation measures

Measure	Standard/target	Responsibility	Timing / phase	Indicative cost (US$, 2026 prices)
Working hours and night-work restriction: 06:00–18:00 in and near settlements, 07:00–17:00 adjacent to the Towah swamp (km 12–14) and 08:00–16:00 while a front is in S3 or S6 (Table 3.9, A2); no night working within 2 km of communities; advance notice of unavoidable noisy operations	EPA Noise Regulation (2017); World Bank Group (WBG) Environmental, Health and Safety (EHS) values at residential receptors — 55 dBA daytime and 45 dBA night-time, or no more than a 3 dB increase over the measured baseline where the baseline already exceeds these values	Contractor	Construction	No additional cost (scheduling rule)
Low-noise equipment, intact silencers; plant separations per Table 3.1 (crusher/asphalt ≥500 m, batch plant	Compliance with the limits of row 1 above at the nearest receptor	Contractor plant manager	Plant operation	15,000; noise meter in Table 8.1

Measure	Standard/target	Responsibility	Timing / phase	Indicative cost (US$, 2026 prices)
≥200 m from dwellings); daylight-only crushing; none on Sundays/religious holidays	(55/45 dBA or baseline +3 dB)			
Camp/mechanical-yard noise management at Zuoyou: generator siting/enclosure, night attenuation	No night nuisance at dwellings	Contractor camp manager	Camp operation	10,000
Reduced-energy compaction within 200 m of buildings; pre-condition surveys of fragile structures (incl. Suaken mud-brick dwellings)	No attributable structural damage	Contractor OHS/EO	Before/during works	10,000
Blasting (conditional): none in the CSZ or the pangolin CH polygons, nor in the Barteh Jam grove and Picathartes buffers (BMP Action A2); elsewhere only under the MME explosives permit and the approved Blasting Management Plan (Annex F), with ≥24-hour notice, a 500 m exclusion with sentries and sirens, vibration and air-overpressure monitoring at the nearest receptor, and pre- and post-blast condition surveys	MME permit; Annex F limits (peak particle velocity ≤12.5 mm/s and air overpressure ≤134 dB(L) at the nearest dwelling; lower site-specific limits for fragile structures)	Contractor (licensed shotfirer); the plan: Supervising Engineer reviews and approves, IIU/MPW reviews and approves, shared with the World Bank; MME explosives permit	If blasting is adopted	Blasting Management Plan 43,200 (Table 8.1; conditional). Blast monitoring, condition surveys and sentries: conditional provisional sum 25,000 (Table 8.3 note), drawn only if blasting is confirmed

3.3 Water Resources and Effluents

Nine creeks (including Donneh Creek, SW-03, and the sacred Kougae Creek) and 31 wetlands (IW-001–031) lie within the RoW; groundwater is the principal drinking source with little headroom (TSS 69–80% of the Class I limit; GW-05 pH 6.53). Operationalises WR-02–WR-05 (residuals Minor/Negligible) for IMP-08–11 and risks RSK-01, 02, 08 and 38: the 50 m fuelling buffer, settlement ponds, wellhead protection and the wetland no-fill rule.

Water demand and sources. The Contractor has not yet declared its construction water demand (ESIA Section 3.9). For planning and licensing, RE-GROUP estimates the demand of the 85 km works at about 140,000 m³ over the three-year works period: compaction water for about 0.4 million m³ of granular pavement layers and the earthworks fill (about 60,000 m³); dust suppression on the works and haul routes (about 22,000 m³, for about 1,500 bowser-days); concrete mixing, curing and washout for the 82 culverts, the bridge works and the lined drains (about 8,000 m³); and camp, plant-complex and workshop use (about 50,000 m³ for a resident workforce of about 450) — an average of about 130 m³/day, with dry-season peaks of about 400–500 m³/day when earthworks and dust suppression coincide. The sources are: (i) surface water from the perennial creeks and rivers near the corridor — the five perennial creek crossings and the bridge waterways of the Cavalla basin — at licensed abstraction points agreed with the host communities, located downstream of community use points, each capped by its licence at a stated fraction of the dry-season flow, with no abstraction from any creek while its flow is below the licensed minimum and none from the four intermittent creeks in the dry season; and (ii) groundwater from the Contractor's own boreholes at the camp and the plant complex for potable and camp use, the area having ample groundwater reserves (ICCO/CET, 2025). No water is drawn from community handpumps, wells or springs. The estimate is confirmed, source by source and month by month, in the C-ESMP water-management plan — reviewed and approved by the Supervising Engineer, then by the IIU/MPW, and shared with the World Bank (Section 1.2) — that accompanies the licence applications (ESIA Table 2.6), and the metered volumes are reported monthly (Table 4.2).

Table 3.3: Water resources and effluents — mitigation measures

Measure	Standard/target	Responsibility	Timing / phase	Indicative cost (US$, 2026 prices)
50 m buffer: no fuelling, maintenance, parking or fuel/chemical storage within 50 m of any watercourse, well or borehole; roofed bunds ≥110% of	Zero sheen in receiving waters; 100% bund integrity	Contractor EO	Mobilisation onward	45,000

Measure	Standard/target	Responsibility	Timing / phase	Indicative cost (US$, 2026 prices)
largest container; oil–water separators; drip trays; sealed couplings				
Settlement ponds at every quarry, crusher, batch plant and wash-down area; discharge only after treatment; lined concrete-washout pits; no vehicle washing in watercourses	Discharge clear; turbidity ≤2× upstream (Table 4.3 indicator); effluent-licence conditions (WBG EHS indicative values: TSS 50 mg/L, pH 6–9, oil and grease 10 mg/L)	Contractor	Before facility operation	40,000
Wellhead protection: no abstraction from community handpumps/wells; barriers and drainage control at water points within 100 m of works; equivalent replacement supply at Contractor's cost for attributable damage	Zero water points lost or degraded	Contractor Community Liaison Officer (CLO)/EO	Construction	15,000
Abstraction only under licence from community-agreed points; capped and metered; dry-season restrictions on the four intermittent creeks; camp on its own borehole; sources and volumes per the Section 3.3 estimate (about 140,000 m³ over the works, from the perennial creeks and the Contractor's boreholes), confirmed in the C-ESMP water-management plan (approval chain of Section 1.2)	Licence conditions; no community depletion	Contractor; Supervising Engineer verifies; IIU	Before/during abstraction	10,000 (licence fees and metering)
Camp and site wastewater and sanitation: septic tanks and soakaways sized to the workforce at the camp and the plant complex; at the works fronts and ancillary sites, mobile toilets at a minimum of one unit per 15 workers present (WBG EHS and ILO practice), separate and lockable for men and women with at least one women's unit at every front — about 32 units for the assumed peak front workforce of about 470 (RE-GROUP planning estimate, Section 3.10) — serviced by a licensed provider; certified sludge removal and treatment (Table 3.6); no untreated discharge	Zero untreated discharge	Contractor camp manager and OHS officer	Camp and front operation (construction)	10,000 (camp and plant-site systems; front sanitation in Table 3.10, sludge in Table 3.6)
Wetland no-fill rule: no filling, drainage or ancillary siting in any of the 31 wetlands, with a 30 m no-facility buffer beyond the seasonal edge of each wetland (ESIA Table 2.8); Towah swamp (km 12–14) span or large box culvert (BMP Action A7); culverts maintain flow paths; swamp culvert works January–February; pre/post photographs each crossing	Zero wetland fill; 10/50/100-year hydraulic design	Contractor; design team	Design and construction	Embedded in design (no separate cost)
Pre-works verification: SW-03 hexavalent-chromium re-test with total chromium; manganese, mercury, arsenic and coliform re-tests; the soil organic-matter/organic-carbon re-analysis (Table 3.5); accredited quality assurance / quality control (QA/QC) — one programme reported before the relevant works (Table E.3)	Verified data before construction (RSK-38)	IIU through the Supervising Engineer	Before works	Laboratory programme (Table 8.1)

3.4 Erosion and Sediment Control

Erodible lateritic soils under 2,500–3,000 mm/yr rainfall make erosion the dominant physical hazard, with a BFS erosion belt at km 30–45 and the drainage crossings (82 culverts and five bridges) draining

to the Cavalla Basin and Cestos headwaters. Operationalises SG-01/WR-01 (residuals Minor) for IMP-08 and IMP-12 and risks RSK-04, 05, 07. The Project is in mobilisation and pre-construction: the number and extent of the hydraulic and cross-drainage structures, the retaining walls and the cut-and-fill quantities are fixed at detailed design (ESIA Sections 3.5 and 3.14). The measures below are therefore specified as performance standards; the C-ESMP, prepared on the approved detailed design, makes them site-specific — drainage by drainage, cut by cut and crossing by crossing, with the quantities of silt fences, check dams, sediment traps and re-vegetation for each section — through the design-schedule reconciliation of Section 1.5, before works start in that section.

Table 3.4: Erosion and sediment control — mitigation measures

Measure	Standard/target	Responsibility	Timing / phase	Indicative cost (US$, 2026 prices)
Sequencing: minimise open ground; bulk cut/fill in drier months; in-stream works dry-season only, single continuous operations	No front left unstabilised through a wet season	Contractor works manager	Programming	No additional cost (programming rule)
Controls before opening any face: cut-off drains, berms, check dams, silt fences; sediment traps at all crossings; 30 m riparian no-facility buffers from the top of the bank, widened to 50 m at the larger rivers and the five bridge waterways (ESIA Table 2.8)	Turbidity ≤2× upstream (Table 4.3)	Contractor EO	Before each front	150,000
Progressive re-vegetation of completed slopes and of every surface the works open (cut and fill slopes, verges inside the right-of-way, closed pits, pads and tracks — BMP Action A8); riprap or lined drains at outfalls	≥70% cover at the end of the first rainy season after planting and ≥60% survival; 5:1 replanting where either is missed (BMP A8)	Contractor	Progressive; no surface left bare through a second rainy season	A8 restoration item (Table 8.3)
Dewatering to vegetated ground only; temporary works sized for wet-season flows; pre-storm securing on weather watch; weekly and pre/post-storm slope inspections, prioritising km 30–45	Zero uncontrolled discharge; 100% inspection compliance	Contractor EO; Supervising Engineer	Wet seasons	70,000

3.5 Soils and Materials

Topsoil is a scarce agronomic resource on infertile ferralsols; materials are won from the sites managed under Section 3.7. Operationalises SG-03, SG-04 and SG-05 (residuals Minor/Negligible) for IMP-14.

Table 3.5: Soils and materials — mitigation measures

Measure	Standard/target	Responsibility	Timing / phase	Indicative cost (US$, 2026 prices)
Topsoil stripped separately, stockpiled ≤2 m away from drainage, seeded, reused; no trafficking or storage on stockpiles	100% conserved and reused	Contractor EO	All stripping	30,000
Clearance confined to design footprint; diversions within the RoW except at structures; no felling >200 mm diameter at breast height (DBH) for temporary works; access tracks drained and reinstated	Zero unauthorised disturbance	Contractor	Construction	No additional cost (setting-out control)
Spoil (including unsuitable material excavated from soft-ground/swamp replacement) reused in embankments before disposal; residual spoil only at approved spoil-disposal sites screened under Section 3.7, shaped, drained and re-vegetated; desilted material tested before disposal	Zero unauthorised dumps; 100% spoil sites screened	Contractor	Earthworks	20,000
Materials from licensed sources only; no river sand extraction; primary-supplier due diligence (ESS2)	100% permitted sourcing	Contractor procurement	Before sourcing	5,000 (source register and audits)

Measure	Standard/target	Responsibility	Timing / phase	Indicative cost (US$, 2026 prices)
Contaminated soil remediated via EPA-approved route; 2026 soil organic-matter/organic-carbon results re-analysed before works	Verified dataset before works; contaminated soil remediated to the FAO and Dutch screening reference values applied in ESIA Appendix G	Contractor EO; IIU through the Supervising Engineer (laboratory re-analysis)	On occurrence; pre-works	5,000 allowance; laboratory programme (Table 8.1)

3.6 General and Hazardous Waste

The camp and works will generate ≈280 kg/day municipal waste and ≈30 kg/day sewage sludge (2024 planning basis) plus construction, bituminous and hazardous streams, and the demolition waste of the structures removed from the right-of-way under the RAP (854 private and 16 public structures by the RAP census), of the existing culverts and headwalls and of the Zwedru pavement. Table 3.6a states, for each waste stream, the handling on site and the disposal route and destination. Operationalises SG-04/WR-03 (residuals Minor/Negligible); supports RSK-02 and RSK-08.

Table 3.6: General and hazardous waste — mitigation measures

Measure	Standard/target	Responsibility	Timing / phase	Indicative cost (US$, 2026 prices)
Waste Management Plan (C-ESMP constituent); segregation at source; lidded scavenger-proof bins; hardstanding storage; inventory	Plan before works; 100% segregation	Contractor EO prepares; Supervising Engineer reviews and approves; IIU/MPW reviews and approves; shared with the World Bank	Before works; throughout	Plan 43,200 (Table 8.1); facilities 25,000
No on-site burning or burial; collection and disposal only by EPA-certified contractors with manifests, by the disposal routes of Table 3.6a (including demolition waste)	Zero burn/burial; full manifest chain	Contractor	Throughout	40,000
Hazardous materials: material safety data sheet (MSDS) register; roofed bunded stores on sealed hardstanding; used oil per EPA guidelines; bitumen containers to authorised dealers; EPML ss. 58/64/71 licences held	Licence conditions; WBG EHS	Contractor EO	Before hazmat arrives	20,000 (stores; licence fees additional)
Sewage sludge: no faecal-sludge treatment facility exists in Grand Gedeh County, so sludge from the camp septic tanks (about 30 kg/day, 2024 planning basis) and from the mobile toilets is either (a) treated on site in a lined sludge drying bed or packaged treatment unit at the camp, the dried and stabilised sludge going to the EPA-approved disposal site agreed with the EPA county office and the Zwedru City Corporation, or (b) hauled by a licensed de-sludging provider to an EPA-approved facility; the route, its licence and the manifests are fixed in the Waste Management Plan before camp occupation; no disposal to watercourses, wetlands, farmland or open ground; septic systems maintained; weekly EO inspection and monthly Supervising Engineer audit of waste, infirmary, septic and drainage facilities	No uncontrolled discharge; findings closed ≤30 days	Contractor EO; Supervising Engineer	Throughout	10,000

Table 3.6a: Waste streams, handling and disposal routes

Waste stream (source)	Indicative quantity (planning basis)	Handling on site	Disposal route and destination
Municipal solid waste (camp, offices, works fronts)	About 280 kg/day — about 165 kg biodegradable and 115 kg non-biodegradable (2024 planning basis)	Segregated at source into lidded, scavenger-proof bins; hardstanding storage; no burning or burial	EPA-certified collector to the disposal site designated by the Zwedru City Corporation and approved by the EPA county office; the biodegradable fraction composted at the camp for restoration use where practicable
Sewage and sludge (camp septic systems; mobile toilets at fronts and ancillary sites)	About 30 m³/day of wastewater and about 30 kg/day of sludge (2024 planning basis)	Septic tanks and soakaways sized to the workforce; about 32 mobile toilets serviced by a licensed provider	Route (a) on-site lined drying bed or packaged treatment unit at the camp with the stabilised sludge to the EPA-approved site agreed with the EPA county office and the Zwedru City Corporation, or route (b) licensed de-sludging provider to an EPA-approved facility; fixed in the Waste Management Plan before camp occupation (Table 3.6)
Demolition waste: structures removed from the right-of-way under the RAP (854 private and 16 public structures by the RAP census), existing culverts, headwalls and the Zwedru pavement	Quantities from the RAP asset inventory and the detailed design (C-ESMP)	Salvageable materials remain with the owners where the RAP so provides; inert rubble and broken pavement crushed and reused as fill or borrow-pit backfill; any asbestos-containing roofing or pipe handled as hazardous waste by trained crews	Reuse as fill within the works; surplus inert material to approved, screened spoil sites away from wetlands and watercourses (Table 3.5); asbestos-containing material to a licensed hazardous-waste handler
Spoil, unsuitable and swamp excavation material; drainage desilting arisings	From the earthworks balance of the detailed design	Topsoil stockpiled separately for reinstatement; arisings tested before disposal	Approved, screened spoil sites only (Table 3.5); never in wetlands, watercourses or sacred sites
Bituminous wastes (cut-back, spillage, plant residues, empty bitumen drums)	Asphalt plant and paving operations	Contained on sealed hardstanding; drums drained and stored under cover	Reuse in the works (cold patching) where the specification allows; otherwise consigned to authorised dealers or recyclers; empty drums returned to the supplier or to authorised dealers
Hazardous wastes: used oils and filters, hydraulic fluids, batteries, paints and solvents, contaminated soils, laboratory chemicals	Workshop, plants, fuel points and spill clean-ups	MSDS register; roofed, bunded stores on sealed hardstanding; labelled containers; manifests for every consignment	Licensed hazardous-waste handlers and recyclers under the EPML licences (used oil and batteries to licensed recyclers); no local disposal or burning
Health-care waste (camp clinic and first-aid posts)	Small quantities	Sharps boxes and colour-coded bags; secure interim storage	Treatment and disposal under an agreement with the county health authority (Martha Tubman Memorial Hospital, Zwedru) or a licensed provider
Scrap metal, tyres, timber and packaging	Fronts, workshop and camp	Segregated and stored for collection	Authorised recyclers or dealers; tyres to retreaders or recyclers; no burning
Vegetation clearance debris	Right-of-way and ancillary-site clearance	Stacked clear of drains and watercourses; no burning in the dry season near forest	Chipped or mulched for the A8 restoration works, or given to host communities for fuel where the walkover file permits; never placed in wetlands

3.7 Borrow Pits, Quarries and Plant Sites

Sixteen borrow pits (about 5 km average spacing), two quarries and the Suaken plant complex are the principal off-carriageway footprints; the ESCP requires the borrow-site restoration clause in the contract before signature. Operationalises SG-02 (residual Minor) for IMP-13, 16 and 26 and risks RSK-06, 40 and 41, including the BP2/BP3/RC2 screening conditions.

Table 3.7: Borrow pits, quarries and plant sites — mitigation measures

Measure	Standard/target	Responsibility	Timing / phase	Indicative cost (US$, 2026 prices)
Siting standards: quarries ≤5 km, borrow pits ≤1 km from the road; no part within 50 m of a watercourse, well or borehole; quarry/crusher/asphalt ≥500 m and batch plant ≥200 m from dwellings; no new quarry, pit, crusher, batching plant, camp or laydown inside the CSZ or a pangolin CH polygon (BMP Action A3), and none within 1 km of any sacred grove or of the Picathartes outcrop, nor within 30 m of a wetland (ESIA Table 2.8); any site within 1 km of the CSZ screened on the overlay before approval	100% conformance for every new site. The registered Suaken quarry (about 5.5–6.5 km from the road; about 431 m from the nearest dwellings) is the one registered exception: it is accepted only under row 5 of this table and ESIA Table 11.5, condition 5, with the equivalent-protection demonstration of ESIA Section 2.11 accepted in writing by the Supervising Engineer and the IIU. IIU approval of every site on the Supervising Engineer's check of the ancillary-site overlay (BMP Table 3.2, Figure 2.1)	Contractor proposes; Supervising Engineer reviews and approves the siting submission; IIU/MPW approval; shared with the World Bank	Before each site opens	No additional cost (design-review task)
Hard screening gate: no pit or plant site opened without ancillary-site screening (biodiversity and cultural heritage), EPA permit, MME licence and documented land agreement; **BP3 (secondary forest) and BP2 (wetland IW-007 overlap) require pre-clearance surveys (BMP A4 walkover), Quarry 2, BP6, BP8, BP9, BP11 and BP12 are resolved on the BMP A3 overlay before approval (ESIA Table 3.6), and the unscreened RC2 crusher site is screened before any approval; any ancillary site not identified at this issue (including a replacement borrow pit or crusher site) is fully assessed — screening, site-specific plan, mitigation, monitoring and cost — in the C-ESMP and approved by the Supervising Engineer and the IIU before any material is won or the site used**	Zero unscreened/unpermitted sites (RSK-40)	Contractor submits; Supervising Engineer reviews and approves; IIU/MPW reviews and approves (gatekeeping); shared with the World Bank	Before opening	30,000 (screening surveys)
Operations: topsoil stripped/stockpiled; benched supervised faces; drainage against ponding; fencing, signage and watchmen near settlements; settlement ponds; closed-loop washing; a licensed explosives magazine only if blasting is confirmed, sited and secured as Annex F requires	Zero accessible water-filled pits; zero third-party injuries	Contractor	Site operation	80,000
Restoration standards: progressive backfilling, battering and dewatering — not end-of-works; faces scaled; topsoil respread; native re-vegetation; restoration to community-agreed after-use or semi-natural habitat; ESCP restoration clause in the contract before signature	Each site certified; EPA and Supervising Engineer sign-off	Contractor; EPA/Supervising Engineer certify	Progressive; before demobilisation	Measured items at closure (Table 8.3, line 3.17) and the A8 item
Suaken quarry–town interface: documented memorandum of understanding (MOU) with Suaken Town; the ≈431 m separation resolved by boundary adjustment, blast design	MOU and agreements before establishment	Contractor with IIU	Before opening/occupation	30,000 (MOU and agreement support; compensation at actual cost)

Measure	Standard/target	Responsibility	Timing / phase	Indicative cost (US$, 2026 prices)
and monitoring, or agreed measures with compensation; land access for all sites by voluntary agreement/MOU or Bank-cleared RAP addendum				

Blasting status and the Blasting Management Plan. Blasting remains conditional. The Contractor's Design Proposal characterises the corridor cuts as residual lateritic and saprolitic soils and weathered rock excavatable by conventional plant, and no rock requiring blasting has been identified within the right-of-way on the design information available at this issue; the design-stage geotechnical investigations now under way are reported with the design-schedule packages of ESIA Section 3.14, and their results confirm the position and set the final specificity of these measures through the Section 1.5 reconciliation. Blasting is therefore foreseen only at the Suaken quarry, if the Contractor adopts it, or at a rock cut that the geotechnical investigations confirm cannot be excavated by conventional ripping. No blasting is foreseen at the Ziah Town quarry (Quarry 2), which lies at the boundary of the CH-West pangolin polygon (ESIA Table 3.6), and none is permitted there while the BMP Action A2 rule applies. The Blasting Management Plan is prepared by the Contractor as a C-ESMP method statement as soon as a blasting requirement is confirmed, submitted to the Supervising Engineer at least 60 days before the first intended blast and approved by the Supervising Engineer and the IIU — with the MME explosives permit, the EPA permit conditions and the host-community notification protocol — before any blasting operation. Where dwellings lie within the 500 m exclusion distance, as at Suaken (about 431 m), the plan demonstrates by trial blasts and monitoring that the Annex F limits are met at those dwellings or provides for temporary evacuation agreed with the community under the Suaken MOU (Table 3.7). No blasting takes place without the approved plan; Annex F states its required contents and the approval gate.

3.8 Camp Management

The camp occupies ≈4 acres at Zuoyou Town with the mechanical site adjacent — a town setting that does not meet the generic siting standard for camps (outside settlements) and is therefore accepted only through the documented Zuoyou community/IIU siting agreement, the 250 m setback from schools and health facilities (ESIA Table 2.8) and the enhanced controls below. The camp site is identified and registered: about 1.6 ha (about 4 acres) of young bush at Universal Transverse Mercator (UTM) 29N 578827 E / 683905 N within Zuoyou Town, with the mechanical (workshop) yard registered separately at 578546 E / 684165 N beside the corridor within the settlement (ESIA Table 3.5; shown on Figure 3.1 of this ESMP). The site has not yet been established: the camp is a new construction of prefabricated single-storey buildings — residential units of 70–140 m² (three-bedroom, dormitory and intermediate layouts) and a consultant office block, with the service buildings that the Camp Management Plan details — and not an existing yard or existing buildings (ESIA Section 3.9; Design Proposal, ICCO/CET, 2025). The Camp Management Plan therefore includes a georeferenced satellite image of the site and its surroundings, the layout plan and dated photographs of the site before and after establishment, kept with the ancillary-site register in the ESMIS. Operationalises SE-01, SE-03 and WR-03 for IMP-06 and IMP-27 and risks RSK-23, 30, 31.

Table 3.8: Camp — mitigation measures

Measure	Standard/target	Responsibility	Timing / phase	Indicative cost (US$, 2026 prices)
Camp Management Plan (C-ESMP constituent) approved before occupation; documented Zuoyou community/IIU siting agreement; EPA camp permit; the plan includes a georeferenced satellite image of the site and its surroundings, the layout plan and dated site photographs before and after establishment	Plan, agreement and permit before occupation	Contractor prepares; Supervising Engineer reviews and approves; IIU/MPW reviews and approves; shared with the World Bank	Pre-occupation	Plan 10,800 (Table 8.1)
Self-sufficiency: own borehole, power, septic/soakaway sanitation, catering from domesticated protein — no draw	Zero reliance on community water; zero bushmeat	Contractor camp manager	Operation	40,000

Measure	Standard/target	Responsibility	Timing / phase	Indicative cost (US$, 2026 prices)
on community systems, no bushmeat demand				
Perimeter fencing and access control; visitor rules; no informal markets or settlements at gates; camp rules incorporating the Code of Conduct, alcohol restrictions, weapons ban	Zero informal establishments; 100% visitor logging	Contractor security	Operation	30,000
Health and hygiene: camp clinic staffed by a resident registered nurse or physician assistant on 24-hour call, with a visiting medical doctor at least weekly and a referral agreement with the Martha Tubman Memorial Hospital, Zwedru; an equipped ambulance with a trained driver and attendant; vector control and drainage (no standing water); rodent-proofed stores (Lassa); bed nets; safe water; surveillance and isolation protocol	Zero camp-origin outbreaks (RSK-23)	Contractor OHS/medical	Operation	35,000 (clinic set-up and equipment; medical staff in Table 3.10)
Accommodation to Liberian labour-accommodation and WBG EHS standards: separate men's/women's facilities, lighting, potable water, clean eating areas	LMP/EHS welfare standards	Contractor	Operation	15,000

3.9 Biodiversity

ESS6 Critical Habitat is triggered under Criterion 1 for the Western Chimpanzee (CR; a single verified detection at station T59 on 3 February 2026, about km 19 near Sennehwein Town, treated precautionarily) and the White-bellied Pangolin (EN; verified camera events clustered at km 38–50); three Critical Habitat polygons total 22.6 km², with six Priority Biodiversity Features. This sub-plan carries the headline controls binding corridor-wide; the detail — the zone rules of BMP Table 3.1, the ten works-period actions A1 to A10, the supervision checks and stop-work triggers of BMP Tables 7.1 and 7.2, the six conditions of BMP Table 6.3 and the gates G1 to G6 of BMP Table 8.2 — is governed by the standalone BMP, reproduced in the ESIA as Appendix T, which prevails in any difference. The BMP is a works-period instrument: it runs from detailed design to the end of the defects-liability period and does not establish an offset, a net-gain programme, key performance indicators, a community-ranger scheme, community conservation agreements, a camera-trap grid, an independent biodiversity monitoring consultant or a biodiversity task force (BMP Sections 2.5, 6.3, 7, 8.3 and 8.4). Operationalises BD-01 to BD-10 and CI-01 for IMP-15 to 22, 39, 40, 42 and 44 and risks RSK-10 to RSK-15 (residuals Minor or Negligible except BD-02, BD-03, BD-04, BD-05, BD-07, BD-08, BD-10 and CI-01, Moderate; ESIA Table 10.11). The spatial regime that the measures apply to — the two pangolin polygons, the CSZ and its no-go core, and the Priority Biodiversity Features by chainage — is shown at Figure 3.2 (BMP Figure 2.1), which must be read with the Figure 3.1 constraints map and loaded to the Contractor’s GIS alongside it.

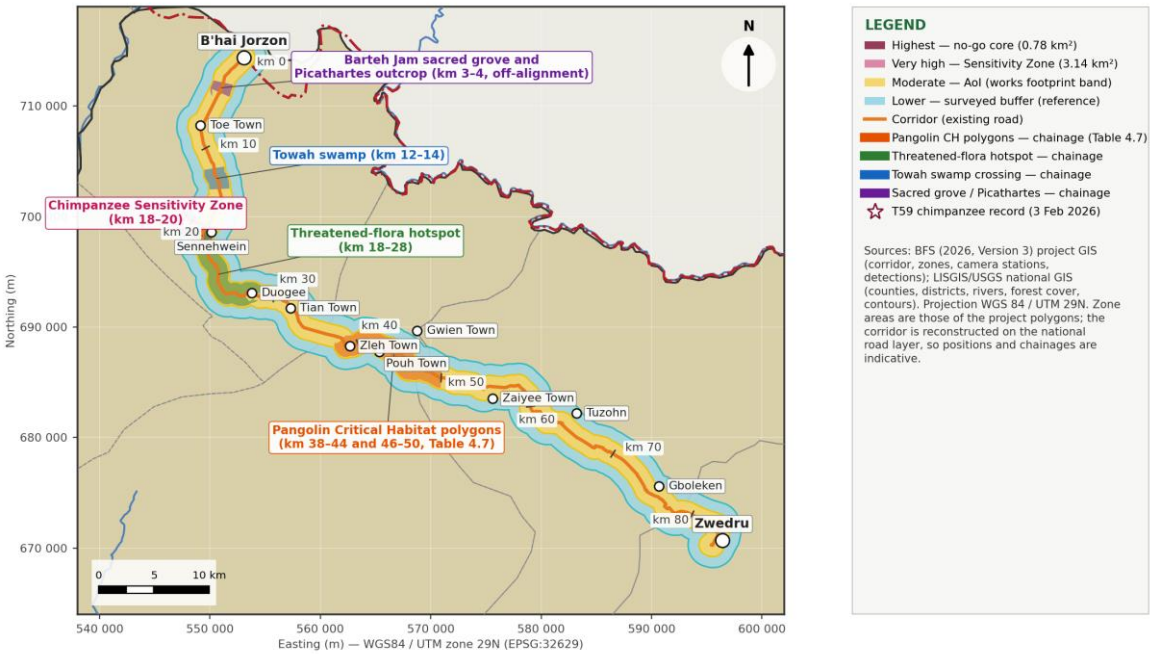


Figure 3.2: Critical Habitat polygons, Chimpanzee Sensitivity Zone and Priority Biodiversity Features along the 85 km corridor — composite sensitivity zonation by chainage (BFS, 2026, project GIS; reproduced from BMP Figure 2.1)

Table 3.9: Biodiversity — headline mitigation measures (detail governed by the BMP)

Measure	Standard/target	Responsibility	Timing / phase	Indicative cost (US$, 2026 prices)
A1 No-go core demarcation: the 0.78 km² no-go core (500 m radius on the T59 record) surveyed from the BFS coordinates and marked with durable posts and tape before any vegetation clearance in S3; entry log kept; no plant, stockpile, temporary track, night lighting or blasting inside the core; a software geofence does not replace physical demarcation	Demarcation complete before S3 clearance (gate G2); zero unauthorised entries	Contractor; Supervising Engineer verifies	Before and during works in S3	11,000 (BMP Table 9.1)
A2 Hours and blasting rule: working hours 08:00–16:00, no night work and no blasting while a front is in S3 or S6; task lighting aimed at the face and switched off when idle; no floodlighting of the core	Zero night work or blasting in the nodes (a breach is a BMP Table 7.2 event)	Contractor	Each week a front is in S3 or S6	No separate item (method statement)
A3 Ancillary-siting freeze: no new quarry, borrow pit, crusher, batching plant, camp or laydown inside the CSZ or a pangolin polygon; every proposed site overlaid on BMP Figure 2.1 at design review (BMP Table 3.2; the km 45 camp of the BFS package is rejected); existing sites outside the polygons remain subject to the corridor-wide rules; the IIU reconciles the ancillary-site coordinates of ESIA Table 3.6 with the BFS consultant's station coordinates before the overlay is signed (gate G3)	Overlay accepted with no site inside the polygons (gate G3)	Contractor proposes; IIU refuses any non-compliant site	Detailed-design review; before any site opens	Within the design fee
A4 Pre-clearance walkover and Class A protocol: right-of-way pegged and the walkover file attached before each clearance package; FDA-co-signed marking of the 20 Class A stems	100% of packages with walkover file before the cut; zero unauthorised Class A felling	Contractor; FDA (marking and permit); Supervising Engineer	Before each clearance package	28,000 (BMP Table 9.1); replacement planting in the A8 item

Measure	Standard/target	Responsibility	Timing / phase	Indicative cost (US$, 2026 prices)
recorded by the BFS in S4 (km 20–28) and of any further Class A stem in a Critical Habitat segment (ESIA Section 11.9.5); the walkover file records active nests, dens and slow-moving fauna encountered, which are rescued or translocated where practicable, and saplings are salvaged for the A8 nursery stock (ESIA Table 10.5, BD-04); no extra width taken; a marked Class A stem lost under the national protocol replaced 5:1				
A5 Workforce conduct and camp checks: signed BMP Annex A Code of Conduct and induction before deployment (all workers, subcontractors and supply-chain personnel); protein that is not wild-caught; weekly unannounced camp checks by the Contractor's Environmental Officer with monthly Supervising Engineer verification (BMP Annex B); dismissal and FDA referral for hunting, bushmeat or wildlife trade	100% signed before deployment (gate G4, with the A9 signs); zero verified breaches (RSK-11)	Contractor environmental, social, health and safety (ESHS) manager and EO; Supervising Engineer	From mobilisation; weekly and monthly	26,000 (BMP Table 9.1); camp running cost
A6 Evidence-led crossings: a wildlife crossing, oversized culvert or canopy connection only where BFS Chapter 3 documents a movement hotspot (candidates: up to two canopy connections in the CSZ at km 18 and km 20, and dry-bench or oversized culverts at documented crossing points); drawings and estimates by the Contractor's design engineer, accepted at design review (gate G6); no default package of crossings	Structures built only to accepted drawings; count fixed at detailed design	Contractor designer; Supervising Engineer; IIU	Detailed design; construction	Provisional sum 80,000 (BMP Table 9.1)
A7 Towah swamp structure: span or large box culvert at km 12–14 maintaining flow paths; low-flow in-stream method; silt control at every live crossing in each in-stream week; dry-season in-stream windows (Section 3.4)	Towah structure as drawn; sediment contained; turbidity ≤2× upstream	Contractor; Supervising Engineer	Design; each in-stream week	Structure in the drainage and structures bill; silt control within Section 3.4
A8 Footprint restoration: every surface the Project opens (site register) re-graded and planted with the twelve-species native palette of the BFS (nursery provenance records kept); ≥70% cover at the end of the first rainy season after planting and ≥60% survival; 5:1 replacement at the Contractor's cost where either is missed; no seed-bearing invasive cover left on a certified section	≥70% cover at the end of the first rainy season after planting and ≥60% survival on every restored surface; section certified by the Supervising Engineer on its environmental specialist's verification (FDA witness where Class A stems are involved) before taking-over	Contractor; Supervising Engineer certifies	Progressive; end of first rainy season; before taking-over	150,000 (BMP Table 9.1)
A9 Speed and node signs: 20 km/h limit and node warning signs at the approaches to S3, S6 and other documented hotspots, posted before the front enters; Project vehicles and plant bound while a front is in the node; at taking-over the permanent signs pass to the MPW, which maintains them; public-traffic limits after handover are set by the MPW and enforced by the Liberia National Police	Signs ready before entry (gate G4) and posted; zero speed breaches by Project vehicles	Contractor; Supervising Engineer; MPW (operation)	Before and during works in S3/S6; operation	6,000 (BMP Table 9.1)
A10 Community notice and grievance: written notice to the affected communities, with grievance contacts,	Notice issued before each entry; 100% complaints registered	Contractor CLO; IIU confirms	Before each front entry	3,000 (BMP Table 9.1)

Measure	Standard/target	Responsibility	Timing / phase	Indicative cost (US$, 2026 prices)
before a front enters S3 or S6 (gate G5); wildlife, sacred-site, camp-conduct and tree-loss complaints through the Project grievance redress mechanism (GRM, Section 7), registered on receipt and acknowledged within 24 hours				
Zone rules and triggers: BMP Table 3.1 zone rules (the no-go core; the CSZ, with canopy retention wherever the approved right-of-way allows; the pangolin polygons; the Towah swamp; the flora hotspot; the sacred groves and the Picathartes outcrop; the remainder of the corridor) reproduced in the C-ESMP Biodiversity Compliance Plan with BMP Tables 7.1 and 7.2 before a front enters S3 or S6 (gate G1); a verified protected-species sighting within 50 m of an active front suspends that front until the Supervising Engineer clears restart; serious incidents (chimpanzee injury or death; works in the no-go core; unauthorised Class A felling; Project-caused pangolin mortality) notified within 24 hours to the IIU and within 48 hours by the IIU to the World Bank and the EPA (Section 6.4)	C-ESMP Biodiversity Compliance Plan approved with the BMP tables (G1); same-day stop-work on any BMP Table 7.2 trigger	Contractor; Supervising Engineer; IIU; referrals to the FDA and the EPA, enforcement by the FDA with the Liberia National Police	Before S3/S6 entry; throughout	Corrective work from the works-contract contingency

Alignment with the BMP (roles and costs). This section follows the BMP as issued: the Contractor's Environmental Officer implements and records; the Supervising Engineer verifies (weekly in S3 and S6, monthly at camps and on the BMP Annex B checklist) and issues stop-work instructions the same day; the IIU, as Employer, holds the plan, refuses any site that fails A3, withholds taking-over until A8 is met and reports quarterly to the EPA and the World Bank; the FDA issues the tree-felling permit and co-signs the Class A marking, and the FDA and the EPA receive the Class A and wildlife-law referrals that national procedure requires (BMP Table 8.1). No biodiversity task force, independent biodiversity monitoring consultant, net-gain dashboard, annual net-gain report or Year-5/Year-10 evaluation is a condition of the BMP, and none is carried in this ESMP. No community rangers are recruited, trained or paid under the BMP or the works contract, and no party acting under the BMP holds enforcement powers: enforcement of the wildlife law rests with the FDA and the Liberia National Police, and any community patrol that the FDA operates is an FDA activity outside the Project (BMP Section 8.1). Society for the Conservation of Nature of Liberia (SCNL) and Wild Chimpanzee Foundation (WCF), the BFS consortium members, have no implementation or advisory role in the works, apart from the WCF awareness materials used for crews deployed at km 18–20 and any specialist service that the IIU separately procures under its own instruction (Section 1.2). The costed biodiversity measures are the ten works-period actions, priced action by action in BMP Table 9.1 and carried in Table 8.1 and Table 8.3 of this ESMP: an indicative Contractor-borne US$224,000 for Actions A1 to A10 plus a provisional sum of US$80,000 for the evidence-led A6 structures, with the A7 Towah structure priced in the drainage and structures bill; the Supervising Engineer's BMP checks are within the supervision contract, and corrective work under BMP Table 7.2 is met from the works-contract contingency. No other biodiversity budget line exists in any Project instrument.

3.10 Labour, OHS and Workers' Welfare

The workforce is estimated at ≈100 international and ≈680 national staff (2024 planning estimate, pending the C-ESMP) with a ≥30% women's participation goal. Of the ≈780, RE-GROUP assumes for planning that about 450 are resident in the camp and about 470 are present at the works fronts at peak; both are planning assumptions, replaced by the C-ESMP figures when the Contractor declares its workforce. Applies the LMP to all direct, contracted and primary-supply workers; operationalises SE-02 (residual Minor) and risks RSK-16–23, 26, 27 and 39. The workers' grievance mechanism is summarised at Section 7.3.

Table 3.10: Labour, OHS and workers' welfare — mitigation measures

Measure	Standard/target	Responsibility	Timing / phase	Indicative cost (US$, 2026 prices)
Employment per the LMP and Decent Work Act (2015): written plain-language contracts; wages ≥ statutory minimum with itemised pay statements; 40-hour week, 10-hour daily cap; freedom of association; 10/30-day termination notice; wage records open to inspection	100% written contracts; wage grievances remedied	Contractor human resources (HR); Supervising Engineer daily oversight	From first engagement	No additional cost (HR procedure within the ESHS staffing, Table 8.3)
Minimum working age 18 with documented verification (ID or corroborated alternatives incl. medical assessment); recruitment audits; flow-down to subcontractors and suppliers; LMP remediation on discovery; no forced labour or trafficking	Zero under-age or forced labour (RSK-26)	Contractor HR; IIU audits	Every engagement	5,000
Workers' GRM before any worker is engaged: focal points; Workplace Grievance Redress Committee (GRC) incl. E&S specialists; anonymous complaints; dedicated telephone/e-mail; 3-week standard, urgent 24 hours–15 days; escalation to management, Ministry of Labour (final tier), courts	100% workers informed; timelines met	Contractor; PMU/IIU oversight	Before engagement	15,000
OHS Plan (C-ESMP constituent) before works per ESS2/WBG EHS: permit-to-work systems (confined space, hot work, height, permit-to-dig); site traffic management, banksmen, reversing alarms; competency-verified operators; daily plant inspections; no sub-standard equipment; full personal protective equipment (PPE) — "no hats, no boots, no job"; heat and snakebite protocols	Zero fatalities; declining lost-time injury frequency	Contractor OHS officer prepares and implements; Supervising Engineer reviews and approves the plan and oversees daily; IIU/MPW reviews and approves; shared with the World Bank	Plan pre-works; daily	OHS Plan 43,200 (Table 8.1); PPE and permit-to-work systems 110,000
Welfare: camp clinic staffed as Table 3.8 (resident nurse or physician assistant, visiting doctor, hospital referral agreement); at least one certified first aider per 25 workers and radio or mobile communications at every front; ≥1 equipped ambulance with trained crew; conveyance of injured or sick workers to hospital at the employer's expense; separate, lockable sanitation for men and women at every front (about 32 mobile units, one per 15 workers present, serviced by a licensed provider, for the assumed peak front workforce of about 470 — Section 3.10); maternity and nursing provisions; potable water	LMP welfare standards at all sites	Contractor	Throughout	80,000 (clinic staffing, first aiders, ambulance running, front sanitation of about 32 units)
Stop-work authority for all workers with non-retaliation; accident and grievance logbooks at every site; near-miss reporting encouraged as a leading indicator	100% sites with logbooks	Contractor; Supervising Engineer	Throughout	10,000
Local content and women's participation (ESIA §10.11): enhancement measures under SE-02 — unskilled and semi-skilled posts offered first to communities within 5 km through the published criteria of Table 3.11; skills certification for trained local workers; local procurement of goods and services where available; a women's participation goal of at least	Local-hire share and women's participation reported quarterly against the goal (Table 4.3)	Contractor HR and procurement; IIU	From first engagement; quarterly reporting	No additional cost (HR and procurement procedure within the ESHS staffing, Table 8.3; facilities within the welfare measure above)

Measure	Standard/target	Responsibility	Timing / phase	Indicative cost (US$, 2026 prices)
30% of the national workforce, with targeted outreach, separate and safe facilities and quarterly public reporting by settlement and sex				

3.11 Community Health, Safety and Security

Speed control and road safety near schools and markets were requested in twelve of the fourteen 2026 consultations. Operationalises CS-01–CS-04 and SE-01/SE-03/SE-04 (residuals Minor; CS-04 reduced to Minor by the engineering package) for IMP-27–31, 35, 36 and 38, and risks RSK-24 (retained High under a documented ALARP justification, all practicable controls committed), RSK-28–31, 34 and 35, including security-personnel management under ESS4.

Table 3.11: Community health, safety and security — mitigation measures

Measure	Standard/target	Responsibility	Timing / phase	Indicative cost (US$, 2026 prices)
Traffic Management Plan before works: 20 km/h haul limits with water sprays through towns; trained flagmen at fronts, junctions and school frontages; segregated pedestrian routes; night haulage through settlements prohibited; engineered, signed diversions with guaranteed emergency-vehicle passage at the five bridge sites; end-of-day reinstatement of crossings	Zero attributable community traffic fatalities; diversions passable	Contractor prepares and implements; Supervising Engineer reviews and approves the plan and enforces it; IIU/MPW reviews and approves; shared with the World Bank	Plan approved before the first haul movement on each front; daily	Traffic Management Plan (TMP) 43,200 (Table 8.1); flagmen, signage and diversions 110,000
School-zone measures: speed humps, rumble strips, signage, marked crossings and street lighting at the six identified school zones and every school/market frontage; flaggers at school hours; gateway treatments and 60 km/h urban limit; road-safety education in the 17 corridor schools before opening; pre-opening road-safety audit; defects-liability crash monitoring with remedial engineering	100% school zones treated before fast traffic	Contractor; MPW (operation)	Progressive; before opening	Embedded in design (no separate cost)
Public safety at sites: excavations barricaded and lit; sites fenced, signed, access-controlled; borrow pits dewatered, battered, progressively restored (no accessible water-filled pit); blasting only under the approved Blasting Management Plan with community notice, sirens and the 500 m exclusion (Annex F)	Zero third-party injuries (RSK-06)	Contractor	Throughout	40,000
Disease and influx: worker screening and vaccination; human immunodeficiency virus (HIV)/sexually transmitted infection (STI) and hygiene awareness with county health teams; camp clinic treats the workforce; vector control at standing water; influx management plan — unskilled/semi-skilled recruitment from communities within 5 km via published criteria, no at-gate hiring, no recruitment fees; rent/price monitoring in host project-affected communities (PACs)	Zero attributable outbreaks; recruitment complaints resolved in GRM timelines	Contractor with the county health team; the influx management plan: Supervising Engineer reviews and approves, IIU/MPW reviews and approves, shared with the World Bank	Before and during works	20,000
Security personnel (ESS4; ESCP 4.4): security risk assessment and Security Management Plan before engagement; vetting; Voluntary Principles rules of engagement;	Plan before engagement; zero unreported incidents	Contractor prepares; Supervising Engineer reviews and approves;	Before security engagement	5,000 (plan and training; guards within the Contractor's security costs)

Measure	Standard/target	Responsibility	Timing / phase	Indicative cost (US$, 2026 prices)
preference for unarmed guards; secured explosives magazine (MME permit); mandatory use-of-force reporting		IIU/MPW reviews and approves; shared with the World Bank		
Utilities and water points: joint utility surveys and relocation agreements before excavation; isolation certificates and permit-to-dig; 50 m buffers at water points; prompt repair or replacement (Solo Town and Tian Town commitments)	Zero outages >24 hours; zero electrocution (RSK-19, 34)	Contractor with utilities/CLSG	Before excavation	5,000

3.12 SEA/SH Prevention and Response

Grand Gedeh is among the counties with the highest reported rape incidence, and the 2026 women's focus group discussions (FGDs) identified exploitation risks to adolescent girls near workforces; RSK-25 is Extreme before controls. Implements the ESCP 4.3 package — Code of Conduct, GBV-sensitive channel and awareness — in place before works, with the survivor-centred referral pathway and the 24/48-hour reporting timeline.

Table 3.12: SEA/SH prevention and response — mitigation measures

Measure	Standard/target	Responsibility	Timing / phase	Indicative cost (US$, 2026 prices)
Code of Conduct signed by every worker before deployment, prohibiting sexual harassment, exploitation and abuse and **any sexual activity with persons under 18**; sanctions to dismissal and police referral; contractor countersignature; flow-down to subcontractors/suppliers; no transporting community members in project vehicles	100% signature before deployment	Contractor ESHS manager; SEA/SH focal point	Before deployment	Code of Conduct (CoC) 8,100 (Table 8.1); administration 5,000
SEA/SH training: induction and quarterly refreshers for all workers; community awareness on risks and channels; extra supervision for female workers	100% of workers inducted; quarterly refreshers delivered to 100% of the workforce; community sessions per the SEP schedule	Contractor focal point; MoA Social Development Specialist	Before works; recurrent	20,000
Confidential channel: trained female focal points and the Social Development Specialist; uptake without literacy or fees; SEA/SH cases never mediated by community committees; anonymised case indicators	Channel operational before works	MoA Social Development Specialist (SDS); Contractor focal point	Before workers are engaged on each front	10,000
Survivor-centred referral: warm referral to GBV service providers; Grand Gedeh provider mapping completed before workers are engaged on the first front; police referral of criminal cases (not resolved under the GRM)	Referral functional before workers are engaged	MoA SDS; IIU	Before the commencement of civil works	In RAP/SEP provisions; 5,000 (provider mapping and directory)
Notification: Contractor→IIU within 24 hours; Project→World Bank within 48 hours; confidential handling; independent third-party investigation with gender experience where required	100% notifications within timelines	Contractor; PMU/IIU	On occurrence	Operational (no cost)

3.13 Cultural Heritage and Chance Finds

The 2026 register records six sacred sites (SS-001–006, including the Ziah Town Sacred Forest, B'hai Sacred Cotton Tree and Sacred Creek, Kougae Sacred Creek, Goyeazon Sacred Forest and Toe Town Sacred Stream), the Central Poro Bush of Gbarzon at Goyeazon, the Barteh Jam grove (km 3–4), 12

grave sites, 15 RAP-registered graves, ten avoided cemeteries and unmarked graves in five communities. Operationalises CU-01–CU-03 (residuals Minor) for IMP-32/33 and RSK-33, avoidance-first with custodial consultation as the non-negotiable gateway.

Table 3.13: Cultural heritage and chance finds — mitigation measures

Measure	Standard/target	Responsibility	Timing / phase	Indicative cost (US$, 2026 prices)
Sacred sites: absolute no-go geofences on all groves, with a 1 km facility-exclusion buffer around every grove and the Picathartes outcrop (ESIA Table 2.8) and no blasting or quarrying within 1 km of Barteh Jam; no ancillary facility in or beside any sacred site; documented custodial consultation (zoes/custodians) on timing, conduct and rites before adjacent works; community MOUs per grove; induction on prohibitions incl. Goyeazon town rules	Zero unauthorised entries or disturbances	Contractor CLO/EO; IIU social team	Before/during adjacent works	12,000 (geofencing, custodial consultations and MOUs)
Sacred creeks (B'hai, Kougae, Toe Town stream): adjacent works planned with custodians; contamination and flow change prevented via Sections 3.3–3.4; the ichthyological survey (Table E.3) carried out at these creeks only with the custodians' documented consent, by non-lethal methods (visual census and environmental DNA; catch-and-release only where the custodians permit handling), with no fish removed from the B'hai creek and no water drawn from the Kougae Creek, its findings shared with the custodians, and the crossing design and in-stream method agreed with them before in-stream work (ESIA Section 6.3.2)	Zero contamination or flow-change events; custodial consent documented before any survey sampling or in-stream work	Contractor EO	Adjacent works	3,000
Graves: relocation of the 15 RAP-registered graves only with documented family/community consent through the RAP (full costs incl. rites; US$20,280); time for ceremonies; ten cemeteries avoided by design; respectful scheduling and vibration control near graves	100% consent-based relocation before affected works	IIU social team; Contractor	Before affected fronts	In RAP budget
Unmarked graves: the five reporting communities (Zaiyee, Zleh, Duogee, Tian, Solo Town) pre-notified to supervisors as high-likelihood locations; pre-construction walkovers with custodians; confidential heritage register	100% fronts briefed before earthworks	Contractor EO/CLO	Before earthworks	2,000
Chance-Find Procedure (contract provision; ESMF Annex 5): stop work; delineate and secure; notify the Supervising Engineer, who notifies the authorities (Ministry of Information, Cultural Affairs and Tourism); resume only with written permission; discovered graves via the GRM and RAP contingency	100% finds managed per procedure	All site personnel; Supervising Engineer; IIU	Throughout earthworks	8,000

3.14 Land and Livelihoods — RAP Interface

Displacement is managed through the RAP: 860 PAPs holding 1,084 assets across 24 settlements — including 854 private structures, 16 public structures, 84 businesses, 98 tenants, 6 farms (2,185 economic trees) and 15 graves, and 116 vulnerable PAPs — under a budget of US$3,658,686.97 and

a census cut-off of 15 December 2024. This ESMP enforces the RAP's condition precedent and carries the construction-phase safeguards of LR-01–LR-04 (residuals Minor) and risks RSK-36/37.

Table 3.14: Land and livelihoods — RAP interface: mitigation measures

Measure	Standard/target	Responsibility	Timing / phase	Indicative cost (US$, 2026 prices)
Compensation-before-works (hard condition): no civil works in any segment until all compensation is paid and the payment-completion report is **Bank-cleared**; site handover ≥3 months after payment; demolition only after independent payment verification	100% compliance; zero premature starts (RSK-37)	IIU gatekeeping; Bank clearance	Before works per segment	In RAP budget (3,658,686.97)
Scope discipline: works confined to the RoW with encroachment monitoring; any realignment, design change or diversion outside the census triggers a RAP update and new cut-off before that segment; cut-off date publicised against speculative claims	Zero uncompensated take	Contractor; IIU; Supervising Engineer	Throughout	Within the Contractor's survey and setting-out costs (no separate item)
Vulnerable PAPs (116): RAP allowances (US$100/person/month, three-month transition) plus case management — named IIU contact per PAP; documentation/banking/relocation assistance; priority scheduling so no household is left between demolition and re-establishment; disability-appropriate reinstatement; monthly monitoring until re-established	100% re-established	IIU social team	Through resettlement and works	In RAP budget
Livelihood-restoration monitoring: quarterly tracking of business resumption, tenant re-housing and farm re-establishment against pre-displacement baselines for ≥24 months, with top-ups where outcomes remain below pre-project levels (ESS5); external monitoring bi-annually; independent RAP completion audit before closure	Livelihoods at or above pre-project levels	IIU social team; external monitor	≥24 months	RAP implementation (incl. audit 80,000)
Works-front continuity: maintained access to homes, shops, farms and markets (footbridges, ramps, signed detours); frontage works phased outside market days; vendors relocated within the same frontage; damage/losses outside the census via the GRM and RAP contingency; utility relocation planned and funded before frontage works	Zero frontages without alternative access	Contractor CLO; Supervising Engineer	Construction	No additional cost: temporary access (footbridges, ramps, signed detours) is priced within the traffic-management and diversion items of Table 3.11 and the works rates; damage and losses outside the census are met from the RAP contingency (302,153.36)

3.15 Stakeholder Engagement and Disclosure

Engagement continues through construction under the SEP, building on the 2026 programme (17 NOI postings; 14 community meetings, 471 participants; 6 women's FGDs). Operationalises the ESIA Chapter 5 engagement commitments and the ESCP disclosure obligations; the grievance mechanism itself is at Section 7.

Table 3.15: Stakeholder engagement and disclosure — mitigation measures

Measure	Standard/target	Responsibility	Timing / phase	Indicative cost (US$, 2026 prices)
Liaison continuity: Contractor CLO capacity plus IIU community liaison assistants covering both corridor halves; a named local contact for every PAC	100% PAC coverage	Contractor CLO; IIU social team	From mobilisation	40,000 (CLO operations and materials; salaries in the Table 8.3 staffing line)
Quarterly community meetings per settlement cluster plus trigger-based engagement: before the commencement of civil works in each settlement cluster, at opening of each sensitive front (the BMP Action A10 notice before a front enters S3 or S6), ahead of major traffic changes, and before the road opens to fast traffic	100% of triggers engaged in advance	Contractor CLO with IIU	Throughout	25,000
Inclusion: women-only sessions at convenient times; Mossi and Fulani migrant representatives; accessible formats (Krahn radio, read-outs, posters); advance publicity of recruitment and closures	Women at least 40% of participants per cluster (the 2026 consultations achieved 46%) and migrant representatives present at every cluster meeting; recorded per cluster	Contractor CLO; IIU	Throughout	10,000
GRM publicity: committee contacts, register locations and timelines posted in every PAC, on radio and in leaflets; GRC refresher training (Solo Town request)	100% PACs with posted information	IIU social team	Before works; maintained	GRM support 50,000 (RAP); publicity 5,000
Disclosure: this ESIA/ESMP per the EPA Guidelines (30-day comment window; possible hearing) and ESCP (before design finalisation and disbursements); ≥2 national dailies and community radio; copies at EPA, IIU, county, district and PAC locations; comments logged and annexed	Disclosure before disbursements	IIU/MPW; MoA-PMU; World Bank website	Before works	In SEP budget (77,000 project-wide); local disclosure 10,000
Cross-lot coordination (CI-02): the MoA-PMU coordinates engagement, recruitment and works sequencing across the RETRAP lots so that the peak workforces of this road and of the Tappita–Toe Town (40 km) lot do not coincide in shared host towns; county-level monitoring of in-migration, rents and service pressure shared between the lots; one grievance channel presented to the communities	Coordination record at each quarterly MoA-PMU review; no uncoordinated simultaneous peaks in shared host towns	MoA-PMU; IIU; Contractor CLO	Quarterly; before each front opens in a shared host town	No additional cost (MoA-PMU coordination within project financing)

3.16 Emergency Preparedness and Response

Unplanned events — spills, fire, medical emergencies, flood, collapse, blasting emergencies, security incidents, disease outbreaks and community incidents — are prevented through Sections 3.1–3.15 and responded to under the EPRP, a C-ESMP constituent approved before works (ESCP 2.4). No municipal fire service operates on the corridor: self-sufficiency is required. Operationalises the ESIA Section 9.8 and Appendix X framework for risks RSK-01–05, 16–23 and 29.

Table 3.16: Emergency preparedness and response — mitigation measures

Measure	Standard/target	Responsibility	Timing / phase	Indicative cost (US$, 2026 prices)
EPRP approved before works with scenario procedures, resources and command for spills, fire, medical/medevac, flood and severe weather, collapse, blasting (if adopted), security, disease outbreak and	Plan pre-works; 6-month review cycle	Contractor prepares; Supervising Engineer reviews and approves; IIU/MPW reviews	Before works; standing	EPRP 48,600 (Table 8.1)

Measure	Standard/target	Responsibility	Timing / phase	Indicative cost (US$, 2026 prices)
community incidents; reviewed ≤6-monthly		and approves; shared with the World Bank		
Training within two weeks of adoption, repeated regularly; drills: each scenario six-monthly; spill drills quarterly at the Suaken complex and camp fuel point; full medevac exercise before works pass km 40; failures generate corrective actions	100% drill programme delivered	Contractor OHS/EO	From adoption	15,000
Spill response: kits sized to credible volumes with MSDS at every fuel point, the Suaken complex, camp/mechanical site and on every bowser; trained teams; containment, recovery, contaminated-soil removal via EPA-approved route; EPA and downstream-user/custodian notification; verification sampling; restocking	100% spills contained and reported	Contractor spill teams	Standing	35,000
Fire: extinguishers by risk class, water supply and firebreaks at camp, fuel stores and plants; wardens; assembly points; dry-season vegetation-fire watch with communities; hot-work permits; no-burn clearing clause	Zero uncontrolled fires (RSK-03)	Contractor	Standing; dry season	25,000
Medevac chain: certified first aider and communications at every front; staffed camp clinic; ≥1 ambulance, stationed forward for remote fronts; referral to Martha Tubman Memorial Hospital and the new county referral hospital; Monrovia tertiary transfer arrangements; antivenom under medical direction; chain applies equally to community casualties	Rehearsed evacuation times — planning targets confirmed in the EPRP: first aid within 10 minutes of the alarm at any front, the casualty under clinical care within 60 minutes and at the referral hospital within 2 hours; 100% front coverage	Contractor medical/OHS	Standing	25,000
Community-incident protocol: scene safety and first aid; family and authority notification; accident-log and GRM entry; the Section 6.4 notification ladder; investigation with root-cause analysis; remedy or compensation	100% incidents managed per protocol	Contractor; IIU	On occurrence	10,000

3.17 Decommissioning and Reinstatement of Ancillary Sites

At completion, all ancillary sites — camp, mechanical site, plant complex, quarries, borrow pits, diversions and access tracks — are decommissioned and reinstated to pre-existing or better condition or a community-agreed after-use, discharging the ESCP restoration covenant and preventing the legacy hazards (ponding pits, contamination, sterilised farmland) flagged by the 2024 ESIA. Operationalises SG-02 and SG-05; closes risks RSK-06 and RSK-40.

Table 3.17: Decommissioning and reinstatement of ancillary sites — mitigation measures

Measure	Standard/target	Responsibility	Timing / phase	Indicative cost (US$, 2026 prices)
Restoration and Rehabilitation Plan approved before demobilisation: landscaping and re-vegetation, soil stabilisation, waste clearance, water management, footprint restoration at every site to the BMP Action A8 standard	Plan approved before demobilisation	Contractor prepares; Supervising Engineer reviews and approves; IIU/MPW reviews and approves; shared with the World Bank; EPA notified	Before demobilisation	54,000 (Table 8.1)

Measure	Standard/target	Responsibility	Timing / phase	Indicative cost (US$, 2026 prices)
Progressive restoration throughout the works — borrow pits backfilled, battered and dewatered as extraction completes; each site certified individually	100% of pits restored or secured at any date	Contractor	Progressive	60,000
Closure standards: temporary structures removed; contaminated soil excavated and remediated; septic/soak pits sealed; hardstandings broken out unless retention community-agreed; native re-vegetation; landform stabilised	Pre-existing or better, or agreed after-use	Contractor	Closure of each site	60,000
After-use and handback: community-agreed safe after-uses documented; land agreements closed; diversion back roads repaired better-than-before ("reinstatement-plus")	Documented community acceptance per site	Contractor with IIU and communities	At each closure	10,000
Verification and handover: joint close-out inspection (EPA, Supervising Engineer, IIU, host community) per site; post-construction monitoring through the defects-liability period; final restoration audit; operation and maintenance (O&M) handover to MPW (drainage clearing, post-storm inspections, school-zone maintenance, crash monitoring, RoW management, and maintenance of the BMP A9 wildlife-warning signs)	100% sites signed off before contract closure; handover accepted	EPA; Supervising Engineer; IIU; MPW	Demobilisation; taking-over	30,000

4. ENVIRONMENTAL AND SOCIAL MONITORING PLAN

This section defines the monitoring programme verifying Section 3: impact-detection monitoring (periodic measurement against the 2026 baseline and applicable standards — Table 4.1) and compliance monitoring (verification, measure by measure, that the mitigation of Section 3 is implemented — Table 4.2). For every monitoring measure the tables state the mitigation measure or medium it verifies, the parameter measured, the method or means of verification, the frequency, the responsible agency and the indicative cost; the monitoring indicator and the means of verification of every measure are carried here, so that the mitigation tables of Section 3 state the measure, the standard, the responsibility, the timing and the cost only. The performance indicators of Table 4.3 are the summary measures reported to the EPA and the World Bank. It is anchored to the real 2026 network for direct comparability: 20 air-quality stations (AQ-01–20), 20 co-located noise stations (NS-01–20), five groundwater stations (GW-01–05), three surface-water stations (SW-01–03) and twelve soil stations (SS-01–12) at the ancillary sites, mapped at Figure 4.1 (UTM Zone 29N). Biodiversity monitoring is compliance supervision of BMP Actions A1 to A10 against BMP Table 7.1, with the stop-work triggers of BMP Table 7.2 and the Supervising Engineer's monthly BMP Annex B verification; it is cross-referenced, not duplicated, here. No camera-trap grid, population monitoring, indicator dashboard or net-gain evaluation is maintained, and biodiversity supervision ends with the defects-liability period (BMP Chapter 7).

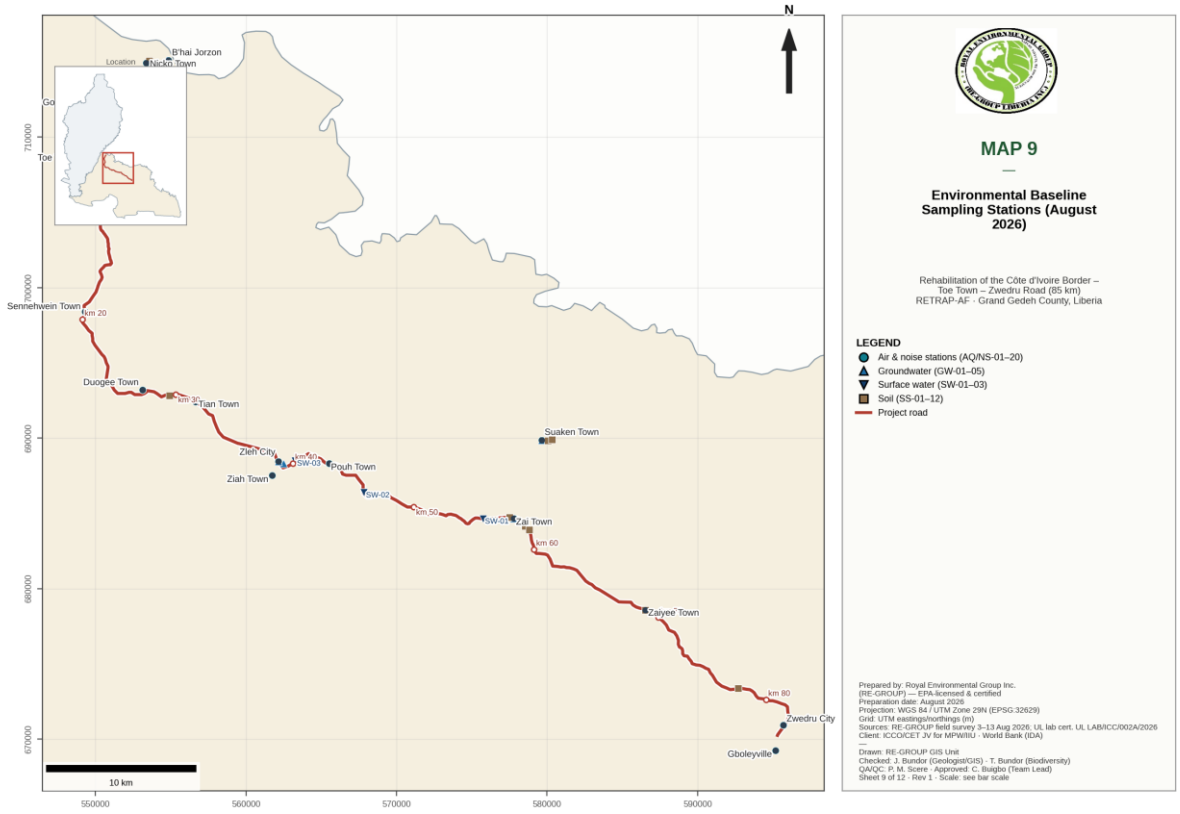


Figure 4.1: Baseline sampling and monitoring stations — the AQ, NS, GW, SW and SS networks to which construction and operation monitoring is referenced (RE-GROUP, 2026)

Table 4.1: Environmental and social monitoring matrix

Medium / aspect (sub-plan verified)	Parameters and method / equipment	Stations / locations	Frequency (construction; operation)	Responsible agency and reporting line	Indicative cost (US$, 2026 prices)
Air quality (Section 3.1)	PM2.5/PM10 continuous at plant; PM10 and gas suite	Continuous at Suaken quarry/crusher and asphalt plant;	Continuous + monthly; operation: Year-1 verification,	Contractor EO; Supervising Engineer verification.	Equipment 97,200 (two continuous dust monitors 64,800 and two

Medium / aspect (sub-plan verified)	Parameters and method / equipment	Stations / locations	Frequency (construction; operation)	Responsible agency and reporting line	Indicative cost (US$, 2026 prices)
	(handheld) at receptors. Method: two continuous PM2.5/PM10 analysers at the plant complex; handheld PM10 and gas spot checks at receptor frontages; results referenced to the AQ-01–20 baseline and the EPA/WHO values	monthly spot checks at ≥6 rotating receptors from AQ-01–20 (Toe Town, Zleh, Zwedru frontages)	then complaint-driven	Reporting: Monthly → Supervising Engineer → IIU; quarterly to EPA	handheld units 32,400 — Table 8.1); operation within the ESHS staffing (Table 8.3)
Noise (Section 3.2)	A-weighted equivalent continuous sound level (LAeq), maximum A-weighted sound level (Lmax) (day; night where relevant). Method: Type 1 integrating sound-level meter, attended 15-minute LAeq/Lmax measurements at receptor façades, referenced to the NS-01–20 baseline	≥6 receptors monthly from NS-01–20 (Zleh school, Zai clinic, Zwedru hospital cluster, markets); verification at new high-impact locations pre-works	Monthly; operation: annual frontage checks	Contractor EO. Reporting: Monthly; quarterly to EPA	Noise meter 16,200 (Table 8.1); staff time within the ESHS staffing
Vibration (Sections 3.2 and 3.7; Annex F)	Peak particle velocity (PPV); air overpressure. Method: seismograph with air-overpressure microphone at the nearest structures for every blast (conditional); PPV spot checks during heavy compaction near buildings	Nearest structures to blasting (Suaken ≈431 m) and heavy compaction	Per blast/activity	Contractor OHS/EO. Reporting: Blast records; monthly	Within the conditional blasting provisional sum (Table 8.3 note); compaction checks within works rates
Surface water (Sections 3.3 and 3.4)	In-situ pH, electrical conductivity (EC), dissolved oxygen (DO), turbidity, temperature; bi-annual laboratory suite; paired upstream/downstream turbidity. Method: multi-parameter probes (four units, two deployed continuously) for the in-situ suite; paired upstream/downstream turbidity at active crossings; bi-annual accredited-laboratory suites	SW-01–03 (incl. SW-03 Donneh Creek) plus ≥15 active crossings incl. the five bridge sites (corridor km ≈42.5–81.6); two continuous probes downstream of the Suaken complex and principal bridge site	Monthly in-situ; turbidity monthly at active crossings; bi-annual laboratory; operation: quarterly Year 1	Contractor EO; accredited laboratory. Reporting: Monthly; quarterly to EPA and Bank	Water-quality probes 86,400 and laboratory programme about 3,900 per year (Table 8.1)
Groundwater (Sections 3.3 and 3.8)	In-situ suite; bi-annual laboratory. Method: in-situ	GW-01–05 (incl. GW-05 B'hai Town pH watch), camp	Monthly; bi-annual laboratory;	Contractor EO. Reporting:	Laboratory programme about 5,800 per year

Medium / aspect (sub-plan verified)	Parameters and method / equipment	Stations / locations	Frequency (construction; operation)	Responsible agency and reporting line	Indicative cost (US$, 2026 prices)
	probe suite at wellheads; bi-annual accredited-laboratory analysis of project-used drinking wells	borehole, rotating community handpumps near works	operation: annual Year 1	Monthly; quarterly to EPA	(Table 8.1); probe time shared with surface water
Soils and land (Sections 3.4, 3.5 and 3.7)	Visual inspection of erosion controls, stockpiles, reinstatement; laboratory metals/total petroleum hydrocarbons (TPH) at hazmat and plant sites. Method: visual inspection checklist; laboratory sampling referenced to SS-01–12 (four samples per campaign) at hazardous-materials and plant sites and at site closure	All active sites; laboratory sampling referenced to SS-01–12 (4 samples/round at fuel/plant sites); closure verification sampling	Weekly visual; bi-annual laboratory; closure sampling	Contractor EO; monthly Supervising Engineer audit. Reporting: Monthly	Laboratory programme about 5,200 per year (Table 8.1); inspections within the ESHS staffing
Waste and hazardous materials (Section 3.6)	Inventory, manifests, storage condition, licence validity. Method: inventory and manifest reconciliation; store, licence and disposal-route inspection checklist	Camp, Suaken complex, mechanical site, fronts	Weekly (EO); monthly audit	Contractor EO; Supervising Engineer. Reporting: Monthly	Within the ESHS staffing (Table 8.3) and the supervision contract
Biodiversity (Section 3.9; BMP)	BMP Table 7.1 checks: no-go core and CSZ demarcation intact, entry log; hours 08:00–16:00 and no night work or blasting in S3/S6; no new ancillary site in the polygons; walkover and Class A protocol before each cut; Code of Conduct records and camp checks; silt control at Towah and live crossings; A6/A7 structures built as drawn and not blocked; A8 cover (≥70%) and survival (≥60%) on restored surfaces; sighting and incident log. Method: BMP Table 7.1 check sheets; BMP	Fronts in S3 (km 18–20) and S6 (km 38–50); Towah swamp and live crossings during in-stream weeks; all camps; restored surfaces; A6/A7 structures	Weekly while a front is in S3 or S6 and in each in-stream week; weekly camp checks (EO) with monthly Supervising Engineer verification; monthly elsewhere during the works; A8 inspection at the end of the first rainy season after planting and before section certification; operation: none (BMP supervision ends with defects liability)	Contractor EO (records); Supervising Engineer (verification; BMP Annex B); IIU (quarterly summary); FDA/EPA (referrals). Reporting: Monthly biodiversity pages → Supervising Engineer → IIU; quarterly summary to the EPA and the Bank (BMP Table 7.3)	Within the supervision contract (BMP Table 9.1); Contractor records within the ESHS staffing

Medium / aspect (sub-plan verified)	Parameters and method / equipment	Stations / locations	Frequency (construction; operation)	Responsible agency and reporting line	Indicative cost (US$, 2026 prices)
	Annex B monthly verification form; no-go core entry logs; A8 cover and survival quadrats at certification				
Social and labour (Sections 3.10, 3.11, 3.12 and 3.15)	Grievance statistics; workforce by sex/origin/age; wages/hours; influx indicators (rents, prices, in-migration); community health; engagement performance. Method: GRM registers; payroll and HR file analysis; influx observations; LMP indicators	Corridor PACs; camp; fronts	Grievances monthly; others quarterly	Contractor SO/CLO; IIU social team. Reporting: Monthly; quarterly to Bank	Within the ESHS staffing (Table 8.3) and the IIU social team budget
RAP and livelihoods (Section 3.14)	Business resumption, tenant re-housing, farm re-establishment vs baselines; vulnerable-PAP status. Method: RAP monitoring framework; external-monitor surveys of PAPs against the census baseline	The 24 RAP settlements	Quarterly ≥24 months; vulnerable monthly; external monitor bi-annual	IIU social team; external monitor. Reporting: Quarterly RAP reports (ESCP 5.3)	RAP implementation budget (external monitor and completion audit 80,000)
Traffic and road safety (Section 3.11)	Project-vehicle speeds; incidents/near misses; school-zone functionality; crashes. Method: radar speed checks; incident and near-miss register; school-zone functionality inspections	Haul routes; town sections; six school zones	Continuous/monthly; operation: defects-liability period (DLP) crash monitoring	Contractor OHS; Supervising Engineer; MPW. Reporting: Monthly; road-safety audit	Within the Traffic Management Plan allowance (Table 8.3) and the supervision contract; pre-opening road-safety audit within the IIU budget
Weather (Sections 3.4 and 3.16)	Rainfall, wind, temperature, humidity. Method: automatic weather station (rainfall, wind, temperature, humidity) with data logger	Automatic weather station at the camp/plant complex	Continuous	Contractor EO. Reporting: Monthly summary; storm alerts	Weather station 8,100 (Table 8.1)

Biodiversity reporting follows the BMP chain: the Contractor's monthly biodiversity pages (BMP Table 7.1 results, BMP Table 7.2 events and close-out, camp checks and Action A8 progress), verified by the Supervising Engineer on the BMP Annex B checklist, and the IIU's quarterly biodiversity section to the EPA and the World Bank (BMP Tables 7.3 and 10.1). No key-performance-indicator dashboard, net-gain report or long-term evaluation is produced under the BMP or this ESMP.

Pre-construction verification actions form part of this plan: the SW-03 hexavalent-chromium re-test with total chromium, the manganese, mercury, arsenic and coliform re-tests (2023 exceedances not re-tested in 2026), the soil organic-matter/organic-carbon re-analysis, and the biodiversity and wetland screening of BP3, BP2 and RC2, the pre-establishment soil sampling at Quarry 2 and RC2, and the ichthyological

survey of the nine creek crossings and the Towah swamp (Table E.3) — all completed and reported before the relevant works or approvals. The programme is reviewed after the first full year (both seasons covered) and on any material change of design, methods or conditions.

Compliance monitoring of the mitigation programme. Table 4.2 carries, for every measure of the seventeen sub-plans of Section 3 (97 measures), the parameter or indicator that is monitored, the method or means of verification, the frequency, the agency responsible for the monitoring and its indicative cost. Unless a discrete item is named, the monitoring is performed by the Contractor's Environmental Officer and verified by the Supervising Engineer within the ESHS staffing and the supervision contract; the biodiversity rows follow BMP Table 7.1 and are verified weekly by the Supervising Engineer while a front is in S3 or S6. Results are compiled in the Contractor's monthly report (Section 6.1) and the Supervising Engineer's verification, and feed the performance indicators of Table 4.3.

Table 4.2: Compliance monitoring of the Section 3 mitigation measures — parameter, method, frequency, responsible agency and cost

Mitigation measure verified (Section 3 sub-plan)	Parameter / indicator monitored	Method / means of verification	Frequency	Responsible agency	Indicative cost (US$, 2026 prices)
3.1 — Water-bowser suppression on active works and unpaved haul routes…	Monthly PM10 spot values at the nearest receptors (µg/m³, 24-hour equivalent); number of dust complaints; bowser-days delivered against the programme	Handheld PM10 spot measurements; bowser log reconciled with the works programme; GRM register; Supervising Engineer inspection	Monthly (PM10 spot checks); daily bowser log	Contractor EO (records); Supervising Engineer (verification)	Handheld PM10 units (Table 8.1, equipment line); staff time within the ESHS staffing
3.1 — 20 km/h haul limit through towns	Number of speed and uncovered-load violations per month; burning events (target zero)	Radar speed checks at town entries; load inspections at the gate and on the haul route; disciplinary records	Daily (Supervising Engineer oversight); monthly tally	Contractor EO (records); Supervising Engineer (verification)	Within ESHS staffing (Table 8.3) and the supervision contract
3.1 — Plant controls	Continuous PM at quarry/crusher and asphalt plant	Monitor telemetry; permit audit	Continuous (telemetry); monthly review	Contractor EO (records); Supervising Engineer (verification)	Continuous dust monitors 64,800 (Table 8.1)
3.1 — Stockpiles sheltered/dampened, away from receptors and drainage	Share of stockpiles sheltered or dampened and sited away from receptors and drains (target 100%); wind-blown loss events	Weekly stockpile inspection checklist with photographs; monthly Supervising Engineer audit	Weekly	Contractor EO (records); Supervising Engineer (verification)	Within ESHS staffing (Table 8.3) and the supervision contract
3.1 — Crop-damage compensation within 50 m of works	Claims settled	GRM; compensation records	Monthly claims review; on occurrence	Contractor CLO; IIU social team (claims review)	Within ESHS staffing (Table 8.3) and the supervision contract
3.1 — Greenhouse-gas and plant-efficiency controls (AQ-03)	Haul distances and fuel use per m³ of aggregate and fill delivered; plant maintenance and idling compliance; the fuel-based GHG inventory of the C-ESMP kept current	Materials-source register and haul logs; fuel records and the C-ESMP inventory; plant maintenance records	Quarterly (inventory and source register); monthly (maintenance and idling checks)	Contractor plant manager and EO (records); Supervising Engineer (verification)	Within ESHS staffing (Table 8.3) and the supervision contract

Mitigation measure verified (Section 3 sub-plan)	Parameter / indicator monitored	Method / means of verification	Frequency	Responsible agency	Indicative cost (US$, 2026 prices)
3.2 — Working hours and night-work restriction	Night-work exceptions; complaints	Works log; GRM	Daily works log; monthly review	Contractor EO (records); Supervising Engineer (verification)	Within ESHS staffing (Table 8.3) and the supervision contract
3.2 — Low-noise equipment, intact silencers	LAeq at the nearest receptors to plants and fronts (dBA) against the Table 3.2 limits; share of plant with intact silencers (target 100%); crushing hours	Attended sound-level measurements at the NS receptors (Table 4.1); plant inspection checklist; crusher log	Monthly	Contractor EO (records); Supervising Engineer (verification)	Noise meter 16,200 (Table 8.1)
3.2 — Camp/mechanical-yard noise management at Zuoyou	Complaints; night checks	GRM; EO log	Monthly; night checks on complaint	Contractor EO (records); Supervising Engineer (verification)	Within ESHS staffing (Table 8.3) and the supervision contract
3.2 — Reduced-energy compaction within 200 m of buildings	Pre/post-condition comparisons	Survey reports; GRM	Before works (pre-condition survey) and after works (post-condition)	Contractor EO (records); Supervising Engineer (verification)	Within ESHS staffing (Table 8.3) and the supervision contract
3.2 — Blasting (conditional)	Records per blast; misfires	Blast records; MME/EPA inspection	Per blast (conditional)	Contractor (licensed shotfirer, records); Supervising Engineer; MME and EPA inspection	Seismograph monitoring within the conditional blasting provisional sum (Table 8.3 note)
3.3 — 50 m buffer	Fuelling, maintenance or storage events within 50 m of a watercourse, well or borehole (target zero); share of containers in compliant bunds (target 100%); spills recorded	Daily fuel-point inspection checklist; bund and separator inspection record; spill register	Daily	Contractor EO (records); Supervising Engineer (verification)	Within ESHS staffing (Table 8.3) and the supervision contract
3.3 — Settlement ponds at every quarry, crusher, batch plant and wash-down…	Monthly discharge/turbidity checks	Records; EPA audit	Monthly	Contractor EO (records); Supervising Engineer (verification)	Probes and laboratory programme (Table 8.1); staff time within the ESHS staffing
3.3 — Wellhead protection	Water-point register; GW-01–05 monthly results	Photo register; GRM	Monthly (GW-01–05 and the water-point register)	Contractor EO (records); Supervising Engineer (verification)	Laboratory programme, groundwater about 5,800 per year (Table 8.1)
3.3 — Abstraction only under licence from community-agreed points	Metered volumes; flow checks	Abstraction records	Monthly (metered volumes); flow checks through the dry season	Contractor EO (metering); Supervising Engineer; EPA/hydrological services (licence compliance)	Within ESHS staffing (Table 8.3) and the supervision contract
3.3 — Camp and site wastewater and sanitation	Toilet-to-worker ratio at each front (target at least	Weekly sanitation inspection checklist; servicing	Weekly	Contractor EO (records); Supervising	Within ESHS staffing (Table 8.3) and the

Mitigation measure verified (Section 3 sub-plan)	Parameter / indicator monitored	Method / means of verification	Frequency	Responsible agency	Indicative cost (US$, 2026 prices)
	1:15); share of units serviced on schedule (target 100%); untreated discharges (target zero)	manifests of the licensed provider; septic-system inspection record		Engineer (verification)	supervision contract
3.3 — Wetland no-fill rule	Crossing photo record	Supervising Engineer design review; EO checks with Supervising Engineer verification	Design review; per crossing before and after works	Contractor EO (records); Supervising Engineer (verification)	Within ESHS staffing (Table 8.3) and the supervision contract
3.3 — Pre-works verification	Re-test results for SW-03 hexavalent and total chromium, Mn, Hg, As and coliforms (method, detection limit, QA/QC) before works	Laboratory certificates	Once, before works	IIU through the Supervising Engineer; accredited laboratory	Laboratory programme (Table 8.1, including the pre-works re-tests)
3.4 — Sequencing	Area of open, unstabilised ground per front (ha) at month end; fronts left unstabilised through a wet season (target zero)	Monthly programme review against the earthworks schedule; site walk-over with GIS record; Supervising Engineer confirmation	Monthly (programme review)	Contractor EO (records); Supervising Engineer (verification)	Within ESHS staffing (Table 8.3) and the supervision contract
3.4 — Controls before opening any face	Paired upstream/downstream turbidity at active crossings (ratio ≤2); share of faces opened with the controls in place (target 100%); condition of traps and silt fences	Turbidity probe readings (Table 4.1); pre-opening inspection checklist signed by the Supervising Engineer; post-storm inspection record	Monthly (paired turbidity); after each storm	Contractor EO (records); Supervising Engineer (verification)	Probes and laboratory programme (Table 8.1); staff time within the ESHS staffing
3.4 — Progressive re-vegetation of completed slopes and of every surface…	Re-vegetated area certified against opened area (BMP Table 7.1)	Ground checks; Supervising Engineer certification	End of the first rainy season after planting; before section certification	Supervising Engineer's environmental specialist (certification); Contractor EO (records)	Within ESHS staffing (Table 8.3) and the supervision contract
3.4 — Dewatering to vegetated ground only	Post-storm findings; defects closed	Inspection reports; non-conformance reports (NCRs)	After each storm; weekly in the wet season	Contractor EO (records); Supervising Engineer (verification)	Within ESHS staffing (Table 8.3) and the supervision contract
3.5 — Topsoil stripped separately, stockpiled ≤2 m away from drainage,…	Stockpile register	EO log; reinstatement records	Weekly (stockpile register)	Contractor EO (records); Supervising Engineer (verification)	Within ESHS staffing (Table 8.3) and the supervision contract
3.5 — Clearance confined to design footprint	Disturbed area outside the design footprint (ha, target zero); unauthorised tracks or felled stems over 200 mm DBH (target zero)	Monthly satellite/GIS audit of the disturbance footprint against the design; Supervising Engineer field check	Monthly (GIS audit)	Contractor EO (records); Supervising Engineer (verification)	Satellite/GIS audit within the IIU reporting budget (Table 8.1) and the ESHS staffing
3.5 — Spoil (including unsuitable material	Disposal records; spoil-site register	Manifests; GIS audit	Monthly	Contractor EO (records);	Within ESHS staffing (Table

Mitigation measure verified (Section 3 sub-plan)	Parameter / indicator monitored	Method / means of verification	Frequency	Responsible agency	Indicative cost (US$, 2026 prices)
excavated from soft-ground/swamp…				Supervising Engineer (verification)	8.3) and the supervision contract
3.5 — Materials from licensed sources only	Source register vs permits	Permit register; audits	Before sourcing; quarterly audit	Contractor EO (records); Supervising Engineer (verification)	Within ESHS staffing (Table 8.3) and the supervision contract
3.5 — Contaminated soil remediated via EPA-approved route	Soil organic-matter/organic-carbon re-analysis results before works; contaminated-soil remediation certificates on occurrence	Laboratory reports	On occurrence; once before works (re-analysis)	Contractor EO; IIU through the Supervising Engineer; accredited laboratory	Laboratory programme (Table 8.1, including the pre-works re-tests)
3.6 — Waste Management Plan (C-ESMP constituent)	Waste Management Plan approved before works; share of waste segregated at source (target 100%); findings open beyond 30 days (target zero)	Plan approval record; weekly waste-facility inspection checklist; monthly Supervising Engineer audit; inventory reconciliation	Weekly (EO); monthly audit (Supervising Engineer)	Contractor EO (records); Supervising Engineer (plan review and approval; verification); IIU/MPW (plan approval)	Within ESHS staffing (Table 8.3) and the supervision contract
3.6 — No on-site burning or burial	Manifest completeness	Manifests; licence checks	Monthly (manifest audit)	Contractor EO (records); Supervising Engineer (verification)	Within ESHS staffing (Table 8.3) and the supervision contract
3.6 — Hazardous materials	Store inspections; licence validity	EO log; EPA inspection	Weekly (store inspections); licence validity monthly	Contractor EO (records); Supervising Engineer (verification)	Within ESHS staffing (Table 8.3) and the supervision contract
3.6 — Sewage sludge	Service records; open findings	Provider manifests; audits	Weekly (EO); monthly audit (Supervising Engineer)	Contractor EO (records); Supervising Engineer (verification)	Within ESHS staffing (Table 8.3) and the supervision contract
3.7 — Siting standards	Siting-approval register, including the record of the Suaken exception and its accepted equivalent-protection demonstration	Overlay sheet with coordinates; approvals	Before each site opens	Supervising Engineer (review and approval); IIU/MPW (register and approval)	Within ESHS staffing (Table 8.3) and the supervision contract
3.7 — Hard screening gate	Screening/permit register monthly	Register; monthly satellite/GIS audit	Before opening; register reviewed monthly	Supervising Engineer (review and approval); IIU/MPW (register and approval)	Satellite/GIS audit within the IIU reporting budget (Table 8.1) and the ESHS staffing
3.7 — Operations	Share of pits with compliant topsoil stockpiles, benched faces, drainage, fencing and signage (target 100%); accessible water-filled pits (target zero); third-party injuries (target zero)	Weekly site inspection checklist with photographs; GRM register; incident register	Weekly	Contractor EO (records); Supervising Engineer (verification)	Within ESHS staffing (Table 8.3) and the supervision contract

Mitigation measure verified (Section 3 sub-plan)	Parameter / indicator monitored	Method / means of verification	Frequency	Responsible agency	Indicative cost (US$, 2026 prices)
3.7 — Restoration standards	Sites restored vs opened	Close-out certificates; photos	At closure of each site; monthly progress	Supervising Engineer and EPA (certification); Contractor (records)	Within ESHS staffing (Table 8.3) and the supervision contract
3.7 — Suaken quarry–town interface	MOU/agreements register; blast monitoring	Documents; monitoring records	Before opening; per blast if blasting is adopted	IIU (agreements register); Supervising Engineer	Within ESHS staffing (Table 8.3) and the supervision contract
3.8 — Camp Management Plan (C-ESMP constituent) approved before occupation	Approval status	Plan; agreement; permit	Before occupation	Supervising Engineer (review and approval); IIU/MPW (review and approval); shared with the World Bank	Within ESHS staffing (Table 8.3) and the supervision contract
3.8 — Self-sufficiency	Draw on community water systems (target zero); bushmeat or wild-caught protein found in camp (target zero); borehole yield and septic performance	Weekly unannounced camp check by the Contractor's Environmental Officer (BMP Annex B check sheet); catering and procurement records; monthly Supervising Engineer verification	Weekly (EO); monthly Supervising Engineer verification (BMP Action A5)	Contractor EO (weekly checks); Supervising Engineer (monthly verification, BMP Annex B)	Within ESHS staffing (Table 8.3) and the supervision contract
3.8 — Perimeter fencing and access control	Gate logs; influx observations	Security records; CLO feedback	Daily (gate logs); monthly review	Contractor EO (records); Supervising Engineer (verification)	Within ESHS staffing (Table 8.3) and the supervision contract
3.8 — Health and hygiene	Clinic surveillance; inspections	Health records (confidential)	Weekly inspections; continuous surveillance	Contractor medical officer (surveillance); Supervising Engineer; county health team	Within ESHS staffing (Table 8.3) and the supervision contract
3.8 — Accommodation to Liberian labour-accommodation and WBG EHS standards	Compliance of the accommodation with the LMP and WBG EHS welfare standards (checklist score; non-conformances open)	Quarterly labour-accommodation inspection checklist (lighting, water, sanitation, eating areas, separate facilities); Supervising Engineer oversight; annual audit	Quarterly	Supervising Engineer (labour-conditions oversight); IIU	Within ESHS staffing (Table 8.3) and the supervision contract
3.9 — A1 No-go core demarcation	Demarcation intact; entry log	Weekly Supervising Engineer check (BMP Table 7.1)	Weekly while a front is in S3	Contractor EO (records); Supervising Engineer (weekly BMP Table 7.1 check)	Within the supervision contract (BMP Table 9.1); Contractor records within the ESHS staffing
3.9 — A2 Hours and blasting rule	Works log; Supervising Engineer inspections	Weekly Supervising Engineer check	Weekly while a front is in S3 or S6	Contractor EO (records); Supervising Engineer (weekly BMP Table 7.1 check)	Within the supervision contract (BMP Table 9.1); Contractor records within the ESHS staffing

Mitigation measure verified (Section 3 sub-plan)	Parameter / indicator monitored	Method / means of verification	Frequency	Responsible agency	Indicative cost (US$, 2026 prices)
3.9 — A3 Ancillary-siting freeze	Overlay sheet with coordinates	Design-review record; siting register	Detailed-design review; before any site opens	Supervising Engineer (overlay check); IIU (acceptance or refusal)	Within the supervision contract (BMP Table 9.1); Contractor records within the ESHS staffing
3.9 — A4 Pre-clearance walkover and Class A protocol	Walkover files; Class A register	Supervising Engineer check before and during clearance	Before and during each clearance package	Contractor EO; FDA (Class A marking); Supervising Engineer	Within the supervision contract (BMP Table 9.1); Contractor records within the ESHS staffing
3.9 — A5 Workforce conduct and camp checks	Induction coverage; camp check sheets; dismissals	CoC register; BMP Annex B forms	Before deployment (induction); weekly camp checks; monthly Supervising Engineer verification	Contractor EO (weekly checks); Supervising Engineer (monthly verification, BMP Annex B)	Within the supervision contract (BMP Table 9.1); Contractor records within the ESHS staffing
3.9 — A6 Evidence-led crossings	Accepted drawings; as-built records	Monthly Supervising Engineer check while under construction; at completion	Monthly while under construction; at completion	Supervising Engineer (design review and construction check); IIU (gate G6)	Within the supervision contract (BMP Table 9.1); Contractor records within the ESHS staffing
3.9 — A7 Towah swamp structure	Crossing photo record; paired turbidity	Weekly Supervising Engineer check during in-stream work	Weekly during in-stream work	Contractor EO (records); Supervising Engineer (weekly BMP Table 7.1 check)	Probes and laboratory programme (Table 8.1); supervision contract (BMP Table 9.1)
3.9 — A8 Footprint restoration	Cover and survival per site	A8 inspection; certification file	End of the first rainy season after planting; before taking-over	Supervising Engineer's environmental specialist (A8 inspection and certification)	Within the supervision contract (BMP Table 9.1); Contractor records within the ESHS staffing
3.9 — A9 Speed and node signs	Sign schedule; speed checks	Supervising Engineer inspections; handover record	Before S3/S6 entry; weekly speed checks	Supervising Engineer; MPW and the Liberia National Police (operation)	Within the supervision contract (BMP Table 9.1); Contractor records within the ESHS staffing
3.9 — A10 Community notice and grievance	Notice record; GRM log	IIU confirmation; GRM audit	Before each front entry	IIU (confirmation); Contractor CLO (records)	Within the supervision contract (BMP Table 9.1); Contractor records within the ESHS staffing
3.9 — Zone rules and triggers	BMP Table 7.2 events and close-out	Monthly biodiversity pages; BMP Annex B; incident file	Continuous; same day on any BMP Table 7.2 event	Supervising Engineer (stop-work and close-out); IIU	Within the supervision contract (BMP Table 9.1);

Mitigation measure verified (Section 3 sub-plan)	Parameter / indicator monitored	Method / means of verification	Frequency	Responsible agency	Indicative cost (US$, 2026 prices)
				(quarterly report); FDA and EPA (referrals); FDA with the Liberia National Police (enforcement)	Contractor records within the ESHS staffing
3.10 — Employment per the LMP and Decent Work Act (2015)	Quarterly labour statistics by sex/origin	Payroll/timesheet inspection	Quarterly	Supervising Engineer (labour-conditions oversight); IIU	Within ESHS staffing (Table 8.3) and the supervision contract
3.10 — Minimum working age 18 with documented verification (ID or…	Age-verification records; audits	HR file audits	At every engagement; quarterly audit	IIU (audits); Contractor HR (records)	Within ESHS staffing (Table 8.3) and the supervision contract
3.10 — Workers' GRM before any worker is engaged	Monthly workers' grievance statistics	Registry audit; publicity	Monthly	Contractor (registry); PMU/IIU (oversight)	Within ESHS staffing (Table 8.3) and the supervision contract
3.10 — OHS Plan (C-ESMP constituent) before works per ESS2/WBG EHS	Lost-time injury (LTI) frequency; near misses; drills	Plan approval; inspections; audit	Daily inspections; monthly statistics; drills per programme	Contractor OHS officer (statistics); Supervising Engineer (plan review and approval; inspection); IIU/MPW (plan approval); annual independent audit	Annual independent audit about 32,400 (Table 8.1); inspections within the supervision contract
3.10 — Welfare	Certified first aiders per 25 workers (target at least one); fronts with communications and sanitation (target 100%); ambulance availability; welfare complaints	Quarterly welfare inspection checklist; HR and training records; workers' GRM register	Quarterly	Supervising Engineer (labour-conditions oversight); IIU	Within ESHS staffing (Table 8.3) and the supervision contract
3.10 — Stop-work authority for all workers with non-retaliation	Near-miss rate; logbook completeness	Logbook inspection; audit	Monthly (near-miss and logbook review)	Contractor EO (records); Supervising Engineer (verification)	Within ESHS staffing (Table 8.3) and the supervision contract
3.10 — Local content and women's participation (ESIA §10.11)	Share of unskilled and semi-skilled posts filled from communities within 5 km; women's share of the national workforce (goal ≥30%); local-procurement value; skills certificates issued	Payroll analysis by settlement and sex; procurement records; training and certification records	Quarterly (public reporting)	Contractor HR (records); IIU (verification and publication)	Within ESHS staffing (Table 8.3) and the IIU social team budget
3.11 — Traffic Management Plan before works	Vehicle-speed monitoring; incidents/near misses	TMP approval; speed records; GRM	Daily (speed checks); monthly incident review	Supervising Engineer (plan review and approval; enforcement); IIU/MPW (plan approval);	Within ESHS staffing (Table 8.3) and the supervision contract

Mitigation measure verified (Section 3 sub-plan)	Parameter / indicator monitored	Method / means of verification	Frequency	Responsible agency	Indicative cost (US$, 2026 prices)
				Contractor OHS officer (speed records)	
3.11 — School-zone measures	Zone completion; crash statistics	As-built verification; audit report	Before opening (as-built); quarterly crash statistics in the defects-liability period	Supervising Engineer (as-built verification); MPW (crash monitoring in operation)	Within ESHS staffing (Table 8.3) and the supervision contract
3.11 — Public safety at sites	Excavations barricaded and lit and sites fenced and signed (share compliant, target 100%); third-party injuries (target zero); safety complaints	Weekly site-safety inspection checklist; GRM register; incident register; Supervising Engineer checks	Weekly	Contractor EO (records); Supervising Engineer (verification)	Within ESHS staffing (Table 8.3) and the supervision contract
3.11 — Disease and influx	Quarterly influx and health indicators	Programme records; GRM	Quarterly	Contractor with the county health team; IIU	Within ESHS staffing (Table 8.3) and the supervision contract
3.11 — Security personnel (ESS4; ESCP 4.4)	Security incident register	Plan approval; incident reports	Before engagement (plan); monthly incident review	Supervising Engineer (plan review and approval); IIU/MPW (plan approval); Contractor (incident register)	Within ESHS staffing (Table 8.3) and the supervision contract
3.11 — Utilities and water points	Outage/damage log	Agreements; GRM	Before excavation (survey); on occurrence (outages)	Contractor with the utilities; Supervising Engineer	Within ESHS staffing (Table 8.3) and the supervision contract
3.12 — Code of Conduct signed by every worker before deployment, prohibiting…	CoC signature register (LMP indicator)	HR records; Supervising Engineer verification	Before deployment; monthly register check	Contractor ESHS manager (register); Supervising Engineer (verification)	Within ESHS staffing (Table 8.3) and the supervision contract
3.12 — SEA/SH training	Training and attendance records	Training register; audit	Quarterly	MoA Social Development Specialist; Contractor focal point	Within ESHS staffing (Table 8.3) and the supervision contract
3.12 — Confidential channel	Anonymised statistics	Confidential log; process audit	Monthly (anonymised statistics)	MoA Social Development Specialist; IIU	Within the MoA-PMU Social Development Specialist's time and the GRM operation
3.12 — Survivor-centred referral	Referral functionality checks	Provider directory; audit	Before the commencement of civil works; quarterly functionality check	MoA Social Development Specialist; IIU	Within the MoA-PMU Social Development Specialist's time and the GRM operation
3.12 — Notification	Notification timestamps	Confidential records	On occurrence (24 h / 48 h)	Contractor; PMU/IIU	Within the MoA-PMU Social

Mitigation measure verified (Section 3 sub-plan)	Parameter / indicator monitored	Method / means of verification	Frequency	Responsible agency	Indicative cost (US$, 2026 prices)
					Development Specialist's time and the GRM operation
3.13 — Sacred sites	Geofence audit; custodial agreements	GIS audit; MOUs; induction records	Monthly (geofence audit); before adjacent works	IIU social team (GIS audit, MOUs); Contractor CLO/EO	Within ESHS staffing (Table 8.3) and the supervision contract
3.13 — Sacred creeks (B'hai, Kougae, Toe Town stream)	Water quality at the creeks	Monitoring data; custodian feedback	Monthly during adjacent works	Contractor EO (records); Supervising Engineer (verification)	Laboratory programme (Table 8.1)
3.13 — Graves	Relocation register	RAP records; community confirmation	Before affected fronts	IIU social team; external RAP monitor	RAP implementation budget (external monitor and audit 80,000)
3.13 — Unmarked graves	Briefing records	Toolbox register; walkover minutes	Before earthworks in each community	Contractor EO (records); Supervising Engineer (verification)	Within ESHS staffing (Table 8.3) and the supervision contract
3.13 — Chance-Find Procedure (contract provision; ESMF Annex 5)	Find events and closure	Find reports; written clearances	On occurrence	Contractor EO (records); Supervising Engineer (verification)	Within ESHS staffing (Table 8.3) and the supervision contract
3.14 — Compensation-before-works (hard condition)	Conditions-precedent register at monthly meetings	Completion report; handover records	Monthly (conditions-precedent register); before works per segment	IIU (register); World Bank (clearance)	RAP implementation budget (external monitor and audit 80,000)
3.14 — Scope discipline	Monthly GIS/encroachment audit	Design-change register; addenda	Monthly	Supervising Engineer (GIS audit); IIU	Satellite/GIS audit within the IIU reporting budget (Table 8.1) and the ESHS staffing
3.14 — Vulnerable PAPs (116)	Monthly vulnerable-PAP register	Case files; external monitor	Monthly	IIU social team; external RAP monitor	RAP implementation budget (external monitor and audit 80,000)
3.14 — Livelihood-restoration monitoring	Quarterly livelihood indicators	Monitoring reports; audit	Quarterly for at least 24 months	IIU social team; external RAP monitor	RAP implementation budget (external monitor and audit 80,000)
3.14 — Works-front continuity	Access complaints; reinstatement checks	GRM; daily works records	Daily (works records); monthly complaints review	Supervising Engineer; Contractor CLO (GRM)	Within ESHS staffing (Table 8.3) and the supervision contract
3.15 — Liaison continuity	Contact register	CLO records; community feedback	Monthly (contact register)	IIU social team; Contractor CLO (records)	Within ESHS staffing (Table 8.3) and the supervision contract

Mitigation measure verified (Section 3 sub-plan)	Parameter / indicator monitored	Method / means of verification	Frequency	Responsible agency	Indicative cost (US$, 2026 prices)
3.15 — Quarterly community meetings per settlement cluster plus…	Meetings held; participation by sex and community	Minutes; attendance records	Quarterly; per trigger	IIU social team; Contractor CLO (records)	Within ESHS staffing (Table 8.3) and the supervision contract
3.15 — Inclusion	Participation statistics	Disaggregated attendance	Quarterly	IIU social team; Contractor CLO (records)	Within ESHS staffing (Table 8.3) and the supervision contract
3.15 — GRM publicity	Publicity audit	Posting photographs; training records	Before works; quarterly audit	IIU social team; MoA-PMU	Within ESHS staffing (Table 8.3) and the supervision contract
3.15 — Disclosure	Disclosure checklist	Tearsheets; distribution records	Once, before works; checklist maintained	IIU social team; MoA-PMU	SEP budget (Table 8.1, training and engagement line)
3.15 — Cross-lot coordination (CI-02)	Coordination record kept; influx indicators (rents, prices, in-migration) in shared host towns; overlapping peak-workforce periods (target: none uncoordinated)	MoA-PMU quarterly review minutes; influx observations (Table 4.1, social row); GRM register	Quarterly	MoA-PMU; IIU social team (records)	Within the MoA-PMU coordination and the IIU social team budget
3.16 — EPRP approved before works with scenario procedures, resources and…	Plan currency; reviews	EPRP approval; version control	Six-monthly review; after any activation	Supervising Engineer (review and approval); IIU/MPW (review and approval); shared with the World Bank	Within ESHS staffing (Table 8.3) and the supervision contract
3.16 — Training within two weeks of adoption, repeated regularly; drills	Drill completion; corrective actions	Auditable drill records	Six-monthly drills; quarterly spill drills	Contractor OHS/EO (records); Supervising Engineer (oversight)	Within ESHS staffing (Table 8.3) and the supervision contract
3.16 — Spill response	Spill events; volumes recovered	Spill register; EPA notifications	On occurrence; monthly kit inspection	Contractor OHS/EO (records); Supervising Engineer (oversight); EPA (notifications)	Within ESHS staffing (Table 8.3) and the supervision contract
3.16 — Fire	Fire events; watch logs	Inspections; incident records	Monthly inspections; daily watch in the dry season	Contractor OHS/EO (records); Supervising Engineer (oversight)	Within ESHS staffing (Table 8.3) and the supervision contract
3.16 — Medevac chain	Medevac exercise results	Exercise and clinic records	Six-monthly exercise	Contractor OHS/EO (records); Supervising Engineer (oversight)	Within ESHS staffing (Table 8.3) and the supervision contract
3.16 — Community-incident protocol	Incident closure tracking	Incident reports; GRM	On occurrence	Contractor OHS/EO (records); Supervising	Within ESHS staffing (Table 8.3) and the supervision contract

Mitigation measure verified (Section 3 sub-plan)	Parameter / indicator monitored	Method / means of verification	Frequency	Responsible agency	Indicative cost (US$, 2026 prices)
				Engineer (oversight); IIU	
3.17 — Restoration and Rehabilitation Plan approved before demobilisation	Approval status	Approved plan	Before demobilisation	Supervising Engineer (review and approval); IIU/MPW (review and approval); shared with the World Bank; EPA (notified)	Within ESHS staffing (Table 8.3) and the supervision contract
3.17 — Progressive restoration throughout the works	Sites restored vs opened (monthly)	Satellite/GIS audit; certificates	Monthly	Supervising Engineer (certification); Contractor (records)	Satellite/GIS audit within the IIU reporting budget (Table 8.1) and the ESHS staffing
3.17 — Closure standards	Closure inspection findings	Verification sampling; photographs	At closure of each site	Supervising Engineer (certification); Contractor (records)	Within ESHS staffing (Table 8.3) and the supervision contract
3.17 — After-use and handback	Handback register	Signed handback records	At each closure	IIU with the host communities; Contractor	Within ESHS staffing (Table 8.3) and the supervision contract
3.17 — Verification and handover	Sign-off completion; handover checklist	Close-out certificates; taking-over annexes	At demobilisation and taking-over	EPA, Supervising Engineer, IIU and MPW (joint inspection)	Within ESHS staffing (Table 8.3) and the supervision contract

Table 4.3: ESMP performance indicators

Indicator	Target / standard	Frequency	Responsible (data owner)	Data source
Grievances acknowledged in writing within 24 hours	100%	Monthly	IIU social team; Grievance Redress Committees	GRM registers
Grievance closure within tier timelines (5/15/15 days) and within 35 days overall where all three tiers are used	≥90% of cases closed within 30 days and 100% within 35 days unless referred to the courts; any case open more than 35 days escalated within 7 days	Monthly/quarterly	IIU social team; Grievance Redress Committees	GRM registers; environmental site meetings
Serious incidents notified within 24 h (Contractor→IIU) and 48 h (→Bank)	100%	On occurrence	Contractor; IIU	Incident records
Work-related fatalities	Zero	Continuous	Contractor OHS officer; Supervising Engineer verifies	Accident logbooks
Lost-time injury frequency; near-miss reporting	LTIF declining; near-miss reporting rising (leading indicator)	Monthly	Contractor OHS officer; Supervising Engineer verifies	OHS statistics
Workers inducted and Code of Conduct signed before deployment	100%	Monthly	Contractor ESHS manager; Supervising Engineer verifies	HR/CoC register
Quarterly ESHS refresher training delivered	100% of workforce	Quarterly	Contractor; IIU	Training records
Local hire of unskilled/semi-skilled labour from communities within 5 km	Unskilled and semi-skilled posts offered first to communities within 5 km (Table 3.11); the local-hire share fixed in the works contract and the C-ESMP	Quarterly (public)	Contractor HR; IIU	Payroll analysis

Indicator	Target / standard	Frequency	Responsible (data owner)	Data source
	achieved; reported by settlement and sex			
Women's participation in the national workforce	≥30% goal	Quarterly	Contractor HR; IIU	Payroll analysis
PM10 at sensitive receptors within the EPA standard	100% of monthly checks; corrective action on exceedance	Monthly	Contractor EO; Supervising Engineer	Air monitoring
Downstream turbidity ≤2× upstream at active crossings	100%	Monthly	Contractor EO; Supervising Engineer	Water monitoring
BMP Table 7.2 stop-work events (unauthorised entry to the no-go core or a CH polygon; night work or blasting in S3/S6; verified hunting or bushmeat; uncontrolled sediment; damage to an accepted structure; restoration below the A8 thresholds)	Zero; same-day stop-work instruction and close-out; penalties per the works-contract penalty schedule	Continuous	Supervising Engineer; IIU	Supervising Engineer inspections; entry logs; monthly biodiversity pages
Unauthorised Class A tree felling	Zero (segment halted; national protocol applied; 5:1 replacement if the stem is lost — BMP Table 7.2)	Continuous	FDA; Supervising Engineer	FDA/Supervising Engineer records
Permits, licences and land agreements before the relevant activity	100%	Monthly gate review	IIU	Permit register
NCRs closed by deadline	≥90%; none open >60 days without escalation	Monthly	Supervising Engineer	NCR register
Ancillary sites screened before opening; progressively restored	100% screened; certificates current	Monthly	IIU; Supervising Engineer	Screening register; GIS audit
Vulnerable PAPs re-established; livelihoods at or above pre-project levels	100% within the monitoring period	Quarterly	IIU social team; external RAP monitor	RAP monitoring
Reports (monthly, quarterly, annual) submitted on time	100%	Per cadence	IIU	ESMIS

The cost of compiling and reporting the indicators of Table 4.3 is within the ESHS staffing (Table 8.3) and the reporting and audit line of Table 8.1; no separate item is carried.

5. CAPACITY CONTEXT, CAPACITY BUILDING AND TRAINING

5.1 Capacity Context

The IIU of the MPW has been improving the Ganta–Tappita–Zwedru corridor (about 225 km) from unpaved to paved standard: the Ganta–Tappita section (100 km) under the South-Eastern Corridor Road Assets Management Project (SECRAMP), under construction since 2021, and the Tappita–Toe Town section (40 km) under the parent RETRAP project. The documented lessons of that experience are set out in ESIA Appendix W (Table W.1), and three realities drawn from it condition the arrangements of this plan. First, the ESMF records that the implementing ministries had no prior Environmental and Social Framework (ESF) implementation experience, and the SECRAMP record shows that thin Employer-side E&S staffing constrained supervision; the ESCP therefore mandates the four-specialist minimum, county focal points and pre-works training (Section 5.2), and the Supervising Engineer's own E&S and OHS specialists are mobilised before any works front opens. Second, the SECRAMP record documents quarry operations that affected nearby communities, workplace accidents including fatalities, SEA/SH cases, late compensation, dust and drainage damage and a biodiversity covenant that lagged the works. This ESMP answers each with a measure required of the Contractor before and during the works: ancillary sites screened, permitted, operated and restored under per-site plans (Sections 3.7 and 3.17); the OHS Plan, the permit-to-work regimes, incident logbooks and the 24-hour notification ladder (Sections 3.10 and 6.4); the Code of Conduct covering SEA/SH, the confidential channel and the survivor-centred referral pathway (Section 3.12); the compensation-before-works gate (Section 3.14); dust suppression to the EPA standard and the 10/50/100-year drainage design (Sections 3.1, 3.3 and 3.4); the BMP actions in place before the fronts reach S6 and S3 (Section 3.9); and the minimum ESHS staffing and the approved C-ESMP before works (Section 1.2; Table 8.3). Third, the 2024 ESIA records that on earlier Liberian road projects supervising engineers neglected E&S monitoring "resulting in a multitude of incidents, some of which were fatal"; in response, daily ESHS oversight is written into the Supervising Engineer's contract, the Supervising Engineer reviews and approves the C-ESMP and its constituent plans before they are submitted to the IIU/MPW for review and approval and subsequently shared with the World Bank, and the annual independent integrated audit — which covers the BMP Table 7.1 checks and requires no separate biodiversity survey — provides a second line. County regulatory structures remain thin — the environmental courts and most county environmental committees are not yet established — so the contractual enforcement machinery (Section 6), the adopted grievance mechanism (Section 7) and the EPA's statutory powers are the effective front line, while the World Bank provides overall technical support and guidance, and recommends additional measures for strengthening the management framework and implementation performance. Capacity-building costs sit in the ESMF, SEP and RAP budgets (Section 8).

5.2 Training Programme

This section establishes the training programme equipping every duty-holder to deliver this ESMP, discharging ESCP C1 (training completed before civil works and repeated periodically) and the ESMF training framework. Records and competence verification are held in the ESMIS and reported quarterly; 100% induction coverage and 100% Code of Conduct signature are standing indicators.

Table 5.1: Training plan

Audience	Topics	Frequency	Provider
PMU/IIU specialists, county focal points, Supervising Engineer, Contractor management	ESCP C1 syllabus: project GRM; stakeholder engagement; E&S requirements and screening; OHS; emergency preparedness; SEA/SH risk mitigation; disability inclusion; documentation and reporting; biodiversity conservation	Before civil works; annual refresher	MoA-PMU/IIU with World Bank support (ESMF budget 111,000, project-wide)

Audience	Topics	Frequency	Provider
All workers incl. subcontractors	ESHS induction: Code of Conduct; SEA/SH; biodiversity code (no hunting, bushmeat, wildlife pets; weapons ban); chance finds; OHS basics and PPE; GRM; cultural rules (Poro/Sande; Goyeazon)	Induction before deployment (100%); quarterly refreshers	Contractor ESHS team (BMP Annex A module)
Crews deployed to km 18–20	CSZ briefing (BMP Annex A, Table A.2): no-go core and zone rules, hours, the 50 m sighting rule, entry-log discipline, using the WCF awareness materials	Before deployment to the reach; toolbox reminder the first morning a crew enters S3 or S6	Contractor ESHS team
Drivers and plant operators	Defensive driving; 20 km/h town and CSZ regimes; wildlife protocols; journey management; load covering	Before operating; quarterly	Contractor OHS officer
Task-specific crews	Permit-to-work regimes (confined space, hot work, height, permit-to-dig); lifting; blasting (if adopted); first aid; heat and snakebite response	Role-based before task; refreshers	Contractor OHS; accredited providers
Emergency teams	EPRP scenarios and drills (spill, fire, medevac, severe weather, collapse, security, outbreak)	Within two weeks of EPRP adoption; drills six-monthly; spill drills quarterly; medevac exercise before km 40	Contractor with Supervising Engineer oversight
SEA/SH focal points; female GRM members	Survivor-centred handling; confidentiality; warm referral; 24/48-hour protocol	Before workers are engaged on the first front; semi-annual	MoA Social Development Specialist; GBV provider
Grievance Redress Committees (8 community; county; project)	GRM procedures, registers, timelines, inclusion	Before works; annual refresher (Solo Town request)	IIU social team (RAP allocations 50,000 + 50,000)
Communities and schools: pupils and teachers of the 17 corridor schools (primary and junior-high), their parent–teacher associations, and community members of the corridor settlements	Road-safety education for pupils and teachers in the 17 corridor schools before the road opens to fast traffic (crossing drills, the school-zone measures, Project-vehicle rules); age-appropriate HIV/STI and hygiene awareness for pupils and teachers; GBV/SEA/SH awareness for communities and parent–teacher associations, including the confidential channel; conservation (no hunting, no bushmeat, the BMP rules); E&S workshops open to communities	Schools before opening and annually; workshops twice yearly	Contractor CLO with the county health and education teams

6. REPORTING, REVIEW AND NON-COMPLIANCE

This section fixes the reporting cadence, the incident-notification ladder, the non-conformance protocol with escalating sanctions, and the management-review cycle that keeps this ESMP current and enforced.

6.1 Monthly Contractor Report

The Contractor reports monthly through the Supervising Engineer to the IIU, covering as a minimum: implementation status of every Section 3 measure due; monitoring results against Table 4.1 with exceedances and corrective actions; incidents, accidents and near misses with classifications; grievance statistics for both mechanisms (received, acknowledged within 24 hours, resolved within timelines, ageing of open cases); labour statistics (workforce by sex, origin and category; local-hire and women's-participation performance; age-verification and Code of Conduct status); training delivered; waste and hazardous-materials records; permit and land-agreement status; ancillary-site screening and restoration progress; the biodiversity pages (BMP Table 7.1 results, BMP Table 7.2 events and close-out, the sighting and incident log, camp checks and Action A8 progress); RAP-interface observations (encroachment, access continuity, damage claims); and NCR status. The Supervising Engineer verifies by inspection and reports monthly to the IIU with its own findings.

6.2 Quarterly EPA Compliance Report

The IIU reports quarterly to the EPA against the five permits and the operational licences, compiling the monthly data, monitoring results referenced to the AQ/NS/GW/SW/SS stations, incidents and regulatory notifications, grievance performance and the status of conditions precedent and verification actions. EPA county inspectors are facilitated on site inspections; the EPA's statutory powers — compliance monitoring, audit and environmental restoration orders under the EPML — operate in parallel with the contractual regime.

6.3 Quarterly World Bank Report and Bi-annual ESF Report

The PMU and IIU submit a quarterly ESHS report to the World Bank (ESCP item A) covering ESCP implementation, instrument status, engagement, the functioning of both grievance mechanisms, RAP monitoring (ESCP 5.3), BMP compliance (BMP Table 7.1 check results, BMP Table 7.2 events and serious incidents), incidents and corrective actions, and staffing continuity; IIU minutes reach the Bank within five working days of each quarterly meeting. A bi-annual ESF implementation progress report consolidates ESMF, ESCP and SEP performance at project level.

6.4 Incident Notification

The ladder applies without exception: the **Contractor notifies the IIU within 24 hours** of any serious incident — any fatality, severe injury requiring off-site care, SEA/SH incident or significant environmental damage — and the IIU (the PIU for this road) notifies the World Bank — and the EPA for serious environmental and biodiversity incidents — within 48 hours of learning of any incident with significant adverse effects. A detailed report with root-cause analysis and a corrective-action plan follows within 10 working days, and the close-out of the corrective actions is reported within 20 working days. Incidents are classified indicative/serious/severe per the LMP; accident and grievance logbooks are kept at every site; pollution incidents are additionally notified to the EPA under the EPML and permits, with the County Environmental Officer as first contact. SEA/SH notifications follow the confidential pathway of Section 3.12. Lessons from every root-cause analysis are briefed to the workforce and fed into the risk-register review.

6.5 Non-Conformance and Corrective Action

Deficiencies identified through supervision, inspections, monitoring exceedances, audits or grievances — including those identified by the Contractor's own ESHS team during the civil works, which the Contractor records in its inspection registers and reports monthly — are recorded by the Supervising Engineer as observations or non-conformance reports (NCRs), each with a corrective action, a responsible person and a deadline; the Contractor responds with a corrective-action plan and closure requires field verification. Sanctions escalate with persistence and severity: (i) observation and corrective instruction; (ii) formal NCR; (iii) withholding of interim payments against unresolved ESHS NCRs; (iv) the contract penalty schedule — including the biodiversity sanctions of the works-contract penalty schedule for breaches of the BMP zone rules (unauthorised entry to the no-go core or a CH polygon; night work or blasting in S3 or S6; an ancillary site opened in breach of A3) and for unauthorised Class A felling, which halts the segment, applies the national protocol and requires 5:1 replacement; (v) suspension of the affected works; and ultimately (vi) the contract's default remedies. Defined events bypass the NCR cycle: the BMP Table 7.2 stop-work triggers (same-day instruction; a verified protected-species sighting within 50 m of an active front suspends that front until the Supervising Engineer clears restart), any works start ahead of a condition precedent (immediate suspension, regularisation, notification to the EPA and the Bank), and any serious incident (Section 6.4). All personnel hold stop-work authority with non-retaliation. NCRs, penalties and closures are logged in the ESMIS and reported monthly, quarterly and annually.

6.6 Audit, Management Review and Revision

An independent integrated environmental, social and health-and-safety audit is undertaken annually (2026 basis about US$32,400 per audit) and submitted to the EPA and the World Bank; it covers the BMP Table 7.1 checks and requires no separate biodiversity survey (ESIA Section 11.9.4). An annual management review — chaired by the IIU with the Contractor, the Supervising Engineer (including its environmental specialist for the BMP) and the MoA-PMU — examines audit findings, Table 4.3 performance, grievance and incident trends, the risk register and resourcing, and decides revisions under Section 1.5; the first annual review also takes as an input the lessons of the Tappita–Toe Town (40 km) section, which the IIU requests the supervision consultant to compile (ESIA Appendix W). Unresolved systemic issues are escalated to the Bank in the next quarterly report or, where arising from an incident, within 48 hours.

7. GRIEVANCE REDRESS MECHANISM (ADOPTED)

This section describes the grievance system through which project-related complaints are received, resolved and reported: the adopted RETRAP community mechanism (Sections 7.1–7.2), the separate workers' mechanism (Section 7.3) and the SEA/SH-sensitive channel with the World Bank's corporate avenues (Section 7.4), charted at Figure 7.1 and summarised in Table 7.1.

7.1 The Adopted Mechanism and Uptake

The Project operates the **established RETRAP grievance redress mechanism**; this ESMP adopts it and does not redesign it. The mechanism follows the SEP/ESMF chiefdom-based approach as operationalised for this corridor by the RAP: it is free of charge, accepts oral and written complaints without retaliation, and **eight Community Grievance Redress Committees (CGRCs) are established and functioning along the corridor**, formed during the RAP census and consultations of December 2024. Grievances may be lodged at any time with any committee member, the community liaison officer, community leadership or the IIU social team; every grievance is entered in the register book kept at each committee and receives a **written acknowledgement within 24 hours** stating the review date and venue; register books are publicly accessible and a central grievance matrix is updated monthly.

7.2 Tiers and Timelines

The structure is a three-tier committee system with the courts as the constitutional last resort: the **Community GRC resolves cases within 5 days**; unresolved cases escalate to the **County GRC (15 days)** and thence to the **Project GRC at the IIU/MPW (15 days), the final administrative tier**. Resolution is verified with the complainant and recorded on a Grievance Redress Form; any aggrieved person retains the right to the courts at any time. The complete flow — uptake and 24-hour acknowledgement, the three tiers and their day-counts, and the parallel workers' and SEA/SH channels — is charted at Figure 7.1.

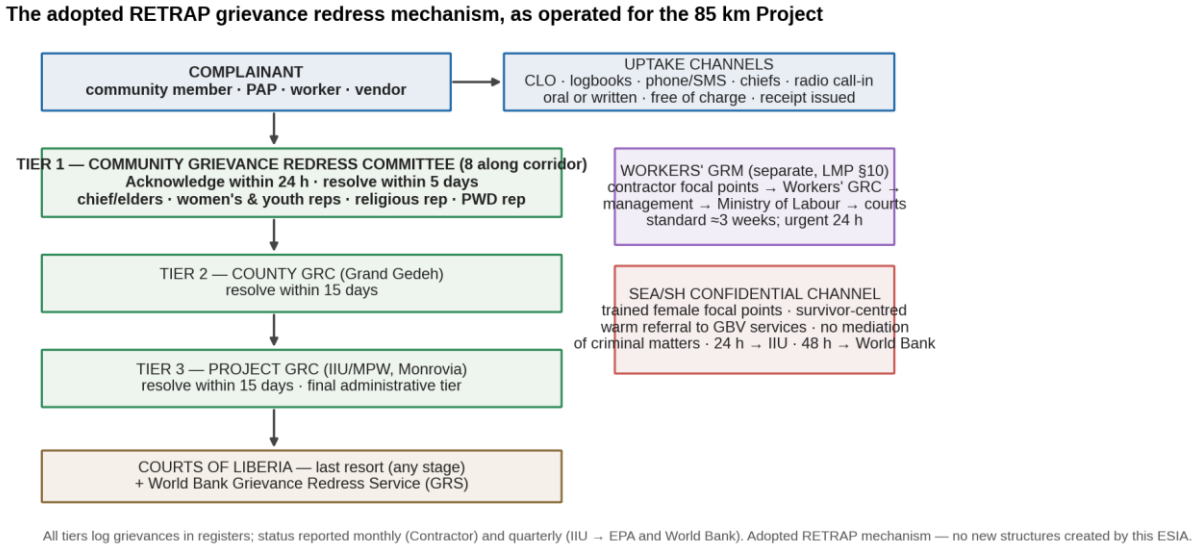


Figure 7.1: The adopted RETRAP grievance redress mechanism (RE-GROUP, 2026)

7.3 Workers' Grievance Mechanism

Two parallel provisions complete the system without altering the adopted tiers, composition or timelines. The first is the **workers' grievance mechanism, which is separate**, operated by the Contractor under the LMP: focal points receive complaints; a Workplace Grievance Redress Committee including the E&S specialists resolves them within a three-week standard (urgent matters 24 hours–15 days); escalation

runs to contractor management, then the Ministry of Labour as final administrative tier, then the courts; anonymous complaints are accepted, with dedicated telephone and e-mail channels, signage, brochures and short message service (SMS) publicity.

7.4 SEA/SH-Sensitive Channel and World Bank Avenues

The second parallel provision is the **SEA/SH-sensitive channel**, which supplements the adopted mechanism (the adopted mechanism lacked an explicit SEA/SH pathway): confidential uptake through trained female focal points and the Social Development Specialist; no mediation of SEA/SH cases by ordinary community committees; survivor-centred support with warm referral to GBV service providers; police referral of criminal cases; and the 24-hour Contractor-to-IIU and 48-hour IIU-to-Bank notifications. Communities and workers also retain access to the World Bank's **Grievance Redress Service** and, after Bank Management has had opportunity to respond, the **Inspection Panel**.

Table 7.1: Tiers and timelines of the adopted grievance redress mechanism

Tier/channel	Composition and uptake (abridged)	Timeline	Records/output
Uptake and registration (all tiers)	Any CGRC member, community leadership, CLO or IIU social team; oral or written; assistance for non-literate complainants; no cost	Written acknowledgement within 24 hours, stating review date and venue	Entry in the publicly accessible register book
Tier 1 — Community GRC (8 committees)	Chair: Town Chief/City Mayor; elders; religious representative; women's and youth representatives; vulnerable-group/persons with disabilities (PWD) representative; male and female PAP representatives	Resolution within 5 days of receipt	Written decision; register book
Tier 2 — County GRC	Chair: County Superintendent; district, judicial, land, Ministry of Internal Affairs (MIA), MPW and EPA membership	Resolution within 15 days of transfer	Written decision; records kept
Tier 3 — Project GRC (IIU/MPW)	Chair: Deputy Minister for Administration (MPW); IIU, RETRAP/PIU, legal, valuation, audit and PAP membership	Resolution within 15 days of transfer; final administrative decision	Written decision; Grievance Redress Form
Courts	Constitutional right of any aggrieved person	At any time; last resort	Judicial record
Workers' GRM (separate, per LMP)	Contractor focal points; Workplace GRC incl. E&S specialists; anonymous complaints; dedicated telephone/e-mail	3-week standard; urgent 24 hours–15 days; escalation to management → Ministry of Labour (final tier) → courts	Workers' complaints registry; publicity
SEA/SH-sensitive channel (supplement)	Trained female focal points and the Social Development Specialist; confidential; never mediated by community committees	Contractor→IIU within 24 hours; →World Bank within 48 hours; survivor-timed resolution	Confidential log with informed consent; referral records
World Bank Grievance Redress Service (GRS) and Inspection Panel	Direct corporate channels	At any time (Panel after Management response)	Bank records

8. ESMP BUDGET

This section presents the indicative budget for implementing this ESMP at 2026 prices, with the provenance of every figure labelled. The ESMP-specific lines derive from the 2024 ESIA Environmental and Social Action Plan (Earthtime, 2024, Table 11-4; 2024 cost basis) and from the project-level ESMF and SEP allocations (2021 basis), re-based to 2026 prices with a composite escalation allowance of 8 per cent; the biodiversity line is the action-by-action costing of BMP Table 9.1 (2026 prices); the works-embedded measures of Section 3 are costed measure by measure in the mitigation tables and summed by sub-plan in Table 8.3 so that they can be priced in the Bills of Quantities; and the resettlement budget is the approved RAP total (2025 actuals). Of the 2024 action plan's one-off total of about US$1,342,500, the allocations for RAP preparation (US$300,000) and the Biodiversity Field Survey (US$650,000) have been delivered and are replaced by the actual RAP and BFS costs; the plans-and-systems component that is carried forward is US$442,500 at the 2024 basis (US$392,500 plus the US$50,000 Restoration and Rehabilitation Plan carried separately in the 2024 plan), which re-bases to US$477,900 at 2026 prices. Table 8.1 states each line and its provenance, Table 8.2 distributes the budget by carrier and phase, Table 8.3 builds up the Contractor-borne cost to be itemised in the Bills of Quantities, Table 8.4 summarises the package by project phase and Table 8.5 reconciles the budget with the works contract's Schedule of Priced Activities; the package is summarised by project phase across the project life cycle. All four tables govern over the base figures retained in ESIA Table 11.3 for traceability and are reconciled against the priced Bills of Quantities under Section 1.5.

Table 8.1: Indicative ESMP budget at 2026 prices (provenance labelled)

Item	Amount (US$, 2026 prices)	Provenance and notes
Management plans and systems (one-off): IIU ESMS and training materials 32,400; Contractor ESMS 32,400; C-ESMP 54,000 plus the site-specific quarry and borrow-pit ESMPs 54,000; Code of Conduct 8,100; Camp Management Plan 10,800; workforce/influx plan 10,800; EPRP 48,600; OHS Plan 43,200; Waste Management Plan 43,200; Traffic Management Plan 43,200; Blasting Management Plan 43,200 (conditional); Restoration and Rehabilitation Plan 54,000	477,900	Earthtime (2024) Table 11-4 items 1–14 and 28 (2024 basis 442,500) × 1.08; of which the Contractor's plans 445,500 (Table 8.3) and the IIU system 32,400; permit fees (EPA/MME-determined) additional
Monitoring equipment set-up: 4 water-quality probes 86,400 (two deployed continuously, two in rotation); 2 continuous dust monitors 64,800; 2 handheld air-quality units 32,400; noise meter 16,200; automatic weather station 8,100 (items sum to 207,900; line rounded to 208,000)	208,000	Earthtime (2024) item 26 (2024 basis 192,500) × 1.08; confirmed by quotation at procurement
Recurring laboratory monitoring over the 3-year works period: soil ≈5,200/yr; groundwater ≈5,800/yr; surface water ≈3,900/yr (≈14,900/yr), including the pre-works verification re-tests	44,700	Earthtime (2024) rates (2024 basis 41,400) × 1.08; accredited laboratory
Reporting and audit: monthly Contractor E&S reports ≈6,480 each (≈233,300 over 36 months, within the contract rates); quarterly IIU reports ≈8,100 each (≈97,200 over 12 quarters); annual independent integrated ESHS audits ≈32,400 each (≈97,200 over 3 years)	427,700	Earthtime (2024) per-report rates × 1.08; 3-year works period; the annual audit covers the BMP Table 7.1 checks
Training and capacity building: project ESHS training 111,000 (ESMF Table 24) and SEP engagement/GRM 77,000, both project-wide and applied pro rata, re-based; GRC support 50,000 and training 50,000 within the RAP budget (not added); worker induction and toolbox training within the Contractor rates	203,000	ESMF (2021) and SEP (2021) allocations (188,000) × 1.08; RAP (2025)
Contractor ESHS staffing: ESHS manager, environmental officer, social officer/CLO, OHS officer and SEA/SH focal point for the 36-month works period; during the defects-liability period a reduced ESHS presence (environmental officer and CLO, as required for the restoration certification, closure and handover tasks) is priced within the contract's defects-liability rates and is not added here; PMU/IIU specialists and county focal points within project financing (E&S unit equipment and facilitation 200,000 project-wide, ESMF)	360,000	RE-GROUP estimate for pricing (five posts × 36 months); ESCP 1.1 and 1.4; works contract preliminary-and-general items

Item	Amount (US$, 2026 prices)	Provenance and notes
Biodiversity — BMP Actions A1 to A10 (BMP Table 9.1): A1 demarcation 11,000; A4 walkover and Class A protocol 28,000; A5 induction and camp checks 26,000; A8 footprint restoration 150,000; A9 signs 6,000; A10 notices 3,000; A2, A3 and A7 within method statements, the design fee and the drainage and structures bill; plus a provisional sum of 80,000 for the evidence-led A6 structures	304,000	BMP Table 9.1 (2026 prices; RE-GROUP estimates for pricing); the priced Bills of Quantities govern (Section 1.5). No separate multi-year biodiversity programme is carried
Works-embedded environmental and social measures of the Section 3 sub-plans (dust, noise, water and effluent controls, erosion and sediment control, soils, waste, ancillary-site controls, camp controls, OHS and welfare, traffic and community safety, SEA/SH, cultural heritage, engagement, emergency preparedness, decommissioning)	1,795,000	RE-GROUP indicative allowances by sub-plan for pricing the Bills of Quantities (Table 8.3); priced within works rates and preliminary-and-general items
Resettlement (RAP), cross-referenced: compensation 3,021,533.61 + implementation 637,153.36 (incl. GRM/committee support 50,000; training 50,000; audit 80,000; contingency 302,153.36)	3,658,687	RAP (2025) actuals; held in the dedicated account and fully expended, with the Bank-cleared completion report, before works
Contingency on the ESMP-specific lines (15% of plans and systems, equipment, laboratory monitoring, reporting and audit, and training: 1,361,300)	204,000	RE-GROUP allowance, equal to about 2.7% of the identified package (about 5.1% of the package excluding the RAP, which carries its own contingency of 302,153)
Identified total environmental and social package (2026 prices)	≈7,683,000	Aggregation for planning purposes of the Employer-administered lines (≈682,500), the Contractor-borne lines (≈3,137,800; Table 8.3), the RAP (3,658,687) and the contingency (204,000); each component is governed under its own instrument. Operation-phase monitoring and maintenance (Year-1 verification monitoring, drainage and school-zone upkeep, crash monitoring, maintenance of the A9 signs) fall to the MPW road-maintenance budget and are not costed here

2026 price basis. The 2024- and 2021-basis lines are re-based to 2026 prices with a composite escalation allowance of 8 per cent (2024→2026); the biodiversity actions are costed at 2026 prices in BMP Table 9.1, the works-embedded allowances of Table 8.3 are 2026 estimates, and the RAP carries 2025 actuals held in the dedicated account. Every mitigation and monitoring measure of Section 3 carries its indicative cost in its own table, either as a discrete amount or as a works-rates measure whose sub-plan allowance is stated in Table 8.3. Table 8.2 distributes the budget by phase and carrier so that the ESMP can be reconciled with the construction contract. The contract's priced activities are set against Tables 8.1 to 8.3 in Table 8.5; the itemised environmental and social breakdown of the Bill of Quantities is produced when the Bills of Quantities are finalised at detailed design and is reconciled line by line with Tables 8.1 to 8.3 within 30 days of each accepted design-schedule package (Section 1.5); until then, the Contractor-borne total of Table 8.3 is the figure carried into the Bills of Quantities as a priced provisional breakdown. The ESIA (Chapter 11) carries the same 2026 figures.

Table 8.2: Phase and carrier distribution of the environmental and social budget (2026 prices)

Line	Base figure (basis year)	2026 amount (US$)	Phase	Carried by
Management plans and systems (one-off)	442,500 (2024)	477,900	Pre-construction / mobilisation	Contractor preliminary-and-general items (445,500); IIU budget (32,400)
Monitoring equipment set-up	192,500 (2024)	208,000	Mobilisation	E&S provisional sum (IIU-administered)
Recurring laboratory monitoring (3 years)	41,400 (2024 rates)	44,700	Construction (recurring)	E&S provisional sum
Reporting and audit	396,000 (2024 rates)	427,700	Construction and defects liability	Contract rates (monthly reports 233,300); supervision and IIU budget (quarterly reports and annual audits 194,400)

Training and capacity building	188,000 (2021–2025 bases)	203,000	Mobilisation and construction	Project financing (ESMF/SEP basis, pro rata)
Contractor ESHS staffing (five posts, 36 months)	— (new line)	360,000	Mobilisation through the works period (36 months); reduced presence in defects liability within the contract's defects-liability rates	Contract rates (preliminary-and-general items)
Biodiversity — BMP Actions A1 to A10	— (BMP Table 9.1, 2026)	304,000	Detailed design through defects liability	Works items (224,000) and the A6 provisional sum (80,000)
Works-embedded E&S measures of the Section 3 sub-plans	— (Table 8.3, 2026)	1,795,000	Construction (progressive); decommissioning at closure of each site	Works rates and preliminary-and-general items
Resettlement (RAP)	3,658,686.97 (RAP 2025 actuals)	3,658,687	Pre-construction, per front	Government counterpart (dedicated account)
Contingency — 15% of the ESMP-specific lines (plans, equipment, laboratory, reporting, training)	— (2026 allowance)	204,000 (≈2.7% of the identified package)	All phases	IIU budget; works-contract contingency for BMP Table 7.2 corrective work
Operation and maintenance (MPW): Year-1 verification monitoring; drainage, school-zone and A9 sign maintenance; crash monitoring	—	Not costed here (MPW road-maintenance budget)	Operation	MPW (handover under Section 3.17)
Identified total (2026 prices)	—	≈7,683,000 (of which Contractor-borne ≈3,137,800; Employer-administered ≈682,500; RAP 3,658,687; contingency 204,000)	—	—

Contractor-borne total for the Bills of Quantities. Table 8.3 builds up the identified Contractor-borne environmental and social cost at 2026 prices: the Contractor's management plans and systems (US$445,500), its ESHS staffing (US$360,000), the monthly E&S reporting (US$233,300), the BMP Actions A1 to A10 (US$224,000 plus the US$80,000 A6 provisional sum) and the works-embedded measures of each Section 3 sub-plan (US$1,795,000) — in total about US$3.14 million, about 5.0 per cent of the contract amount of US$63,392,345.04. The Contractor itemises these amounts in the Bills of Quantities at design finalisation (as measured items, preliminary-and-general items or priced provisional sums, as Table 8.3 indicates) and they are reconciled under Section 1.5; Table 8.5 states the works-contract activity under which each is paid; the allowances are RE-GROUP estimates for pricing and the priced Bills of Quantities govern. The contingency for environmental and social corrective work is stated in Table 8.2 as 15 per cent of the ESMP-specific lines (US$204,000, about 2.7 per cent of the identified package), in addition to the works-contract contingency that funds BMP Table 7.2 corrective actions.

Table 8.3: Contractor-borne environmental and social cost build-up for the Bills of Quantities (2026 prices)

Component	Indicative allowance (US$)	Bill of Quantities (BoQ) treatment and basis of the allowance
Contractor management plans and systems (Contractor ESMS; C-ESMP and the site-specific quarry and borrow-pit ESMPs; Code of Conduct; Camp Management Plan; workforce/influx plan; EPRP; OHS, Waste, Traffic and Blasting Management Plans; Restoration and Rehabilitation Plan)	445,500	Preliminary-and-general items; 2024 basis 412,500 × 1.08
ESHS staffing: ESHS manager, environmental officer, social officer/CLO, OHS officer, SEA/SH focal point (36 months)	360,000	Preliminary-and-general items; five posts × 36 months
Monthly E&S reporting (36 reports)	233,300	Preliminary-and-general items; ≈6,480 per report
BMP Actions A1 to A10 (BMP Table 9.1)	224,000	Measured items and preliminary-and-general items as BMP Table 9.1 states
A6 evidence-led wildlife structures	80,000	Provisional sum, drawn only against accepted drawings (gate G6)
3.1 Air quality and dust: water-bowser suppression on works and haul routes (two bowsers, three dry seasons), load covering, plant dust controls	180,000	Works rates; bowser operation ≈ 1,500 bowser-days
3.2 Noise and vibration: silencers and enclosures, camp noise management, pre-condition surveys of fragile structures (blast monitoring is the conditional item below the total)	35,000	Works rates
3.3 Water resources and effluents: fuel-point bunds and oil–water separators, settlement ponds, lined washout pits, camp septic systems, wellhead protection	120,000	Works rates
3.4 Erosion and sediment control: cut-off drains, berms, check dams, silt fences and sediment traps at all crossings and fronts; pre-storm securing	220,000	Works rates; the drainage crossings (82 culverts and five bridges) and the km 30–45 erosion belt
3.5 Soils and materials: topsoil stripping, stockpile management and reuse; spoil-site shaping and drainage	60,000	Works rates (earthworks)
3.6 General and hazardous waste: segregation and storage facilities, licensed collection and disposal with manifests, sludge removal	95,000	Works rates and preliminary-and-general items
3.7 Borrow pits, quarries and plant sites: screening surveys, fencing and signage, settlement ponds, progressive battering and dewatering (planting under A8)	140,000	Works rates
3.8 Camp management: perimeter and access control, clinic and ambulance stand-by, vector control, sanitation (E&S-specific items)	120,000	Preliminary-and-general items
3.10 Labour, OHS and welfare: PPE, permit-to-work systems, first aiders and communications at fronts, welfare facilities, workers' GRM	220,000	Works rates and preliminary-and-general items
3.11 Community health, safety and traffic: flagmen, signage, diversions and pedestrian routes, influx management, security management (school-zone engineering within the design)	180,000	Works rates
3.12 SEA/SH prevention: Code of Conduct administration, training, focal point, awareness	40,000	Preliminary-and-general items
3.13 Cultural heritage: custodial consultations, grove geofencing, rites support, chance-find procedure	25,000	Preliminary-and-general items
3.15 Stakeholder engagement: CLO operations, notices (incl. BMP A10), meetings, GRM publicity	90,000	Preliminary-and-general items
3.16 Emergency preparedness: spill kits, fire equipment, drills, medevac arrangements	110,000	Preliminary-and-general items
3.17 Decommissioning and reinstatement: removal of temporary structures, hardstanding break-out, septic sealing, contaminated-soil remediation, handback (planting under A8)	160,000	Measured items at closure
Identified Contractor-borne total	≈3,137,800	About 5.0% of the contract amount; itemised in the Bills of Quantities at design finalisation and reconciled under Section 1.5. The allowances are built up for the full 85 km: if the 10 km border leg proceeds under a separate instrument,

Component	Indicative allowance (US$)	Bill of Quantities (BoQ) treatment and basis of the allowance
		the works-embedded allowances (lines 3.1 to 3.17) scale with the quantities of that leg and the one-off plans, staffing and reporting lines are not duplicated (Section 1.1)
Conditional item, outside the total: blast monitoring, pre- and post-blast condition surveys and sentries	25,000 (conditional provisional sum)	Drawn only if blasting is confirmed and the Blasting Management Plan is approved (Annex F); the plan itself (43,200) is within the plans-and-systems line

Table 8.4: Indicative environmental and social budget by project phase (2026 prices)

Project phase	Lines and components	Indicative amount (US$, 2026 prices)	Carrier
Pre-construction and mobilisation (before civil works on each front)	Management plans and systems 477,900; monitoring equipment set-up 208,000; pre-works training (about half of the training line) 101,500; resettlement under the RAP 3,658,687	4,446,087	RAP from the dedicated Government account; plans and equipment through the works contract (preliminary-and-general items) and the E&S provisional sum; training from project financing
Construction (about three years, progressive by front)	Recurring laboratory monitoring 44,700; reporting and audits during the works 395,300; Contractor ESHS staffing 360,000; BMP Actions A1–A10 and the A6 provisional sum 304,000; works-embedded mitigation measures of Section 3 (excluding decommissioning) 1,635,000; training during construction 101,500	2,840,500	Works contract (measured items, preliminary-and-general items, provisional sums); E&S provisional sum and IIU budget for laboratory work, quarterly reports and audits; project financing for training
Defects liability, decommissioning and handover	Decommissioning and reinstatement of ancillary sites 160,000 (Table 8.3, line 3.17); final independent audit 32,400; A8 restoration certification and BMP checks within the supervision contract	192,400	Works contract (measured items at closure); IIU budget (audit); supervision contract
All phases — contingency	15 per cent of the ESMP-specific lines (plans and systems, equipment, laboratory monitoring, reporting and audit, training)	204,000	IIU budget; works-contract contingency for BMP Table 7.2 corrective work
Operation and maintenance (MPW)	Year-1 verification monitoring; drainage and school-zone upkeep; crash monitoring; maintenance of the A9 signs	Not costed here	MPW road-maintenance budget (handover under Section 3.17)
Identified total (2026 prices)	Sum of the costed phases	≈7,683,000	Of which Contractor-borne about 3,137,800 (Table 8.3), Employer-administered about 682,500, RAP 3,658,687 and contingency 204,000

Table 8.4 distributes the identified package over the project life cycle. The pre-construction phase carries the RAP (fully expended before works) and the one-off plans, systems and equipment; construction carries the recurring monitoring, reporting, staffing, biodiversity actions and the works-embedded measures of Section 3, drawn progressively as fronts open; the defects-liability phase carries decommissioning, the final audit and the restoration certification; and the operation phase is met from the MPW road-maintenance budget. The phase totals sum to the identified package of about US$7,683,000; the conditional blasting provisional sum (US$25,000) sits outside the total and is drawn only if blasting is confirmed.

Budget governance follows instrument ownership: the Contractor-borne lines of Table 8.3, including the BMP actions and all works-embedded mitigation, sit within the works contract and are payable against verified delivery; the monitoring equipment, laboratory programme, quarterly reporting, audits and training are administered by the IIU with Project Financial Management Unit (PFMU) fiduciary management; the RAP budget is expended before works under its own account; and corrective work

under the BMP triggers is met from the works-contract contingency. Expenditure against every line is reported quarterly and examined at the annual audit; the C-ESMP costing restates the figures at the priced Bills of Quantities without reducing the scope of any measure of Sections 3 or 4; the C-ESMP costing also confirms the adequacy of every allowance and prices the ancillary facilities and quantities not fully known at this issue.

Reconciliation with the works contract. The works contract (ICCO/CET Joint Venture; Contract Agreement of 5 May 2026; contract price US$63,392,345.04) is priced as lump-sum activities and sub-activities in its Schedule of Priced Activities and carries no measured Bill of Quantities at this issue. Table 8.5 sets the lines of this ESMP against the contract's price structure: the contract prices environmental and social management explicitly as Activity 4 (US$520,000) and health and safety management as Activity 5 (US$540,000), provides a provisional sum of US$100,000 for specific environmental and social outcomes and a provisional sum of US$4,000,000 for contingency allowance — both expended only at the direction of the Engineer under Sub-Clauses 13.4 and 13.5 of the General Conditions — and carries the remaining works-embedded mitigation within the lump sums for design services, mobilisation and site establishment and the construction of the 75 km road. The Contractor-borne allowances of Table 8.3 (about US$3,137,800) are therefore reconciled in two steps: the explicitly priced lines (US$1,160,000 in all, about 1.8 per cent of the contract price) are matched line by line, and the balance (about US$1,977,800), which is deemed included in the lump sums, is itemised in the Bill of Quantities that the Contractor produces with the design-schedule packages and is confirmed in the C-ESMP costing (Section 1.5). The reconciliation alters no allowance of Tables 8.1 to 8.4; it states where in the contract each is paid.

Table 8.5: Reconciliation of the ESMP budget with the works contract's Schedule of Priced Activities and Grand Summary (ICCO/CET Joint Venture; Contract Agreement 5 May 2026; US$ as contracted)

Works-contract activity / item	Contract amount (US$)	ESMP lines carried (Tables 8.1 and 8.3)	Reconciliation
Activity 1 — Design services for the 75 km and the 10.5 km sections: geotechnical investigation 350,000.00; inception design 200,000.00; detailed design 550,000.00; as-built drawings 100,000.00	1,200,000.00	BMP action A3 overlay (design task; Section 3.7); A6 and A7 drawings (Section 3.9); the design-schedule packages of Section 1.5 (retaining walls and slope stabilisation; cross-drainage; culverts and crossings)	Design outputs: the itemised quantities and the Bill of Quantities for cross-drainage, culverts, retaining walls and slope stabilisation are produced here and reconciled with this plan within 30 days of each accepted package
Activity 2 — Mobilization and site establishment: Contractor's personnel, equipment and site establishment 5,100,440.27; offices, accommodation, laboratory and transportation for the Engineer 4,327,839.37	9,428,279.63	Preliminary-and-general items of8 Table 8.3: Contractor plans and systems (445,500); ESHS staffing (360,000); camp controls (3.8: 120,000); emergency preparedness (3.16: 110,000); BMP A1 demarcation (11,000) and A5 induction and camp checks (26,000)	The C-ESMP costing allocates each preliminary-and-general item between Activities 2 and 4
Activity 3 — Construction of the 75 km road: site works 9,915,849.44; bituminous construction 26,830,604.21; concrete works 8,623,476.95; incidental works 1,061,183.73	46,431,114.33	Works-rates measures of Table 8.3: 3.1 dust (180,000); 3.2 noise (35,000); 3.3 water and effluents (120,000); 3.4 erosion and sediment control (220,000); 3.5 soils (60,000); 3.6 waste (95,000, in part); 3.7 ancillary sites (140,000); 3.10 OHS (in part); 3.11 traffic and community safety (180,000); 3.17 decommissioning (160,000); BMP A4 (28,000), A7 structure, A8 restoration (150,000) and A9 signage (6,000)	Priced within the lump sums for site works, concrete works and incidental works; the cross-drainage, culvert, retaining-wall and slope works whose quantities follow the design-schedule packages sit here; itemised at design finalisation
Activity 4 — Environmental and social management: environmental and social impact assessment 45,000.00; stakeholder engagement 20,000.00; environmental and social	520,000.00	The contract's explicit environmental and social line: monthly E&S reporting (233,300; Section 6); SEA/SH (3.12: 40,000); cultural heritage (3.13: 25,000); stakeholder engagement and GRM publicity (3.15: 90,000); BMP A10 notices (3,000); Contractor	With Activity 5 and the US$100,000 provisional sum, US$1,160,000 (about 1.8 per cent of the contract price) is explicitly priced for environmental, social, health and safety management

Works-contract activity / item	Contract amount (US$)	ESMP lines carried (Tables 8.1 and 8.3)	Reconciliation
monitoring and mitigation 430,000.00; grievance redress mechanism 25,000.00		environmental monitoring (Section 4); preliminary-and-general items allocated here by the C-ESMP costing	
Activity 5 — Health and safety management: health and safety risk assessment 45,000.00; stakeholder engagement 20,000.00; health and safety monitoring and mitigation 420,000.00; grievance redress mechanism 25,000.00; security and guards 30,000.00	540,000.00	OHS and welfare (3.10: 220,000, in part); emergency preparedness (3.16, in part); security management and community safety (3.11, in part); workers' grievance mechanism (Section 7.3)	—
Daywork — provisional sum	22,951.08	—	Dayworks as instructed by the Engineer
Specified provisional sums: Employer's portion of DAAB costs 150,000.00; provisional sums for any specific environmental and social outcomes 100,000.00; provisional sum to be determined by the Employer 1,000,000.00	1,250,000.00	A6 evidence-led wildlife structures (80,000 provisional sum; Table 8.3) and other specific environmental and social outcomes instructed by the Engineer. The IIU-procured verification items of Annex E, Table E.3 (ichthyological survey, laboratory re-tests) are met from the Project's E&S provisional sums administered by the IIU (Table 8.2)	Expended only at the direction of the Engineer (Sub-Clauses 13.4 and 13.5 of the General Conditions); A6 drawn only against accepted drawings (gate G6)
Provisional sum for contingency allowance	4,000,000.00	BMP Table 7.2 corrective actions; environmental and social corrective work beyond the ESMP contingency of Table 8.2 (204,000)	Expended only at the direction of the Engineer
Contract price (Grand Summary): priced activities 58,119,393.96 + daywork 22,951.08 = 58,142,345.04; + contingency allowance = 62,142,345.04; + specified provisional sums 1,250,000.00	63,392,345.04	Contractor-borne total of Table 8.3 ≈3,137,800 (about 5.0 per cent of the contract price)	Explicitly priced ESHS lines 1,160,000; the balance of the Table 8.3 allowances (≈1,977,800) is deemed included in the lump sums of Activities 1 to 3 and is itemised in the Bill of Quantities at design finalisation (Section 1.5)
Optional works — construction of the 10.5 km Toe Town to Côte d'Ivoire border section	8,582,116.83	Scaling rule of Table 8.3 (last line) if the border leg proceeds	Outside the contract price

Source: Design and Build Contract, Rehabilitation of the Road Section from Côte d'Ivoire Border to Toe Town to Zwedru (85 km), RFP LR-IIU-404122-CW-RFP — Price Schedules: Schedule of Priced Activities (printed page 241), Schedule of Priced Sub-Activities (pages 242–243), Daywork (pages 244–255), Specified Provisional Sums (page 257) and Grand Summary (page 259). The allocation of the ESMP lines to the contract activities is RE-GROUP's reading for reconciliation purposes and is confirmed in the C-ESMP costing; the priced Bill of Quantities governs (Section 1.5). The ESIA carries the contract price structure at its Table 3.9.

ANNEX E — COMPLETENESS VERIFICATION: ESIA CHAPTER 10 MEASURES AND BMP CONDITIONS

This annex records the verification, by measure group of ESIA Chapter 10 and by BMP action, condition and gate, that every mitigation and monitoring measure of Chapter 10 of the ESIA and every action, condition and gate of the Biodiversity Management Plan is carried in this ESMP with an owner, timing, a monitoring indicator (Section 4) and a cost, each linked to a Bill of Quantities item, a preliminary-and-general item or a provisional sum. Table E.1 maps the Chapter 10 measure groups to their carriers in this ESMP (each ESIA management code is mapped to its sub-plan in Table 2.1); Table E.2 maps the BMP actions, conditions and gates; Table E.3 carries the supplementary verification commitments and the design-schedule gate.

Table E.1: ESIA Chapter 10 measure groups — carriers, owners, timing, indicators and cost linkage

ESIA Chapter 10 measure group	Carried in this ESMP	Owner	Timing	Indicator and monitoring	Cost / BoQ linkage
Air quality and dust (ESIA §10.4; AQ-01–AQ-03; stations AQ-01–AQ-20)	§3.1; §4 (monitoring)	Contractor (Environmental Officer); Supervising Engineer verifies	Mobilisation through defects liability; monthly measurements	PM10/PM2.5 and dust-complaint indicators at the 20 AQ stations against WHO/EPA screening values	Dust suppression and plant controls costed in Table 3.1; sub-plan allowance in Table 8.3, line 3.1 (US$180,000, works rates); monitoring equipment under Table 8.1 and the E&S provisional sum
Noise and vibration (§10.5; NV-01–NV-03; stations NS-01–NS-20)	§3.2; §4	Contractor; Supervising Engineer	Construction phase; monthly attended measurements	Leq limits at sensitive receptors; blasting-notification compliance	Costed in Table 3.2; sub-plan allowance in Table 8.3, line 3.2 (US$35,000, works rates); monitoring equipment under Table 8.1; blast monitoring a conditional provisional sum (Table 8.3)
Surface water and effluents (§10.3; WR-01–WR-05; SW-01–SW-03)	§3.3; §4	Contractor; Supervising Engineer	Construction phase; monthly in-situ, six-monthly laboratory suites	In-situ profiles and laboratory suites at the 3 SW stations; turbidity controls at live crossings	Costed in Table 3.3; sub-plan allowance in Table 8.3, line 3.3 (US$120,000, works rates); laboratory programme under the E&S provisional sum (Table 8.1)
Erosion and sediment control (§10.2 and §10.3; SG-01, WR-01)	§3.4	Contractor	Progressive, per front	No active gully on closed sections; first-rainy-season inspection	Costed in Table 3.4; sub-plan allowance in Table 8.3, line 3.4 (US$220,000, works rates)
Soils and materials (§10.2; SG-03, SG-04;	§3.5; §4	Contractor; Supervising Engineer	Pre-establishment and construction	Soil-quality verification incl. the Quarry 2 and RC2 pre-establishment	Costed in Table 3.5; sub-plan allowance in

stations SS-01–SS-12)				sampling (Table E.3)	Table 8.3, line 3.5 (US$60,000, works rates); laboratory re-analysis under the E&S provisional sum (Table 8.1)
General and hazardous waste (§10.2 and §10.3; SG-04, WR-03)	§3.6	Contractor	Construction through demobilisation	Manifests, segregation and licensed-disposal records	Costed in Table 3.6; sub-plan allowance in Table 8.3, line 3.6 (US$95,000); Waste Management Plan in Table 8.1
Borrow pits, quarries and plant sites (§10.2; SG-02; §3.8 register)	§3.7; §3.17	Contractor; Employer accepts siting	Siting at detailed design; operation; closure	500 m dwelling setbacks (ESIA Table 2.8); ancillary-register overlay; restoration certification	Costed in Table 3.7; sub-plan allowance in Table 8.3, line 3.7 (US$140,000, works rates); restoration in the A8 item and Table 8.3, line 3.17
Camp management (§10.8; SE-01, SE-03)	§3.8	Contractor's Environmental Officer; Supervising Engineer verification	Weekly camp checks; monthly Supervising Engineer verification (BMP Annex B)	Weekly check sheets; monthly verification forms	Costed in Table 3.8; sub-plan allowance in Table 8.3, line 3.8 (US$120,000, preliminary-and-general items); Camp Management Plan in Table 8.1
Biodiversity (§10.6; BD-01–BD-10, CI-01; BMP A1–A10)	§3.9; §4; BMP (Appendix T of the ESIA)	Contractor; Supervising Engineer; IIU (Employer)	Per BMP action windows (design, mobilisation, construction, defects liability)	BMP Table 7.1 checks; BMP Table 7.2 stop-work triggers; A8 70%/60% certification	BMP Table 9.1 items (US$224,000) and the A6 provisional sum (US$80,000)
Labour, OHS and workers' welfare (§10.8; SE-02; LMP)	§3.10	Contractor (ESHS staff); Supervising Engineer	Mobilisation through defects liability	LTI/incident statistics; induction and CoC (incl. SEA/SH) records	Costed in Table 3.10; sub-plan allowance in Table 8.3, line 3.10 (US$220,000); OHS Plan in Table 8.1; ESHS staffing in Table 8.3

Community health, safety and traffic (§10.9; CS-01–CS-04; risk RSK-24 at ALARP)	§3.11	Contractor; Supervising Engineer; IIU	Construction phase; school-zone measures before works near schools	Traffic-incident register; school-zone compliance; as low as reasonably practicable (ALARP) programme items	Costed in Table 3.11; sub-plan allowance in Table 8.3, line 3.11 (US$180,000, works rates); Traffic Management Plan in Table 8.1; school-zone engineering within the design
Worker–community relations and social cohesion (§10.8; SE-04)	§3.10 (Table 3.10); §3.11 (Table 3.11, row 4); §3.12 (Table 3.12); §3.15 (Table 3.15); §4 (Table 4.2)	Contractor (ESHS manager, CLO); IIU social team	Before deployment and throughout	Code of Conduct signature; GRM statistics; influx indicators (Table 4.2)	Costed in Tables 3.10 to 3.12 and 3.15; sub-plan allowances in Table 8.3, lines 3.10, 3.11, 3.12 and 3.15
Cumulative and induced socio-economic pressure (§10.8 and §10.12; CI-02)	§3.11 (Table 3.11, row 4 — influx management plan); §3.15 (Table 3.15, cross-lot coordination row); §4 (Table 4.2)	Contractor; MoA-PMU and IIU (cross-lot coordination)	Before and during works; quarterly review	Influx indicators (rents, prices, in-migration); MoA-PMU coordination record (Table 4.2)	Costed in Table 3.11 (US$20,000) and Table 3.15 (no additional cost); Table 8.3, lines 3.11 and 3.15
SEA/SH prevention and response (§10.9; ESCP 4.3; RSK-25)	§3.12; §7.4	Contractor; IIU; GBV service providers	Before deployment and throughout	Signed CoC (incl. SEA/SH); referral-pathway activation; GRM SEA/SH channel statistics	Costed in Table 3.12; sub-plan allowance in Table 8.3, line 3.12 (US$40,000, preliminary-and-general items); Code of Conduct in Table 8.1
Cultural heritage and chance finds (§10.10; CU-01–CU-03; sacred sites SS-001–SS-006)	§3.13	Contractor; IIU; county authorities	Pre-clearance and construction	1 km grove buffers; chance-find records closed out	Costed in Table 3.13; sub-plan allowance in Table 8.3, line 3.13 (US$25,000, preliminary-and-general items)
Land and livelihoods — RAP interface (§10.7; LR-01–LR-04)	§3.14	IIU (RAP implementation); Contractor (no entry before clearance)	Compensation complete, Bank-cleared, notice run before works on any front	RAP completion evidence per front; grievance statistics	RAP budget (Government counterpart); not a works cost
Stakeholder engagement, disclosure and GRM (ESIA	§3.15; §7	IIU; Contractor (CLO)	Continuous; notices before front entry (BMP A10)	GRM statistics (24-hour acknowledgement)	Costed in Table 3.15; sub-plan allowance in

Chapter 5; ESIA §5.6 and §5.8)				; disclosure records	Table 8.3, line 3.15 (US$90,000, preliminary-and-general items); GRM support and training within the RAP and SEP budgets (Table 8.1)
Emergency preparedness and response (§11.8; §9.8 and Appendix X)	§3.16	Contractor; Supervising Engineer; IIU	EPRP before works; drills during construction	Incident notifications (24 h to the IIU; 48 h to the World Bank and, for serious environmental and biodiversity incidents, the EPA — Section 6.4); drill records	Costed in Table 3.16; sub-plan allowance in Table 8.3, line 3.16 (US$110,000, preliminary-and-general items); EPRP in Table 8.1
Decommissioning and reinstatement of ancillary sites (§10.2; SG-02, SG-05)	§3.17	Contractor; Supervising Engineer certifies	Before taking-over, per site	Restoration certification against the A8 standard	Costed in Table 3.17; sub-plan allowance in Table 8.3, line 3.17 (US$160,000, measured items at closure); Restoration and Rehabilitation Plan in Table 8.1
Enhancement of beneficial impacts (§10.11; IMP-B01–IMP-B08)	§3.10 (Table 3.10, local content and women's participation row); §3.11 (Table 3.11, rows 2 and 4); §3.15; §3.17 (Table 3.17, row 4 — reinstatement-plus); §4 (Tables 4.2 and 4.3)	Contractor HR and procurement; IIU	From first engagement; quarterly reporting; at each site closure	Local-hire share by settlement and sex and women's participation (Table 4.3, rows 8 and 9); reinstatement-plus acceptance per site	No additional cost (HR and procurement procedure within the ESHS staffing, Table 8.3); reinstatement within Table 8.3, line 3.17

Table E.2: BMP actions, conditions and gates — carriers in this ESMP

BMP condition / action	Requirement (summary)	ESMP carrier	Owner
Six conditions (BMP Table 6.3)	The residual conclusion (Criterion 1 Medium; no feature High or Severe through defects liability) holds only if A1, A2, A3, A4, A5 and A8 are delivered; they are construction controls, not a funding covenant	§3.9 (Table 3.9, rows A1–A5 and A8); §4 (Table 4.2); §6.5 sanctions	Contractor (delivery); Supervising Engineer (verification); IIU (holds the plan)
Gates G1–G6 (BMP Table 8.2)	Before a front enters S3 or S6: G1 C-ESMP reproduces BMP Tables 3.1, 7.1 and 7.2; G2 no-go core demarcation materials and method statement; G3 ancillary-site overlay shows no site in the polygons; G4 BMP Annex A signed for the crews	§1.2; §3.9 (Table 3.9); Table 4.2	Supervising Engineer accepts G2 and G4; IIU accepts G1, G3, G5 and G6 (G1 and G6 with the Supervising Engineer)

	and A9 signs ready; G5 A10 notice issued; G6 A6/A7 drawings only where justified		
Roles (BMP Table 8.1)	Contractor delivers A1–A10; Supervising Engineer verifies (BMP Tables 7.1 and 7.2; BMP Annex B); IIU holds the plan, refuses sites that fail A3, withholds taking-over until A8 is met and reports; FDA and EPA receive referrals; communities receive A10 notice and use the GRM; no task force, independent committee, consultant or ranger service	§1.3 (with ESIA Table 2.5 and Figure 2.3); §3.9; §6	As stated
A1 No-go core demarcation	Demarcated before any S3 clearance	§3.9	Contractor; Supervising Engineer verifies
A2 Hours and blasting rule	08:00–16:00; no night work or blasting in the CSZ/polygons	§3.9; §3.2	Contractor
A3 Ancillary-siting freeze	No new ancillary facility in the CSZ or pangolin Critical Habitat polygons; compliance via the ancillary-site overlay, verified at detailed-design review	§3.7; §3.9; §3.17	Employer (design review); Contractor
A4 Pre-clearance walkover	Walkover, RoW pegging, FDA Class A protocol, 5:1 replacement	§3.9; §3.13	Contractor; FDA; Supervising Engineer
A5 Workforce conduct and camp checks	CoC (incl. SEA/SH); weekly camp checks by the Contractor's EO with monthly Supervising Engineer verification	§3.8; §3.9; §3.10; §3.12	Contractor EO; Supervising Engineer
A6 Evidence-led crossings	Structures only at BFS-documented hotspots, to design-engineer drawings	§3.9	Contractor designer; Supervising Engineer
A7 Towah swamp structure	Span or large box culvert; low-flow in-stream method; silt control	§3.3; §3.9	Contractor; Supervising Engineer
A8 Footprint restoration	70% cover / 60% survival, 5:1 replacement; certified standard (species source, nursery provenance records, Supervising Engineer certification on its environmental specialist's verification, FDA witness for Class A)	§3.9; §3.17	Contractor; Supervising Engineer certifies
A9 Speed and node signage	20 km/h and node warning signs; in operation MPW maintains and the Liberia National Police enforce	§3.11; §3.9	Contractor; MPW (operation)
A10 Community notice and GRM	Notice before front entry; wildlife, grove and camp complaints through the GRM (registered on receipt; 24-hour acknowledgement)	§3.15; §7	Contractor CLO; IIU

Table E.3: Supplementary verification commitments and the design-schedule gate

Commitment	Owner	Timing	Indicator / use of results	Cost linkage
Ichthyological survey of the nine creek crossings (five perennial, four intermittent) and the Towah swamp	IIU through the Supervising Engineer, with an aquatic specialist procured by the IIU	Per crossing: completed and reviewed before the design of that crossing is finalised, and in any case within six months of commencement; no in-stream works at any crossing until the review is closed and the findings are reflected in the design	Survey report informs the crossing designs through the design-review gate; updated aquatic impact rating (ESIA Sections 7.4.5 and 11.9.3); at the sacred creeks (SS-003, SS-004; SS-006 where affected) the survey follows the custodial protocol of Table 3.13 and ESIA Section 6.3.2 (consent, non-lethal methods, findings shared, crossing method agreed with the custodians)	E&S provisional sums

SW-03 hexavalent-chromium verification and the pre-works re-test programme (hexavalent and total chromium; manganese, mercury, arsenic and coliforms; soil organic matter/organic carbon)	IIU through the Supervising Engineer; laboratory confirmation in writing	Pre-construction verification record	Corrected result reported with method and detection limit; total chromium analysed alongside; re-tests extended to Mn, Hg, As and coliforms where applicable; the soil organic-matter/organic-carbon re-analysis of Table 3.5 reported with it	E&S provisional sums
Quarry 2 and RC2 pre-establishment soil sampling	Contractor under Supervising Engineer verification	Before site establishment	Pre-establishment certificates appended to the ancillary register	E&S provisional sums
Weekly camp-check cadence	Contractor's Environmental Officer (weekly, unannounced); Supervising Engineer (monthly verification, BMP Annex B)	Throughout works and defects liability	Weekly check sheets and monthly verification forms in the camp file	Contractor overhead (no separate BoQ item)
Soil laboratory data qualifications (ESIA Appendix G)	IIU through the Supervising Engineer with the UL laboratory	Before construction	Units, detection limits and sampling depths obtained in writing and appended to the certificate record	E&S provisional sums
Design-schedule gate for hilly terrain (ESIA Section 3.14): retaining-wall and slope-stabilisation schedules tested against measurable limits (cut height, wall height, disturbance width and clearing per chainage; wetland, stream-bank and riparian-buffer tests) before works in each hilly section	Contractor's design engineer (schedules); Supervising Engineer (review, with its environmental specialist's sign-off at km 18–28, km 30–45 and km 38–50); IIU (acceptance)	Before works in each hilly section; no works until the schedule is accepted; an ESIA addendum where a schedule exceeds the limits materially	Schedule acceptance record; this ESMP reconciled within 30 days of each accepted package (Section 1.5)	Within the design fee; works items as scheduled

Verification statement. RE-GROUP has verified, against the mitigation tables (Section 3), the monitoring plan (Section 4) and the budget (Section 8) of this ESMP, group by group and action by action, that no measure of ESIA Chapter 10 and no action, condition or gate of the BMP is left without an owner, timing, indicator and cost linkage. The supplementary commitments of Table E.3 operate with the same contractual force through the C-ESMP and the works contract.

ANNEX F — BLASTING MANAGEMENT PLAN: REQUIRED CONTENTS AND APPROVAL GATE

The Blasting Management Plan is a conditional C-ESMP method statement: it is required only if blasting is confirmed (the Suaken quarry, if adopted, or rock within an excavation that conventional ripping cannot achieve), it is submitted at least 60 days before the first intended blast, and no blasting

takes place before the plan is approved by the Supervising Engineer and the IIU, the MME explosives permit and the EPA permit conditions are in hand, and the host community has been notified. The plan shall contain, as a minimum:

Table F.1: Required contents of the Blasting Management Plan

#	Element	Requirement
1	Responsibility and qualifications	Named blasting contractor and licensed shotfirer; roles and supervision chain; MME licence references
2	Justification and alternatives	Geotechnical evidence, location by location, that the rock cannot be excavated by ripping or hydraulic breaking; evaluation of non-explosive methods (ripping, hydraulic breaker, expansive chemical splitting agents, rock saw) for each location, with blasting adopted only where these are shown to be impracticable; no blasting inside the CSZ, the pangolin Critical Habitat polygons, the sacred-grove and Picathartes buffers or at the Ziah Town quarry
3	Blast design	Per-location design: charge weights per delay, burden, spacing, stemming, initiation sequence; design signed by the licensed shotfirer
4	Vibration and air-overpressure limits	Peak particle velocity ≤12.5 mm/s and air overpressure ≤134 dB(L) at the nearest residential receptor (the residential criteria of the United States Bureau of Mines, RI 8507, adopted as the Project standard in the absence of a Liberian blasting standard); lower site-specific limits (≤5 mm/s) for mud-brick and other fragile structures identified by the pre-blast surveys
5	Pre-blast condition surveys	Documented condition surveys of all structures within 500 m before the first blast and periodically thereafter
6	Exclusion zone and sentries	500 m exclusion with sentries and flagmen; access control; livestock and pedestrian sweep before each blast. Where dwellings lie within 500 m (Suaken, about 431 m): trial blasts and monitoring demonstrating the item 4 limits at those dwellings, or temporary evacuation agreed with the community under the Suaken MOU (Table 3.7), before any production blast
7	Notification	Advertised blasting times; ≥24-hour notice to the host community and authorities; audible warning and all-clear signals
8	Explosives type, storage and transport	The explosive products and initiation system to be used (packaged emulsion or ANFO with non-electric initiation; no loose explosives on site) and the maximum quantities held; a licensed magazine sited at the Suaken quarry (if blasting is adopted there) or another MME-approved location at least 500 m from any dwelling and outside the CSZ, the pangolin polygons and the sacred-grove buffers, with 24-hour security and an inventory reconciled daily; records and escort per the MME explosives permit
9	Scheduling restrictions	Daytime only; no blasting inside the CSZ, the pangolin Critical Habitat polygons or the agreed Barteh Jam grove and Picathartes buffers (BMP Action A2 and BMP Table 3.1), and none at a site adjoining those zones without the Supervising Engineer's written confirmation that the A2 rule is met
10	Monitoring	Seismograph vibration and air-overpressure records for every blast at the nearest receptor; results in the monthly E&S report
11	Misfire procedures	Misfire identification, wait times, disposal and reporting
12	Emergency response	Interface with the EPRP blasting scenario; incident notification per Section 6.4
13	Records	Blast register (design, monitoring, notifications, surveys) retained for EPA/MME inspection and audit

Costing. The Blasting Management Plan is carried at US$43,200 (2026 basis) within the plans-and-systems line of Table 8.1, and the blast monitoring, pre- and post-blast condition surveys and sentries at a conditional provisional sum of US$25,000 (Table 8.3); the plan allowance is held within the plans-and-systems line and released, and the provisional sum is drawn, only if blasting is confirmed; the explosives, drilling and blasting operations themselves are priced within the quarry and earthworks rates of the Bills of Quantities. The required contents of this annex are reproduced in the ESIA as Appendix Y.