THE WORLD BANK

Liberia Renewable Energy Access Project (LIRENAP)

Temporary Closure of Kaiha 2 Hydropower Site in Lukambeh District, Lofa County, Liberia

Reference No. LR-RREA-466352-CS-CQS

Environmental and Social Management Plan (ESMP)

FINAL VERSION

Rural and Renewable Energy Agency

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CARES Group

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Acronyms and Abbreviations

COO	Community Outreach Officer
DC	Decommissioning Contractor
E&S	Environmental and Social
EHS	Environmental, Health, and Safety
EPA	Environmental Protection Agency
EPML	Environmental Protection and Management Law
ESA	Environmental Site Assessment
ESIA	Environmental and Social Impact Assessment
ESIRIT	Environmental and Social Incident Response Toolkit
ESMP	Environmental and Social Management Plan
FDA	Forestry Development Authority
GoL	Government of LIberia
GRM	Grievance Redress Mechanism
H&S	Health and Safety
HPP	Hydropower Project
IFC	International Finance Corporation
LIRENAP	Liberia for the Liberia Renewable Energy Access Project
MASL	Meters Above Sea Level
MDGs	Millennium Development Goals
MSDS	Material Safety Data Sheet
NEOHP	National Environmental and Occupational Health Policy
NEP	National Energy Policy
OHS	Occupational Health and Safety
OPs	Operational Policies
PACs	Project Affected Communities
PAPs	Project Affected Persons
PPE	Personal Protective Equipment
RREA	Rural and Renewable Energy Agency
SEP	Stakeholder Engagement Plan
ToR	Terms of Reference
VECs	Valued Environmental Components
WMP	Waste Management Plan

1. Executive Summary

1.1. Introduction

The Rural and Renewable Energy Agency (RREA) has received funding from the World Bank for the Liberia Renewable Energy Access Project (LIRENAP). A key component of the LIRENAP was the 2.6MW Kaiha 2 Hydropower Project (HPP), located on the Kaiha (Zeriba) River, 4.75km southwest of the village of Mbaloma, Lofa County, Liberia.

It is understood that because the project has encountered several significant setbacks, including financing gaps, a decision was made to halt and temporarily decommission the hydropower component of the project with alternative power supply options being explored for the Lofa County mini-grid project.

As the decision to decommission the Kaiha 2 HPP has associated Environmental and Social (E&S) risks, RREA appointed CARES to prepare this Environmental and Social Management Plan (ESMP) following Liberian environmental laws and World Bank Safeguards and to monitor the implementation of the ESMP during decommissioning.

As EPA also instructed RREA to prepare a Decommissioning Plan (DP) and Stakeholder Engagement Plan (SEP) to begin the environmental and social assessment process for the intended decommissioning works CARES Scope of Work (SoW) was extended to include these documents and the DP, SEP, and ESMP, should be read in conjunction.

1.2. Project Design and Background

The project was initially designed as a 2.6 MW hydropower facility under the LIRENAP. Planned infrastructure included a 7.5-meter-high concrete overflow weir / gravity dam with a spillway crest elevation of 450.5 Meters Above Sea Level (MASL), situated at the top of the Kaiha Falls and a left bank embankment dam.

The design also incorporated two penstocks, each with a diameter of 1.85 meters and lengths of 41 metres and 45 metres respectively, an intake structure and tailrace channel, and a surface powerhouse fitted with 2 Kaplan turbines operating with a gross head of 13.2 metres - delivering power into a micro-grid (constructed as a separate component of the larger LIRENAP), and a regulating reservoir intended to store water during low-flow periods.

Construction activities at the site advanced significantly, with key components such as the stilling basin and retaining walls nearing completion. However, the development was subsequently halted, leaving the site partially constructed. Various structures, including the powerhouse and penstocks, remain in incomplete states, with different elements at varying stages of progress and the site has since been designated for temporary decommissioning.

1.3. Decommissioning Activities

A Decommissioning Contractor (DC) is being commissioned by RREA to conduct the decommissioning and restoration works. The appointed DC will need to prepare the schedules, costs and detailed methodologies for the decommissioning activities. The detailed methodologies will be prepared for RREA (with the Supervising Engineer approving on behalf of RREA or recommending to RREA if they should approve). However, in summary, the decommissioning will involve the following critical activities:

- Comprehensive Site Assessment.
- Restoration of Natural Water Flow.
- Removing Exposed Rebar and Covering Exposed Concrete Works.
- Dismantling and Removal of Temporary Infrastructure.

- Waste Management.
- Slope Stabilisation, Site Clearance, and Site Rehabilitation.
- Handling Explosives & Removing the Blasting Magazine.
- Storage / Removal of Equipment.
- Implementing Community Safety Measures.
- Stakeholder Engagement.
- Site Inspection and Handover.
- Post Decommissioning Environmental Monitoring

1.4. Stakeholder Engagement

To support the development of this ESMP stakeholder engagement sessions were held across the five project-affected districts. Several key observations and recommendations were made by community members and local authorities. These are summarized below:

- **General Reception of the Decommissioning Plan** - The decommissioning of the Kaiha2 HPP was generally well-received across all five districts. However, some residents expressed concerns about the prolonged delays and the proposed temporary closure of the facility.
- **Urgency for Alternative Energy Solutions** - A significant majority of participants emphasized the need for the swift implementation of the proposed solar farm and diesel plant. These alternatives were seen as critical to fulfilling the original goal of the Kaiha-2 project - namely, the electrification of the surrounding communities.
- **Utilization of Remaining Project Materials** - Many participants recommended that reusable project materials, such as aggregates and sand, be allocated to the districts for use in local community development initiatives.
- **On-Site Storage of Project Components** - In some PACs, stakeholders suggested that essential project components and materials be securely stored on-site, rather than transported elsewhere, to facilitate easier reactivation of the project in the future.
- **Community Awareness and Public Information** - County authorities, including Superintendents and District Commissioners, requested that public service announcements regarding the temporary decommissioning be broadcast across local media channels. They emphasized the importance of using local vernacular languages during local radio announcement to ensure effective communication and broad community understanding.
- **Security Presence During Decommissioning** - County officials also recommended the presence of security personnel during the decommissioning process to maintain order, protect valuable assets, and prevent unauthorized access to the project site. This suggestion was made in case RREA, in collaboration with the DC, decides to relocate construction equipment to another location for safety reasons. It was considered important for the equipment to be accompanied by security personnel to alleviate public concerns and prevent misunderstandings.

1.5. Identification of Risks and Environmental Monitoring Plan

Identification of the E&S risks was carried out in line with Liberia's laws and the World Bank Operational Policies (OPs) (especially OP 4.01, OP 4.12, and OP 4.37); specifically, the E&S risks were identified based on the findings of a site inspection (08 May 2025), stakeholder consultations (09 May to 15 May 2025), an understanding of the decommissioning scope / DP, and a review of project-related documentation including the Environmental and Social Impact Assessment (2019) and the Environmental and Social Compliance Audit Report (2024).

Based on the identified E&S risks, potential negative impacts were identified and evaluated with mitigation measures proposed and an approach for monitoring their effectiveness provided, including responsibilities. Details of this are provided in Table 1-1 below.

Table 1-1 - Components of Decommissioning, Risk Assessment, and Management and Monitoring Plan

Component	Risks	Impact	Mitigation	Monitoring	Responsibility	ESPP
Removing Upstream Left Bank Earth Cofferdam	The Upstream Left Bank Earth Cofferdam will be removed to release the impounded water and to restore the natural flow. Whilst this should reduce the risk of the water being accidentally and uncontrollably released; there is a risk this will cause a reduction in water quality (i.e., increased turbidity) and / or sedimentation and erosion downstream. Shift in water temperature, and may lower oxygen levels	Moderate	Remove the cofferdam in controlled stages to allow gradual water release and prevent sudden surges. Install silt curtains or turbidity barriers downstream to capture suspended sediments during the release. Schedule removal activities during favorable weather conditions and low-flow periods. Apply immediate erosion control measures (such as bank stabilization or revegetation) in downstream areas to limit potential erosion.	Conduct water quality testing before removal to establish baseline, then conduct daily monitoring of key water quality indicators (e.g., turbidity, temperature sediment) during decommissioning.	Decommissioning Contractor (DC).	Water Quality, Soil, Sediment and Erosion Control
Removing Upstream Left Bank Earth Cofferdam	The Upstream Left Bank Earth Cofferdam will be removed to release the impounded water and to restore the natural flow. Whilst this should reduce the risk of the water being accidentally and uncontrollably released there is a potential risk to any settlements or river users downstream of the site.	Moderate	Dismantle the cofferdam in stages to gradually restore natural flow and prevent abrupt water surges. Develop and implement an emergency response plan, including predefined protocols for rapid intervention. Align removal schedules with favourable hydrological conditions. Inform downstream settlements or river users about the cofferdam removal and the scheduled timeline for its removal.	Conduct daily inspections / monitoring to ensure adherence to implementing ESMP mitigation measures including staged dismantling.	DC, CARES Group, RREA	Community Risks / Health and Safety (H&S)
			Establish clear communication channels with downstream communities and local authorities, providing advance warnings and updates on water release activities.	Number of community engagement and sensitisation campaigns about project activities conducted.	RREA	Community Risks / H&S
Removing Upstream Left Bank Earth Cofferdam	Removal of the Upstream Left Bank Earth Cofferdam can release accumulated sediments into the water, affecting aquatic ecosystems.	Minor	Install silt curtains or turbidity barriers downstream of the removal zone. Conduct removal in stages, allowing sediments to settle between phases. Implement temporary sediment traps or diversion channels to capture mobilized sediments.	Conduct water quality testing before removal to establish baseline, then conduct daily monitoring of key water quality indicators (e.g., turbidity, temperature sediment) during removal.	DC	Water Quality, Soil, Sediment and Erosion Control
Removing Upstream Left Bank Earth Cofferdam	Removal of the Upstream Left Bank Earth Cofferdam may introduce pollutants or alter water chemistry, impacting aquatic ecosystems or downstream communities.	Minor	Remove in stages to minimize sediment disturbance and reduce the likelihood of releasing pollutants. Ensure removal activities adhere to established water quality standards and promptly intervene if deviations occur.	Conduct water quality testing before removal to establish baseline, then conduct daily monitoring of key water quality indicators (e.g., pH, dissolved oxygen, turbidity, pollutant levels, sediment) during removal.	DC	Water Quality, Soil, Sediment and Erosion Control
Removing Upstream Left Bank Earth Cofferdam	Removal of the Upstream Left Bank Earth Cofferdam may cause a sudden change in water flow which can disturb the aquatic ecosystem.	Minor	Implement a staged removal process to ensure water flow increases gradually.	Conduct daily inspections / monitoring to ensure adherence to implementing ESMP mitigation measures including staged dismantling.	DC, CARES Group, RREA	Ecosystem Protection / Improvement
Removing Upstream Left Bank Earth Cofferdam	If the materials (i.e., earth) removed from the Upstream Left Bank Earth Cofferdam are not managed appropriately, several environmental and social risks could arise. Poorly managed materials could result in sedimentation in nearby waterbodies which may disrupt aquatic ecosystems, affecting water quality and harming local biodiversity. Poorly placed materials could encroach on natural habitats, leading to habitat destruction and ecological imbalance. On a community level, airborne dust and dirt could create nuisance effects, settling on drying clothes, windows, and other surfaces, impacting daily life. Failure to adhere to regulatory waste management standards may also result in compliance violations.	Moderate	Materials to be repurposed for landscaping and to cover partially exposed concrete works. Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance.	Daily monitoring of dust levels and water quality. Daily inspections of waste management to promptly correct improper practices.	DC	Waste Management Ecosystem Protection / Improvement Noise & Air Quality
			Conduct regular inspections and audits to ensure adherence to regulatory waste management standards. Ensure that only experienced and trained personnel are assigned to the removal of the cofferdam	Conduct daily inspections / monitoring and weekly audits to ensure adherence to regulatory waste management standards.	DC, CARES Group, RREA	Waste Management

Component	Risks	Impact	Mitigation	Monitoring	Responsibility	ESPP
Removing Upstream Left Bank Earth Cofferdam	There are additional H&S risks associated with removing the Upstream Left Bank Earth Cofferdam to release the impounded water in the rainy season when water levels will likely be higher. For example, an unstable structure during removal can pose a hazard to workers and nearby residents. However, there are also additional environmental and public H&S risks associated with an uncontrolled release of water which may be more likely with higher water levels.	Major	Conduct a structural stability assessment to understand the cofferdam's condition. Prepare a work plan to enable the safe removal during the rainy season. Evaluate weather forecasts to determine safe operational windows. Gradually dismantle the cofferdam in phases, using temporary supports as needed to maintain stability throughout each stage. Regulate water release incrementally to minimize sudden surges and manage downstream flow. Develop and implement an Emergency Response Plan with clear procedures for rapid evacuation, spill management etc. Suspend removal operations during extreme rainfall or adverse weather events. ensure that only experienced and trained personnel are assigned to the removal of the cofferdam	Conduct daily inspections / monitoring to ensure adherence to implementing ESMP mitigation measures.	DC, CARES Group, RREA	Worker H&S Community Risks / H&S
			Establish clear communication channels with downstream communities and local authorities, providing advance warnings and updates on water release activities.	Number of community engagement and sensitisation campaigns about project activities conducted.	RREA	Community Risks / H&S
Removing Left Bank Geo-Bag Cofferdam	The partially failed Left Bank Geo-Bag Cofferdam will be removed to ensure minimal disruption to the river ecosystem. There is a risk of water being accidentally and uncontrollably released; there is a risk this will cause a reduction in water quality (i.e., increased turbidity) and / or sedimentation and erosion downstream.	Moderate	Remove the cofferdam in controlled stages to allow a gradual, predictable release of water rather than an abrupt surge. Regulate water flow during removal, ensuring that discharge rates remain within safe and predictable limits. Install temporary silt curtains or turbidity barriers downstream to capture mobilized sediments. Implement bank stabilization measures to counteract potential erosion. Develop and implement an emergency response plan. Inform downstream communities about the operation schedule and water release events.	Conduct water quality testing before removal to establish baseline, then conduct daily monitoring of key water quality indicators (e.g., turbidity, sediment) during removal.	DC	Water Quality, Soil, Sediment and Erosion Control
Removing Left Bank Geo-Bag Cofferdam	The partially failed Left Bank Geo-Bag Cofferdam will be removed to ensure minimal disruption to the river ecosystem and to restore the natural water flow; however, there is a risk of a sudden water release which could lead to a reduction in water quality (i.e., increased turbidity) and sedimentation and erosion downstream of the site.	Moderate	Dismantle the cofferdam gradually to allow controlled water release. Install silt curtains or turbidity barriers downstream and implement bank stabilization measures to reduce erosion. Inform downstream communities about the removal schedule and water release events.	Conduct water quality testing before removal to establish baseline, then conduct daily monitoring of key water quality indicators (e.g., turbidity, sediment) during removal.	DC	Water Quality, Soil, Sediment and Erosion Control
Removing Left Bank Geo-Bag Cofferdam	If the materials removed from the Left Bank Geo-Bag Cofferdam are not managed appropriately, several environmental and social risks could arise. The synthetic materials used in the Geo-Bags may degrade into microplastics, contaminating soil and water and potentially entering the food chain, posing risks to biodiversity and human health. Additionally, deteriorating bags and loose materials could obstruct waterways, increasing flood risks and harming aquatic ecosystems. Chemical leaching from degraded materials may further impact soil and water quality, affecting both local biodiversity and public health. Poor waste management could lead to accumulation and environmental degradation, exacerbating pollution concerns. Furthermore, failure to adhere to regulatory waste disposal standards could result in compliance violations.	Minor	Segregate synthetic geo-bag materials from other materials. Geo-Bag fill returned to borrow pits, whilst the geobags should be disposed of at an approved disposal site following their removal. Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance.	Daily inspections / monitoring to ensure all waste management practices meet regulatory requirements and to identify any potential environmental degradation early.	DC, CARES Group, RREA	Waste Management

Component	Risks	Impact	Mitigation	Monitoring	Responsibility	ESPP
Removing Exposed Rebar	As part of securing the partially completed concrete works the exposed rebar (reinforcement bars) will be cut and removed from the partially completed concrete works and stilling basin. There is a risk to worker safety during the cutting process from accidents with the cutting equipment and with sharp edges and flying debris, requiring strict safety protocols. The removal of exposed rebar embedded in cast concrete must be carried out with careful planning and strict adherence to safety protocols to prevent injury, structural damage, or equipment failure. All personnel involved should be properly trained and equipped with appropriate Personal Protective Equipment (PPE), including hard hats, safety goggles, gloves, steel-toe boots, and hearing protection.	Major ●	Require all workers to wear appropriate PPE, including safety goggles or face shields, cut-resistant gloves, long-sleeved protective clothing, steel-toe boots, and hearing protection. Use certified and well-maintained cutting equipment. Inspect tools before each use to ensure they are functioning correctly. Exposed rebar should be cut using suitable tools such as rebar cutters, angle grinders, or oxy-acetylene torches, depending on the size and accessibility of the material. Demarcate the work area. Follow established safe cutting procedures, including proper positioning and two-hand operation. Provide specific training on the proper use of cutting equipment and hazard awareness related to sharp edges and flying debris. Maintain strict on-site supervision during the cutting operations. Implement procedures for the immediate removal and safe disposal of cut rebar fragments and metal shavings to reduce subsequent hazards.	The DCs site-specific health and safety plan should be signed off by RREA, CARES Group, and DC prior to commencing decommissioning. Records of PPE issuance and training delivery.	DC	Worker H&S
Removing Exposed Rebar	The risk to worker safety is higher during removal of the exposed rebar situated in the middle of the river. This risk is increased when water levels are higher during / immediately after the rainy season.	Major ●	Plan rebar removal during periods of low water levels. If water levels are high, delay operations until conditions improve. Develop and communicate an emergency action plan. Avoid using electric tools in a wet environment Use battery-powered or hydraulic tools in wet environment	Emergency action plan to be signed off my RREA, CARES Group, and DC. Monitor water levels and weather conditions during operations and cease work immediately if conditions become unsafe.	DC	Worker H&S
Removing Exposed Rebar	The cutting of the rebar will generate metal dust and fumes which can temporarily degrade air quality and pose respiratory hazards for the workers involved.	Minor ●	Ensure workers use appropriate respiratory protection in addition to goggles, gloves, and hearing protection. Where feasible, employ wet cutting methods to suppress dust generation during the cutting process. Train workers in the proper use of PPE and safe cutting procedures to minimize exposure.	Monitor air quality during cutting operations, ensuring they remain within safe limits. Records of PPE issuance and training delivery.	DC	Worker H&S Noise & Air Quality
Removing Exposed Rebar	The cutting of the rebar can generate high levels of noise presenting a risk to workers and affecting nearby communities and wildlife.	Major ●	Require all workers to wear appropriate hearing protection (e.g., earplugs or earmuffs). Ensure cutting equipment is well-maintained and outfitted with noise reduction features. Schedule noisy operations to minimize disturbance. To maintain positive community relations, the public shall be kept informed about the decommissioning activities and any efforts to minimise disturbance, and procedures for prompt response and corrective action shall be documented within the GRM.	Monitor noise levels during cutting operations, ensuring they remain within acceptable limits and triggering operational adjustments if necessary.	DC	Noise & Air Quality

Component	Risks	Impact	Mitigation	Monitoring	Responsibility	ESPP
Removing Exposed Rebar	If cut rebar is not managed appropriately, several environmental and social risks may arise. Rusting can lead to the leaching of iron and other metals into soil and waterbodies, potentially contaminating ecosystems and posing public health risks. Accumulated debris may obstruct waterways, increasing flood risks and harming aquatic habitats. Sharp metal scraps can create hazardous conditions for wildlife and public safety, while improper disposal may degrade the visual landscape. Additionally, failure to adhere to regulatory waste management standards could result in compliance violations.	Moderate	Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance. Collect all cut rebar immediately and store it in designated, covered containers. Segregate clean and contaminated rebar, directing all scrap to scrap dealers. Prevent debris from entering waterways. Adhere strictly to waste management regulations including records to ensure compliance. Safely secure metal scraps to eliminate public and wildlife safety hazards.	Daily inspections / weekly monitoring to ensure all waste management practices meet regulatory requirements.	DC, CARES Group, RREA	Waste Management
Covering Exposed Concrete Works	During covering the exposed concrete workers are likely to be required to access areas close to unstable or eroding platforms, both on the riverbank and in the middle of the river. Such work conditions increase the risk of falls and there is a risk of falling in the river. These risks are increased when working in the rainy season.	Major	Inspect and secure unstable or eroding surfaces before work begins. Prepare a work plan that enables the activity to be safely conducted in the rainy season. Monitor weather conditions and water levels, postponing high-risk activities during heavy rainfall or rapidly changing conditions. Schedule work during periods of low rain and more stable conditions.	Weekly progress reporting of decommissioning activities.	DC	Worker H&S
Covering Exposed Concrete Works	As the concrete structures are partially completed, it is unclear which structures are at risk of erosion or exposure to water, which structures should be covered / backfilled, and which structures shall be dismantled and removed. This uncertainty about which structures are vulnerable means that personnel undertaking remedial work face additional health and safety risks through the unexpected collapse of partially complete concrete structures. This risk is particularly high if the stabilization choice (through covering, backfilling, or controlled dismantling) is not based on a clear assessment of condition. Covering unstable, partially completed structures may pose hazards during construction and maintenance. Covering the exposed concrete works may present structural integrity issues and shall make monitoring the structures harder.	Major	Qualified structural engineers to conduct inspections and document the condition of all partially completed structures and to determine which structures require stabilization (cover, backfill) versus those slated for dimantling and removal.	Report detailing assessment to be signed off by qualified structural engineers.	RREA, DC	Worker H&S
			Establish safe work perimeters around vulnerable structures and provide specialized training for personnel working on, or near unstable or partially complete works.	Records of training undertaken.	DC	Worker H&S
Covering Exposed Concrete Works	It is intended to cover the exposed concrete works utilizing the material from the existing earth cofferdam / stock of blast rock as a protective measure; however, there is a risk that the material may not be suitable for this purpose which may erode, leading to the release of concrete debris and sediment into the river which could cause an obstruction and disrupt aquatic ecosystems by altering turbidity, water chemistry, and sedimentation patterns. The unintended release of aggregate and dust could affect water quality and harm wildlife, especially species that depend on clear or stable water conditions.	Moderate	Conduct site trials to assess the erosion resistance and overall suitability of material for cover applications. Develop an adaptive management plan that allows for rapid changes in remediation techniques if the material fails to perform as intended.	Weekly progress reporting of decommissioning activities.	DC	Water Quality, Soil, Sediment and Erosion Control Ecosystem Protection / Improvement
			Schedule frequent site inspections to assess the integrity of the cover layer, looking for signs of deterioration, displacement, or early erosion.	Quarterly site inspections to assess the integrity of the cover layer, looking for signs of deterioration, displacement, or early erosion. This should continue until RREA decide what to do as a permanent solution.	RREA	Water Quality, Soil, Sediment and Erosion Control Ecosystem Protection / Improvement

Component	Risks	Impact	Mitigation	Monitoring	Responsibility	ESPP
Demolition and Dismantling and Removing Buildings and Other Structures	If the waste from demolition, dismantling, and removal of buildings and other structures is not managed appropriately, several environmental and regulatory risks could arise. Improper handling of construction debris - including concrete, metal, and hazardous materials - may lead to contamination of soil and water, introducing pollutants into surrounding ecosystems. Accumulated debris can result in wasted materials that could otherwise be repurposed, increasing landfill pressure and resource depletion. Additionally, illegal or inappropriate dumping could further degrade environmental conditions and pose legal consequences. The transportation and processing of waste may contribute to emissions, logistical challenges, and safety risks. Failure to adhere to regulatory requirements could lead to compliance violations.	Moderate	Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance. Develop and implement a Comprehensive Waste Management Plan that specifies procedures for on-site waste segregation, temporary storage, handling, and final disposal. This plan should address all material streams, including concrete, metal, and hazardous substances. Segregate waste by type to facilitate recycling and reuse. Identify and repurpose materials where feasible to reduce landfill demand and resource depletion. Maintain records of all waste movements and disposals for audit and regulatory compliance. Targeted training on safe handling and processing of demolition debris, including hazardous materials. Equip workers with appropriate PPE and enforce safe work practices.	Weekly progress reporting of decommissioning activities. Waste Management Plan signed off by RREA, CARES Group, and DC.	DC	Waste Management Worker H&S
			Conduct routine inspections and audits to verify that waste management practices are followed.	Daily inspections / monitoring to ensure all waste management practices meet regulatory requirements.	DC, CARES Group, RREA	Waste Management
Demolition and Dismantling and Removing Buildings and Other Structures	During the demolition, dismantling, and removal of buildings and other structures the workforce may be exposed to health and safety risks caused by hazardous material exposure, dust and particulate matter, and noise.	Moderate	Ensure all workers wear appropriate PPE, including respirators or dust masks, protective eyewear, gloves, hearing protection (earplugs / earmuffs), and coveralls when working in hazardous areas. Develop and enforce strict work procedures and training related to handling hazardous materials, controlling dust, and minimizing noise exposure.	Implement daily air quality and noise level monitoring to ensure that levels remain within safe limits and adjust controls as necessary. Records of PPE issuance and training delivery.	DC	Noise & Air Quality Worker H&S
Demolition and Dismantling and Removing Buildings and Other Structures	During the demolition, dismantling, and removal of buildings and other structures there may be noise and vibration impacts caused by heavy machinery and dismantling and demolition operations which can disrupt ecosystems and affect nearby communities.	Minor	Use heavy machinery with noise reduction features and low-vibration technology. All machinery to be regularly serviced and fully functioning. Schedule high-impact activities during daytime hours to minimize disturbance to local communities.	Implement daily noise monitoring to ensure levels remain within acceptable limits. Records of recent service history of the machinery.	DC	Noise & Air Quality Worker H&S
			To maintain positive community relations, the public shall be kept informed about the decommissioning activities and any efforts to minimise disturbance, and procedures for prompt response and corrective action shall be documented within the GRM.	Number of community engagement and sensitisation campaigns about project activities conducted.	RREA	Community Risks / H&S
Removing Excavated Material	The excavation, handling, and transportation of excavated material like sand can produce dust and particulate matter. This airborne dust can travel into nearby communities and the surrounding environment and contribute to broader air quality degradation.	Minor	Utilize water sprays at excavation and handling points to reduce dust generation. Cover transport vehicles with tarpaulins or netting to contain dust during movement. Regularly clean access roads to prevent dust accumulation. To be discussed with the community and the Ministry of Public Works. Establish and enforce speed limits within community areas	Establish air quality baseline before removal, then conduct daily monitoring of dust levels during decommissioning to ensure particulate levels remain within acceptable limits and adjust controls if necessary.	DC	Noise & Air Quality
Removing Excavated Material	During the removal of excavated material, there is a risk that the underlying top levels of soil will also be removed and / or be more susceptible to erosion. This may lead to increased turbidity in waterbodies downstream.	Negligible	Implement immediate re-vegetation or overseeding using native grass species to stabilize soil surfaces. Adjust erosion control measures based on observed performance.	Conduct water quality testing before removal to establish baseline, then conduct daily monitoring of key water quality indicators (e.g., turbidity, sediment) during removal.	DC	Water Quality, Soil, Sediment and Erosion Control
			Establish routine inspections.	Establish routine inspections.	RREA	Water Quality, Soil, Sediment and Erosion Control

Component	Risks	Impact	Mitigation	Monitoring	Responsibility	ESPP
Removing Excavated Material	The removed excavated material will likely be transported with heavy machinery and trucks. This can contribute to a reduction in air quality and an increase in greenhouse gas emissions.	Minor	Use well maintained machinery and trucks, implementing regular engine maintenance and tune-ups to ensure optimal performance No idling enforced. Consolidate transport operations to minimize the number of trips required. Cover open loads with tarpaulins to prevent dust dispersion during transit.	Establish air quality baseline before removal, then conduct daily monitoring during decommissioning to ensure air quality remains within acceptable limits and adjust controls if levels exceed acceptable limits.	DC	Noise & Air Quality
Removing Excavated Material	If the removed excavated material is not managed appropriately, it could lead to the unnecessary disposal of materials that could otherwise be repurposed or recycled. Improper handling may also result in illegal dumping, contributing to environmental contamination and regulatory violations. Additionally, transporting and processing waste can create logistical challenges, emissions, and safety concerns. If the material is not managed properly, it might obstruct waterways, increasing flood risks and harming aquatic ecosystems, and degrade the visual landscape / effect community aesthetics.	Moderate	The removal of excavated materials such as sand and boulder rock from the site must be carried out responsibly to comply with environmental regulations and minimize the impact on the surrounding area. Sand may be donated to communities undertaking public infrastructure projects such as schools, clinics, bridges, and other public buildings. Boulders and rocks should be repurposed for riprap (erosion control), retaining walls, or decorative landscaping on-site. Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance. Develop and implement a detailed waste management plan that addresses the entire lifecycle - from on-site segregation to final disposal or repurposing. Include clear protocols for waste sorting, stockpiling, transportation, and processing. Segregate excavated materials (e.g., concrete, metals, soil, and other aggregates) allowing for prioritization of reuse or recycling. Collaborate with local authorities to manage materials that can be repurposed. Ensure all handling, transportation, and disposal activities comply with regulations. Maintain detailed records and audit trails for all waste streams. Use appropriate equipment to transport and process waste. Develop optimized logistics plans to reduce the number of trips. Proactively design and monitor waste storage areas.	Establish baseline prior to removal then implement daily monitoring of air quality, water quality, and soil conditions near the site.	DC	Noise & Air Quality Soil Quality
				Conduct daily inspections / monitoring to verify that waste management practices are followed.	DC, CARES Group, RREA	Waste Management
Slope Stabilisation	While slope stabilisation engineering interventions can help prevent severe erosion, it can change the natural hydrology and soil structure potentially affecting nearby aquatic ecosystems.	Minor	Opt for bioengineering and soft stabilization methods such as vegetative stabilization, live staking, and the use of geotextile mats that integrate natural materials to support slope stability while preserving ecological function. Preserve all trees and vegetation that were not previously cleared / disturbed as part of construction activities i.e., clearing only permitted to take place on vegetation recently established around partially completed structures. Reprofile the riverbanks as per the original soil horizon structure and revegetate with indigenous species. Revegetate / landscape all disturbed areas as part of the decommissioning activities. The rehabilitation shall take place using local topsoil and indigenous plant species.	Revegetation / slope stabilisation plan to be signed off by RREA, CARES Group, and DC before decommissioning. Conduct water quality testing before removal to establish baseline, then conduct daily monitoring of key water quality indicators (e.g., pH, dissolved oxygen, turbidity, pollutant levels, sediment) during removal.	DC	Ecosystem Protection / Improvement Water Quality, Soil, Sediment and Erosion Control

Component	Risks	Impact	Mitigation	Monitoring	Responsibility	ESPP
Site Clearance	Site clearance operations can produce dust and airborne particles from disturbed debris and miscellaneous materials. These particles - potentially mixed with chemical residues or fine particulates from hazardous substances can lead to deteriorated air quality, potentially affecting humans and wildlife.	Minor	Regularly clean access roads to prevent dust accumulation (to be discussed with the community and the Ministry of Public Works). Separate and safely handle any hazardous substances or chemical residues found in cleared materials. Provide PPE, such as N95 respirators, goggles, and dust masks, to workers in high-exposure areas.	Collect air quality measurements before decommissioning to establish baseline, then conduct daily monitoring during decommissioning activities. Records of PPE issuance.	DC	Noise & Air Quality Worker H&S
Site Clearance	If hazardous materials are mixed with inert construction debris, there is a risk that these contaminants are leached into the soil and nearby waterbodies. This leaching can degrade soil quality, harm aquatic ecosystems, and compromise downstream water quality.	Moderate	Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance. Implement on-site waste segregation protocols by identifying and separating hazardous materials from inert construction debris. Train personnel to recognize hazardous substances so that they are correctly isolated and handled separately. Ensure all waste handling, storage, and disposal practices comply with relevant regulations.	Establish baseline before decommissioning, then institute a weekly monitoring programme to check water quality near any storage and processing areas. Implement continuous monitoring of waste handling processes.	DC	Waste Management Water Quality, Soil, Sediment and Erosion Control
			Conduct routine inspections and audits to verify that waste management practices are followed.	Conduct daily inspections / monitoring to verify that waste management practices are followed.	DC, CARES Group, RREA	Waste Management
Site Clearance	The site clearing process will generate large quantities of waste that, if not adequately sorted, reused and / or recycled will be disposed of in landfill or dumped. Not only does this contribute to the premature depletion of landfill capacity but represents lost opportunity for recycling and reusing valuable materials, whilst also having potential regulatory non-compliance impacts. If the material is dumped, this could cause physical obstruction which could increase flood risks and / or harm aquatic ecosystems, as well as have an aesthetic impact. There are also potential impacts caused by the transporting and processing of the waste.	Moderate	Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance. Develop and implement an integrated waste management plan that outlines procedures for on-site waste segregation, storage, processing, and final disposal or reuse. Incorporate clear protocols that ensure hazardous, inert, perishable, and recyclable materials are managed through separate waste streams. Establish dedicated waste separation zones with clearly labeled containers for construction debris, perishable items, hazardous materials, and other recyclables. Optimize logistics by consolidating waste transport to reduce the number of trips.	Conduct routine inspections to verify that waste management practices are followed. Waste Management Plan signed off by RREA, CARES Group, and DC.	DC	Waste Management
			Conduct routine inspections and audits to verify that waste management practices are followed.	Conduct daily inspections / monitoring to verify that waste management practices are followed.	DC, CARES Group, RREA	Waste Management
			Collaborate with local authorities and communities to salvage and repurpose valuable construction materials.	Waste Management Plan signed off by RREA, CARES Group, and DC.	RREA	Waste Management
Site Clearance	The process of clearing debris, when it includes hazardous substances, presents serious health and safety risks to workers and nearby residents.	Moderate	Conduct site surveys and risk assessments before starting clearance to identify all hazardous substances. Implement strict on-site segregation procedures to ensure hazardous materials are separated from inert debris. Provide workers with appropriate PPE, including respirators, gloves, eye protection, and coveralls, tailored to identified hazards. Deliver comprehensive training on the proper handling, removal, and disposal of hazardous materials, including emergency response protocols.	Weekly progress reporting of decommissioning activities. Records of PPE issuance and training delivery.	DC	Worker H&S
			Conduct routine inspections and audits to verify that waste management practices are followed.	Conduct daily inspections / monitoring to verify that waste management practices are followed.	DC, CARES Group, RREA	Waste Management

Component	Risks	Impact	Mitigation	Monitoring	Responsibility	ESPP
Site Clearance	Use of heavy machinery during site clearance activities can lead to the generation of noise and dust which can disrupt local communities.	Minor	Utilize water sprays at key operations (e.g., excavation and loading areas) to capture dust. Utilise heavy machinery with noise reduction technologies. Heavy machinery operations shall only take place during daytime. Regularly service equipment to ensure optimal functioning. Opt for well-maintained machinery to reduce both noise and particulate emissions.	Establish baseline, then conduct daily dust and noise monitoring.	DC	Noise & Air Quality
Rehabilitation	Whilst rehabilitation activities will aim to restore the site's ecological functions and appearance, there is a risk that if improperly managed, the site will not replicate the complexity or services of the original. This risk is increased through the temporary nature of the decommissioning activities.	Moderate	Preserve all trees and vegetation that were not previously cleared / disturbed as part of construction activities i.e., clearing only permitted to take place on vegetation recently established around partially completed structures. Define clear restoration targets that strive to replicate both the complexity and functional aspects of the original environment. Develop a tailored rehabilitation plan that integrates both active restoration (e.g., planting native species, regrading soils) and passive recovery measures (e.g., establishing protective buffers to allow natural recolonization). Utilize bioengineering techniques that promote soil stabilization and habitat complexity, such as the use of living retaining walls, bio-rolls, or erosion control mats seeded with indigenous vegetation. Combine structural rehabilitation with soft, nature-based solutions.	Weekly progress reporting of decommissioning activities. Rehabilitation Plan signed off by RREA, CARES Group and DC.	DC	Ecosystem Protection / Improvement
			Set aside resources and responsibilities for ongoing monitoring, maintenance and protection.	Set aside resources and responsibilities for post-decommissioning monitoring, maintenance, and protection.	RREA	Ecosystem Protection / Improvement
Rehabilitation	If rehabilitation activities use inappropriate vegetation species or there is a failure to manage soil quality, then there is a risk of persistent erosion or the invasion of undesirable species.	Minor	Select native species proven to thrive in the soil and climatic conditions. Implement soil stabilization measures to protect soil integrity during the establishment phase. Develop a clear rehabilitation plan that integrates appropriate plant species with structural erosion control measures. Use planting techniques that promote rapid ground cover, such as staggered or mixed seeding of complementary native species, to resist erosion and inhibit invasive growth.	Rehabilitation Plan signed off by RREA, CARES Group, and DC.	DC	Ecosystem Protection / Improvement
Rehabilitation	If areas for rehabilitation do not include carefully designed interventions - such as organic amendments, contouring for water retention, or re-vegetation - the area might experience degraded water filtration and increased runoff potentially leading to reduced water quality downstream.	Minor	Incorporate compost or manure to improve soil structure and water retention. Regrading the land helps retain water in place, increasing infiltration and reducing the potential for erosion and sediment transport downstream. Establish native, deep-rooted vegetation to stabilize the soil and promote water uptake. Preserve all trees and vegetation that were not previously cleared / disturbed as part of construction activities i.e., clearing only permitted to take place on vegetation recently established around partially completed structures.	Establish baseline, then monitor water quality downstream. Rehabilitation Plan signed off by RREA, CARES Group, and DC.	DC	Ecosystem Protection / Improvement Water Quality, Soil, Sediment and Erosion Control

Component	Risks	Impact	Mitigation	Monitoring	Responsibility	ESPP
Handling Explosives & Blasting Magazine	When handling the explosives / dismantling the blasting magazine there is always a risk of accidental detonation caused by improper handling, mechanical impact, or exposure to extreme environmental conditions. Therefore, workers involved in the handling and decommissioning process face significant safety risks with physical injuries and exposure to toxic chemicals the primary concerns. Accidental detonation also presents community H&S risks and would release hazardous substances into the environment, create a wide dispersion of debris, and could lead to habitat destruction. Accidental detonations can also generate shock waves, release fine particulates and toxic gases, and trigger fires. These secondary effects can impact air quality and disturb local wildlife and communities.	Major ●	Utilize Material Safety Data Sheets (MSDS) and risk assessments to inform safe handling, storage, and decommissioning protocols. Only trained personnel with certified experience in explosives and blasting operations should be permitted to handle or remove the explosives and associated magazine. Conduct a detailed hazard analysis and risk assessment specific to explosives handling and dismantling activities. Identify all potential triggering factors (e.g., improper handling, mechanical impact, or extreme environmental conditions etc.) and develop control strategies accordingly. Develop and enforce robust Standard Operating Procedures (SOPs) for the handling of explosives and the dismantling of the blasting magazine. Ensure SOPs cover all stages, from preparatory measures to post-operation cleanup. Establish stringent procedures for isolating and safely storing hazardous materials. Define and enforce exclusion zones. Develop a comprehensive emergency response plan that includes evacuation routes, spill containment, fire suppression, and medical response strategies.	Risk Assessment, Standard Operating Procedures (SOPs) and Comprehensive Emergency Response Plan signed off by RREA, CARES Group, and DC.	DC	Worker H&S Waste Management Community Risks / H&S
Handling Explosives & Blasting Magazine	Decommissioning the Explosives and Blasting Magazine may involve a controlled explosion which can generate significant noise and vibration disturbance to local communities and wildlife.	Moderate ●	To maintain positive community relations, the public shall be kept informed about the decommissioning activities and any efforts to minimise disturbance, and procedures for prompt response and corrective action shall be documented within the GRM.	Records of community engagement and sensitisation campaigns about project activities conducted.	RREA	Noise & Air Quality
Handling Explosives & Blasting Magazine	Explosives typically contain reactive chemicals and additives that may be toxic if leaked. During handling, storage, or decommissioning, accidental spills or degradation of these compounds can contaminate soil and water. Such contamination might affect local ecosystems or alter water quality in nearby waterbodies.	Moderate ●	Only trained personnel with certified experience in explosives and blasting operations should be permitted to handle or remove the explosives and associated magazine. Conduct detailed analyses of all explosive compounds, including reactive chemicals and additives, to determine their toxicity and potential environmental impacts. Utilize Material Safety Data Sheets (MSDS) and risk assessments to inform safe handling, storage, and decommissioning protocols. Implement strict segregation practices to ensure that reactive explosives are not mixed with other incompatible substances, reducing the risk of chemical reactions during degradation. Establish comprehensive emergency response plans that include immediate spill containment, neutralization, and decontamination protocols.	Risk Assessment, Standard Operating Procedures (SOPs) and Comprehensive Emergency Response Plan signed off by RREA, CARES Group, and DC.	DC	Worker H&S Waste Management Water Quality, Soil, Sediment and Erosion Control
Handling Explosives & Blasting Magazine	Decommissioning a blasting magazine produces waste streams that require specialized handling. If not, then this can lead to regulatory non-compliance impacts.	Moderate ●	Rigorously adhere to all regulations regarding the handling, storage, and disposal of hazardous explosive materials. Maintain detailed records of all assessments, handling protocols, and disposal methods to ensure accountability. Provide comprehensive training for all personnel on handling degraded explosives, emergency response procedures, and emergency equipment usage.	Conduct routine inspections to verify that waste management practices are followed. Waste Management Plan signed off by RREA, CARES Group, and DC.	DC	Waste Management
				Audit of records of all assessments, handling protocols, and waste management processes.	CARES Group	Waste Management

Component	Risks	Impact	Mitigation	Monitoring	Responsibility	ESPP
Removing Fuel Depot & Contaminated Soils	There is some evidence of legacy spills, leaks and / or seepage of hydrocarbons surrounding the fuel depot which may have led to high concentrations in the surrounding soils. When these are disturbed during removal of the soil, there is a risk that contaminated material may migrate into nearby waterbodies potentially affecting human health and ecosystem integrity.	Moderate	Conduct assessment to delineate the extent and concentration of any hydrocarbon contamination. Segregate contaminated materials from clean soils immediately upon excavation and store them in sealed, leak-proof containers. Ensure that all hazardous waste is processed and disposed of in accordance with regulatory guidelines. Ensure that response equipment, such as spill containment kits and neutralizing agents, is readily available and that team members are trained in their use.	Establish baseline, then monitor soil, water, and air quality.	DC	Water Quality, Soil, Sediment and Erosion Control
Removing Fuel Depot & Contaminated Soils	Removing any contaminated soils surrounding the fuel depot can alter the natural soil composition and lead to increased erosion. This loss of topsoil might reduce its capacity to support vegetation during rehabilitation efforts.	Negligible	Conduct pre-removal surveys to identify and carefully salvage uncontaminated topsoil. Store salvaged topsoil in secure, controlled areas for later use in rehabilitation.	Weekly progress reporting of decommissioning activities.	DC	Water Quality, Soil, Sediment and Erosion Control
Removing Fuel Depot & Contaminated Soils	Ecosystems that may have partially colonized the contaminated soil surrounding the fuel depot may experience habitat loss when the soils surrounding the fuel depot are removed or altered. The disturbance can impact microbial communities that play a critical role in biodegradation and natural soil recovery processes.	Minor	Incorporate organic amendments (e.g., compost, biochar) during soil restoration to enhance microbial habitat and promote soil regeneration. Focus on restoring soil structure and moisture retention, which are critical for microbial activity and overall ecosystem recovery. Employ low-impact removal techniques where possible to reduce the disruption of soil ecosystems.	Weekly progress reporting of decommissioning activities.	DC	Water Quality, Soil, Sediment and Erosion Control
Removing Fuel Depot & Contaminated Soils	Waste from the dismantled fuel depot and the contaminated soils must be handled properly as poorly contained waste increases the likelihood of secondary contamination incidents. Contaminated soils often require specialized treatment - such as stabilization, solidification, or thermal treatment - before they can be disposed of or reused. Inadequate treatment may allow residual contaminants to remain active, prolonging environmental harm and complicating future land remediation efforts.	Minor	Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance. Conduct laboratory analyses to determine the spectrum and concentration of contaminants. Clearly delineate waste streams so that contaminated soils, fuel residues, and other hazardous materials are isolated. Use sealed containers to prevent leaching or accidental releases during transport or temporary storage.	Weekly progress reporting of decommissioning activities.	DC	Waste Management
			Consult with regulatory bodies to ensure that all handling, transport, and treatment procedures meet current environmental and safety standards, and that all necessary permits are obtained. Audit of records of all assessments, handling protocols, and waste management processes.	Audit of records of all assessments, handling protocols, and waste management processes.	RREA	Waste Management
Removing Fuel Depot & Contaminated Soils	Workers involved in the excavation, transport, and treatment of contaminated soils from surrounding the fuel depot face health risks if proper safety procedures are not strictly followed.	Moderate	Develop and enforce clear SOPs for each stage of work - from excavation through transport to treatment - to ensure consistent adherence to safety protocols. Equip workers with appropriate PPE including chemical-resistant coveralls, gloves, eye and face protection, and respirators suitable for the contaminants present. Implement measures such as water sprays to limit dust generation during excavation and transport. Limit the duration of exposure.	Establish baseline then monitor air quality to detect any change in dust or contaminant concentrations.	DC	Worker H&S Noise & Air Quality

Component	Risks	Impact	Mitigation	Monitoring	Responsibility	ESPP
Removing All Equipment	During the removal of a mix of heavy equipment (e.g., front roller, truck, brick-making machine, rock crusher and pickup vehicle) there is a risk of the release of residual fluids, degraded materials, and potential contaminants to the environment. This risk is increased and further complicated as ownership is unclear, with some assets not maintained and not operational. When dismantling or transporting these assets, leakage or accidental spills can occur. These substances can seep into soil or nearby waterbodies, leading to localised pollution and environmental degradation. Outdated or damaged machinery may have corroded parts that release heavy metals (such as lead or cadmium) and other contaminants, which further contribute to soil and water pollution risks during removal.	Moderate	Clarify ownership and responsibilities. Prepare an inventory of all equipment to identify potential hazards, such as residual fluids, corroded components, and degraded materials. Identify a suitable location for safe storage or consider constructing a shelter on-site to protect the equipment. Although all PACs have been informed about the potential relocation of the equipment, some of the machines are not in operational condition.	Audit of records of all assessments.	DC / RREA	Waste Management Water Quality, Soil, Sediment and Erosion Control
			Prior to dismantling any equipment, drain any residual fluids safely using spill containment systems such as bunding or secondary containment trays. Use certified absorption materials and spill kits to manage any unavoidable leaks during removal or transport. Isolate components known to have corroded parts or heavy metal contamination, and secure them in sealed, leak-proof containers for proper disposal or safe storage. Document and comply with all environmental regulations regarding hazardous waste disposal. Monitor any leakage or changes in soil and water quality during and after equipment removal. Develop and implement robust spill response and decontamination protocols. Ensure workers are specifically trained on emergency actions, and that all necessary decontamination and cleanup equipment is readily available.	Establish baseline, then monitor soil, water, and air quality.	DC	Waste Management Water Quality, Soil, Sediment and Erosion Control
Removing All Equipment	Decommissioning activities generate a variety of waste materials, including metals, plastics, rubber, and electronic components. If not managed properly, these materials may be wasted instead of repurposed, leading to unnecessary resource consumption. Poor disposal practices can also result in inappropriate or illegal dumping, contributing to environmental contamination and regulatory compliance issues. Additionally, transporting and processing waste can create emissions and logistical challenges, while accumulated debris may obstruct waterways, increasing flood risks and harming aquatic ecosystems. Beyond these environmental concerns, mismanaged waste can negatively impact the visual landscape, diminishing the overall aesthetics of the site and surrounding areas.	Moderate	Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance. Establish designated areas for segregating metals, plastics, rubber, electronic components, and other waste streams. Train personnel to correctly identify and classify materials, ensuring that reusable or recyclable items are not mixed with non-recyclables. Develop partnerships to recover valuable resources. Follow best practices and regulatory guidelines for the transport, processing, and disposal of hazardous and non-hazardous waste. Develop a rehabilitation plan that includes landscape restoration.	Establish baseline, then monitor local water quality during decommissioning.	DC	Waste Management Water Quality, Soil, Sediment and Erosion Control
			Audit of records of all assessments, handling protocols, and waste management processes. Collaborate with local authorities and communities to salvage and repurpose valuable construction materials.	Audit of records of all assessments, handling protocols, and waste management processes. Waste Management Plan signed off by RREA, CARES Group, and DC.	RREA	Waste Management
Implementing Community Safety Measures	Installation of chain link fencing may close the site to livelihood activities such as fishing and sand mining.	Minor	The chain link fencing will not encircle the entire fifeen acres of the site - just the areas which present a public health and safety risk / areas at risk of erosion. The fenced area shall be determined by RREA and DC following completion of the Comprehensive Site Assessment. Whilst the site will not be entirely closed the local community will not be encouraged to undertake livelihood actitivites as these could contribute to erosion.	The number of community complaints will be monitored.	DC, RREA	Community Risks / H&S

Component	Risks	Impact	Mitigation	Monitoring	Responsibility	ESPP
Implementing Community Safety Measures	During installation, improper handling of waste construction materials (e.g., packaging waste or surplus materials) must be handled appropriately.	Negligible 	Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance. Clearly separate packaging waste, surplus materials, and hazardous wastes as they are generated. Establish dedicated, clearly marked areas for temporary storage of waste materials. Follow waste management guidelines to ensure proper disposal and recycling practices.	Daily inspections of waste handling areas to promptly correct improper practices.	DC	Waste Management
			Audit of records of all assessments, handling protocols, and waste management processes.	Audit of records of all assessments, handling protocols, and waste management processes.	CARES Group	Waste Management
Implementing Community Safety Measures	Over time, exposure to weather elements may cause corrosion or physical degradation of the fence, signs and / or billboards. Without regular maintenance by RREA, the compromised safety features might release fragments or rust particles into the environment, and faded signage could reduce overall site safety. Any lapses in upkeep (e.g., broken fence panels, faded safety signs) can lead to accidents or unwanted entry to the site which compromise safety; furthermore, this can erode public confidence in the project being completed.	Minor	Choose corrosion-resistant materials (e.g., galvanized steel, stainless steel, aluminum) for fences and structural components. Utilize weatherproof materials or coatings for signs and billboards to maintain their integrity and color over prolonged exposure. Apply high-performance paints and sealants specifically designed for outdoor conditions.	Implement a strict maintenance schedule with routine inspections (e.g., quarterly or biannually) to monitor corrosion levels, physical deterioration, and the signage condition. Use checklists and document findings to prioritize repair and replacement work.	RREA, DC	Community Risks / H&S

2. Introduction

2.1. Terms of Reference

The Rural and Renewable Energy Agency (RREA) has engaged CARES Consultant Liberia Ltd., a member of the CARES Group, to provide consultancy services for the preparation of an Environmental and Social Management Plan (ESMP) and the monitoring the implementation of the ESMP by the Decommissioning Contractor (DC) for the temporary Closure of Kaiha 2 Hydropower Site in Lukambeh District, Lofa County, Liberia under the Liberia Renewable Energy Access Project (LIRENAP).

This report should be read in conjunction with the Decommissioning and Restoration Plan, which is also being prepared as an extension to the original ESMP assignment, following an instruction from the Environmental Protection Agency (EPA) that the environmental and social assessment process for the decommissioning should begin with a Decommissioning Plan and a Stakeholder Engagement Plan (SEP) (Ref: ED/EPA/01/0882/25/RL, dated 08 April 2025).

2.2. Background

RREA has received funding from the World Bank for the LIRENAP. A key component of the LIRENAP was the 2.6MW Kaiha 2 Hydropower Project (HPP), located on the Kaiha (Zeriba) River, 4.75km southwest of the village of Mbaloma, Lofa County, Liberia. Construction of the Kaiha 2 HPP has advanced significantly, with key components such as the stilling basin and retaining walls nearing completion. Various other structures are in incomplete states, with different elements at varying stages of progress.

The project, originally included the development of:

- A 7.5 m high concrete overflow weir / gravity dam with a spillway crest at 450.5 masl, situated at the top of Kaiha Falls and a left bank embankment dam.
- 2 x 1.85 m diameter penstocks of 41 m and 45 m length, respectively.
- Surface powerhouse with 2 Kaplan turbines operating with about 13 m of gross head - delivering power into a micro-grid - constructed as a separate component of the larger LIRENAP.
- A regulating reservoir which would have enabled water to be stored overnight during low flow periods.

It is understood that because the project has encountered several significant setbacks, including financing gaps, a decision was made[1] to halt and temporarily decommission the hydropower component of the project with alternative power supply options being explored for the Lofa County mini-grid project.

As the decision to decommission the Kaiha 2 HPP has associated Environmental and Social (E&S) risks (with the site works incomplete and hazardous materials like explosives and fuel stored onsite), RREA appointed CARES to prepare the ESMP following Liberian environmental laws and World Bank Safeguards and to monitor the implementation of the ESMP during decommissioning.

As EPA also instructed RREA to prepare a Decommissioning Plan (DP) and Stakeholder Engagement Plan (SEP) to begin the environmental and social assessment process for the intended decommissioning works CARES Scope of Work (SoW) was extended to include these documents and the DP, SEP, and ESMP, should be read in conjunction.

[1] RREAs decision to decommission the partially completed works was confirmed by RREA in the terms of reference for the ESMP consultancy services.

The Decommissioning and Restoration Plan provides the plan of actions required to temporarily decommission the partially completed 2.6MW Kaiha 2 HPP and is the key input into the ESMP preparation by providing the intended activities that will need to be managed from an environmental and social perspective.

2.3. Plan Development

This ESMP has been informed by a site visit conducted by Kokulo Yorgbor and Trokon Gargar conducted on 08 May 2025, stakeholder engagement conducted between 09 May 2025 and 15 May 2025 and a review of the following project-related documentation:

- The technical specifications / Terms of Reference (ToR) prepared for the potential decommissioning works contractors.
- Details of key decommissioning activities prepared for submission to EPA as part of the notification process.
- Details of elements for decommissioning provided in the terms of reference for the ESMP consultancy assignment.
- Environmental and Social Compliance Audit Report for the LIRENAP (dated February 2024).
- Environmental and Social Impact Assessment (ESIA) for the Kaiha 2 Mini Hydropower Project (dated 18 April 2019).
- Quarterly progress report.
- Tender input.

All of the information obtained has been used to develop an understanding of the current site conditions, potential environmental and social risks, and the development of appropriate mitigation measures to reduce the risks.

2.4. Scope

The scope of this plan is limited to the environmental and social management associated with the decommissioning and restoration of the partially completed Kaiha 2 HPP, located in Mbaloma, Lofa County, Liberia.

The 5.5km access road to the hydropower plant, the diesel plant, and the 155km distribution lines corridor are not included in this ESMP because these project components fall outside the area affected by the Kaiha 2 decommissioning.

3. Methodology

This ESMP has been prepared using data and information gathered from both primary and secondary sources of information. The ESMP was developed based on the review of existing data and information, a site inspection on 08 May 2025, and stakeholder engagement with Project Affected Communities (PACs) and local authorities between 09 May 2025 and 15 May 2025. Based on the information obtained the Environmental and Social (E&S) risks were identified and proposed mitigation measures developed.

3.1. Review of Existing Data and Information

The key existing data and information reviewed consisted of the following:

- The technical specifications / Terms of Reference (ToR) prepared for the potential decommissioning works contractors.
- Details of key decommissioning activities prepared for submission to EPA as part of the notification process.
- Details of elements for decommissioning provided in the terms of reference for the ESMP consultancy assignment.
- Environmental and Social Compliance Audit Report for the LIRENAP (dated February 2024).
- Environmental and Social Impact Assessment (ESIA) for the Kaiha 2 Mini Hydropower Project (dated 18 April 2019).
- Liberia Renewable Energy Access Project (LIRENAP) Highlight Report: Quarter of October 1 - December 30, 2023.
- Liberia Renewable Energy Access Project (LIRENAP) Request for Quotations: Temporary Decommissioning of Kaiha2 Hydro Power Plant.
- Environmental and Social Incident Response Toolkit (ESIRIT) Incident Form (Describing an October 2024 severe flood incident when the cofferdam Failed).
- Detailed Assessment and Final Incident Report: Kaiha 2 Cofferdam Failure (dated 28 November 2024).

3.2. Site Inspection

A site inspection was completed by Kokulo Yorgbor (CARES) and Trokon Gargar (EcoGreen) on 08 May 2025. The site inspection was carried out to enable the CARES and EcoGreen team to develop a detailed understanding of the sites, temporary decommissioning and proposed rehabilitation activities within the site setting, including adjoining land and related activities; review the environmental sensitivity and the location of the Valued Environmental Components (VECs). A summary of the observations made during the site inspection are provided in a pictorial in Table 4-1 and included incomplete civil works, storage of equipment and hazardous (e.g., fuel explosives) and non-hazardous materials

3.3. Stakeholder Engagement

Stakeholder engagement was carried out by Kokulo Yorgbor (CARES), Trokon Gargar (EcoGreen) and Moses Saah (RREA COO) between 09 May 2025 and 15 May 2025. The stakeholder engagement included Project Affected Communities (PACs) and local authorities. The engagement sessions aimed to provide stakeholders with the opportunity to discuss opinions, potential benefits, and adverse impacts, and to identify stakeholder interests. The engagement also sought input into the ESMP including the identification of the VECs and mitigation measures and to disclose information on the ESMP implementation that could affect them. Details of the stakeholder engagement activities conducted between 09 May 2025 and 15 May 2025 are presented in Chapter 6 with the consultation taking place with 311 participants (62% women) and included PACs, local leaders and women with the documentation of concerns and feedback informing the ESMP by influencing the

3.4. E&S Risks

Identification of the E&S risks was carried out in line with Liberia's laws and the World Bank Operational Policies (OPs) (especially OP 4.01, OP 4.12, and OP 4.37); specifically, the E&S risks were identified based on the findings of the 08 May 2025 site inspection, the stakeholder consultations (09 May to 15 May 2025), understanding of the decommissioning scope / decommissioning and restoration plan, and the review of project-related documentation (see Section 2.3) including the ESIA (2019) and the Environmental and Social Compliance Audit Report (2024). The understanding of the decommissioning activities to be undertaken, is key to the identification of the E&S risks, with key activities - such as the removal of the cofferdam, explosives, and fuel depot linked to specific E&S risks like water pollution, worker safety, and soil contamination. For each of the E&S risks identified an evaluation of their significance (negligible, minor, moderate, major) was evaluated by professional judgement and a consideration of the likely magnitude, duration, frequency, and reversibility of the potential impacts based on an understanding of the site sensitivity and the planned decommissioning activities. For each E&S risk identified mitigation measures were identified, along with measures for monitoring and responsible parties to allow adaptive monitoring. This was presented in the form of a monitoring matrix in Chapter 9, with risk-specific Environmental and Social Protection Plans (ESPPs) provided in Section 9.1.

4. Project Description

This chapter provides a summary description of the project to be decommissioned with a focus on the current status of the infrastructure.

4.1. Site Information

The Kaiha2 HPP is located on the Kaiha River in the upper portion of the Mano River Basin at geographic coordinates 8.0015° N latitude and 10.2100° W longitude. The site lies immediately upstream of the Kaiha River waterfall, approximately 4.75 kilometres south-southwest of Mbaloma Village, Kolahun District, Lofa County, Liberia.

4.2. Project Design and Background

The project was initially designed as a 2.6 MW hydropower facility under the LIRENAP. Planned infrastructure included a 7.5-meter-high concrete overflow weir / gravity dam with a spillway crest elevation of 450.5 Meters Above Sea Level (MASL), situated at the top of the Kaiha Falls and a left bank embankment dam.

The design also incorporated two penstocks, each with a diameter of 1.85 meters and lengths of 41 metres and 45 metres respectively, an intake structure and tailrace channel, and a surface powerhouse fitted with 2 Kaplan turbines operating with a gross head of 13.2 metres - delivering power into a micro-grid (constructed as a separate component of the larger LIRENAP), and a regulating reservoir intended to store water during low-flow periods.

Construction activities at the site advanced significantly, with key components such as the stilling basin and retaining walls nearing completion. However, the development was subsequently halted, leaving the site partially constructed. Various structures, including the powerhouse and penstocks, remain in incomplete states, with different elements at varying stages of progress. The site has since been designated for temporary decommissioning. A general layout plan of how the project was expected to look if it was completed is provided in Figure 4-1 below.

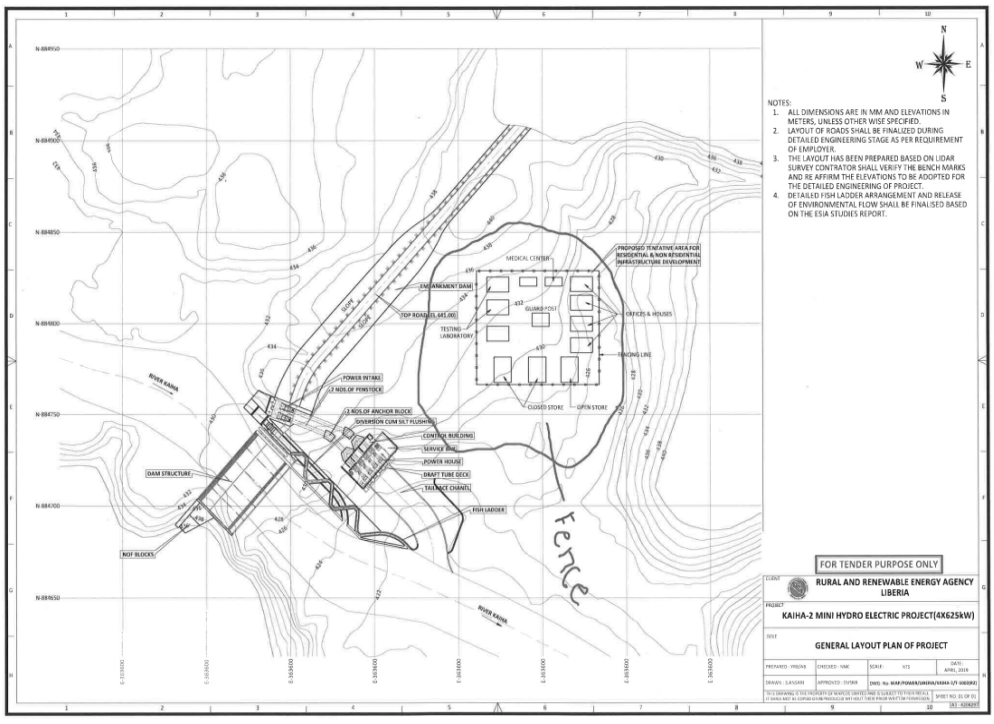

Figure 4-1 - General Layout Plan of Project

4.3. Site Characteristics

A summary of the site characteristics is provided in this subsection. These characteristics directly relate to the risks and potential impacts detailed in Chapter 8.

The project acquired 6.07 hectares (15 acres) of land donated by the community for the construction of the hydropower plant (which is only partially completed and planned for temporary decommissioning). The land was unoccupied and devoid of crops, eliminating the need for resettlement activities.

The site originally consisted of river rapids and a concentrated waterfall over a length of approximately 100m, and a total vertical drop of around 7.5m. The rapids and waterfall at the hydropower plant site form a conspicuous landscape element, although it is not visible from afar because of thick vegetation cover. The waterfall is probably located at an old fault line that has been eroded. Two waterfalls of roughly similar size are located upstream of the project site (Kaiha 1 and Kaiha 3).

The terrain immediately surrounding the Kaiha River is characterised by undulating hills and thick vegetation consisting of both primary and secondary forest. In the upper catchment the soil cover is generally sparse, with exposed dome shaped rock formations being visible in many places. The hydropower plant is located at an altitude of 425 Metres Above Sea Level (MASL) and the highest point in the catchment about 850 MASL.

Geologically, the project area is in the Liberian age province (Figure 4-2) which can be dated back to 2,700 million years ago (Tysdal and Thorman 1983). The Liberian age province is generally structurally stable today with little recorded earthquake activities. In Lofa County, it typically consists of massive and competent granite, metamorphosed granite, gneiss and intrusive diabase dyke.

At the hydropower plant site, the observed granite and gneiss in the riverbed outcrops was considered suitable for a concrete gravity dam and bedrock is generally expected within 1 m to 3 m of superficial deposits.

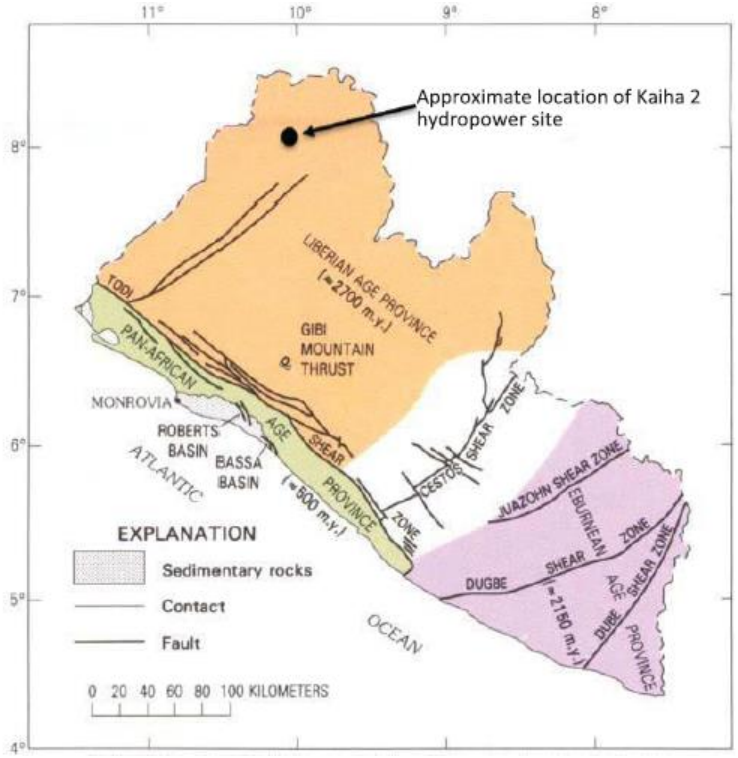

Figure 4-2 - Geology
(Source: ERM and Earthtime, 2019. Location of boundary between Liberian and Eburnean age provinces is uncertain)

The project is located within the Kaiha River catchment. The Kaiha River forms the upper part of the Mano River Basin and drains the Liberian Northern Highlands and marginally into Guinea. The Kaiha River flows in a general south-west direction over a low gradient and with a meandering shape, contributing to the Mano River. The Mano

River forms the Liberia-Sierra Leone border for about 70 km before it empties into the Atlantic Ocean at Mano Salija. The Kaiha River contributes to the Mano River about 180 km from the coast (ERM and Earthtime, 2019). River flow at the site varies considerably within the year and from year to year (Multiconsult, 2016).

The site comprises mainly close canopy gallery forest with high tree density, tree heights ranging between 40 and 50 meters and a significant proportion of trees with diameter at breast height (dbh) of over 100 cm. The forest canopy was considered to be healthy. The common tree species are *Albizia zygia* West African walnut, *Albizia adianthifolia* Flat crown, *Cathormion altissimum, Cathomium rhombifolium, Pterocarpus santalinoides, Penthaclethra macrophylla* African oil bean, *Pycnanthus angolensis* African / False nutmeg, *Uapaca heudilotii* and *Amphimas pterocarpoides* (ERM and Earthtime, 2019).

The habitat of the Project's AoI can support a high diversity of mammals, birds, amphibians and reptiles, including four Endangered species (western chimpanzee, red colobus monkey, pygmy hippopotamus, hooded vulture) and one Critically Endangered (CR) species (slender-snouted crocodile). Of these, only one species (hooded vulture) was sighted during the survey conducted for the ESIA, while all the others were reported by local informants as rarely occurring (ERM and Earthtime, 2019). Based on the information obtained during the May 2025 stakeholder engagement and site inspection it is understood that there have been reports of snakes in and around the construction area, along with monkeys and other wildlife due to the proximity to forested areas.

The land cover prior to commencing the hydropower plant was rainforest, and devoid of any settlements. A former footpath from the nearest town Mbaloma has been upgraded to a permanent access road. The forest surrounding the access road is in various stages of succession (i.e., secondary forest), evidence that shifting cultivation has been practised for a long time. There are also a few openings in the forest where the farmers have planted crops, mainly rice. Temporary farm shelters are erected during the planting and harvesting season.

The setting is mainly rural with poverty, illiteracy and unemployment widespread. The main source of livelihood in the project area is agriculture mainly practiced for subsistence purposes characterised by low levels of mechanisation, low productivity, limited access to improved farm inputs and poor post-harvest handling techniques (ERM and Earthtime, 2019). The Environmental and Social Compliance Audit described the project context as: *"The project area is predominantly agrarian, with limited income-generating opportunities primarily centred around farming, chainsaw activities, and fishing. The Project Affected Persons (PAPs) and local community members engage in semi-skilled labour activities such as palm oil production, fishing, hunting, and small-scale trading for basic household goods and food"* (Scere, 2024).

Observations on the site characteristics as informed through the 08 May 2025 site visit are provided in Table 4-1.

4.4. Incidents

The following documentation provided by RREA has provided details of a cofferdam failure incident during October 2024:

- Completed Incident Form from the Environmental and Social Incident Response Toolkit (ESIRT), detailing an incident of dam failure that took place in October 2024.
- Detailed Assessment and Final Incident Report: Kaiha2 Cofferdam Failure, Prepared by RREA, dated 28 November 2024. The report presents a detailed assessment of conditions following the partial failure of the cofferdam on 16 October 2024.

It is understood that on the 16 October 2024 (following heavy rainfall during the peak of the rainy season), the cofferdam failed under pressure and a large section was washed away. This resulted in uncontrolled water flow in areas previously protected by the structure. A substantial section remained intact and stable, and the impact was confined to the adjacent riverbank and the construction site, with only minor erosion observed. Some sediment was carried downstream but remained within natural seasonal variations, and no signs of pollution or water quality issues were identified. Vegetation was slightly disturbed but was reported to be recovering naturally.

4.5. Status of the Project to be Decommissioned

This section provides a description of the status of the project to be decommissioned. Section 4.5.1 provides a description of the project status as reported in the February 2024 E&S Audit Report, whilst Section 4.5.2 provides a description of the project status as observed during the 08 May 2025 in the form of a pictorial (presented in Table 4-1).

4.5.1. Project Status Reported in the Environmental and Social Compliance Audit Report

The Environmental and Social Compliance Audit Report for the LIRENAP (dated February 2024) provided the following as the status of the project works.

"The project acquired 6.07 hectares (15 acres) of land donated by the community for the construction of the hydropower plant. The land was unoccupied and devoid of crops, eliminating the need for resettlement activities. Site clearance for the construction of the hydropower plant was completed, along with the excavation of rocks for the intake, silt flushing canal, and dam / stilling basin (Blocks 1 & 2). The penstock path is 93% complete, while the powerhouse and tailrace are 68% complete, and the dam / stilling basin (Blocks 1 & 2) is over 95% complete. The construction of intake retaining walls is at 65% completion. Excavation for the fish ladder is 100% complete. Excavation and infill concrete work halted at 75% due to a directive from RREA. The state of completion of the upstream and downstream retaining walls varies across sections, with some areas fully completed and others stopped between 48% to 76% completion due to a stop-work order from the RREA. The service / loading bay excavations of the powerhouse are complete, with work on the machine hall and draft tube area ongoing at the time of the February E&S Audit. Tailrace Channel excavation is noted at 85% completion, although activities were halted as per RREA's directive. Progress on River Protection Work varies, with sections stopped at varying degrees of completion due to work stoppage orders."

4.5.2. Project Status Observed During the Site Visit

Based upon a site visit conducted around 08 May 2025 a pictorial to detail the status of the project development is provided in Table 4-1 below, with a map of the site layout provided in Figure 4-3. It is clear that further deterioration has occurred since the February 2024 E&S audit with key physical issues identified included the washed-away cofferdam sections; deteriorating geo-bags and visible erosion; and overgrown vegetation and inactive machinery. Stockpiles of construction materials (sand, boulder rocks, various grades of aggregate); exposed rebar in the partially completed stilling basin, spillway, and powerhouse; partially completed exposed concrete works; blasting magazine; fuel depot with contaminated soil; along with several other structures on-site, including scaffolding, storage containers, staff accommodations, contractor offices, temporary power lines, generators, surveillance equipment, and guard posts were also observed. The RREA Engineer should provide guidance on which structures are stable, deteriorating, or hazardous and which should be made safe, which shall be demolished or dismantled, and which shall be donated to the local community.

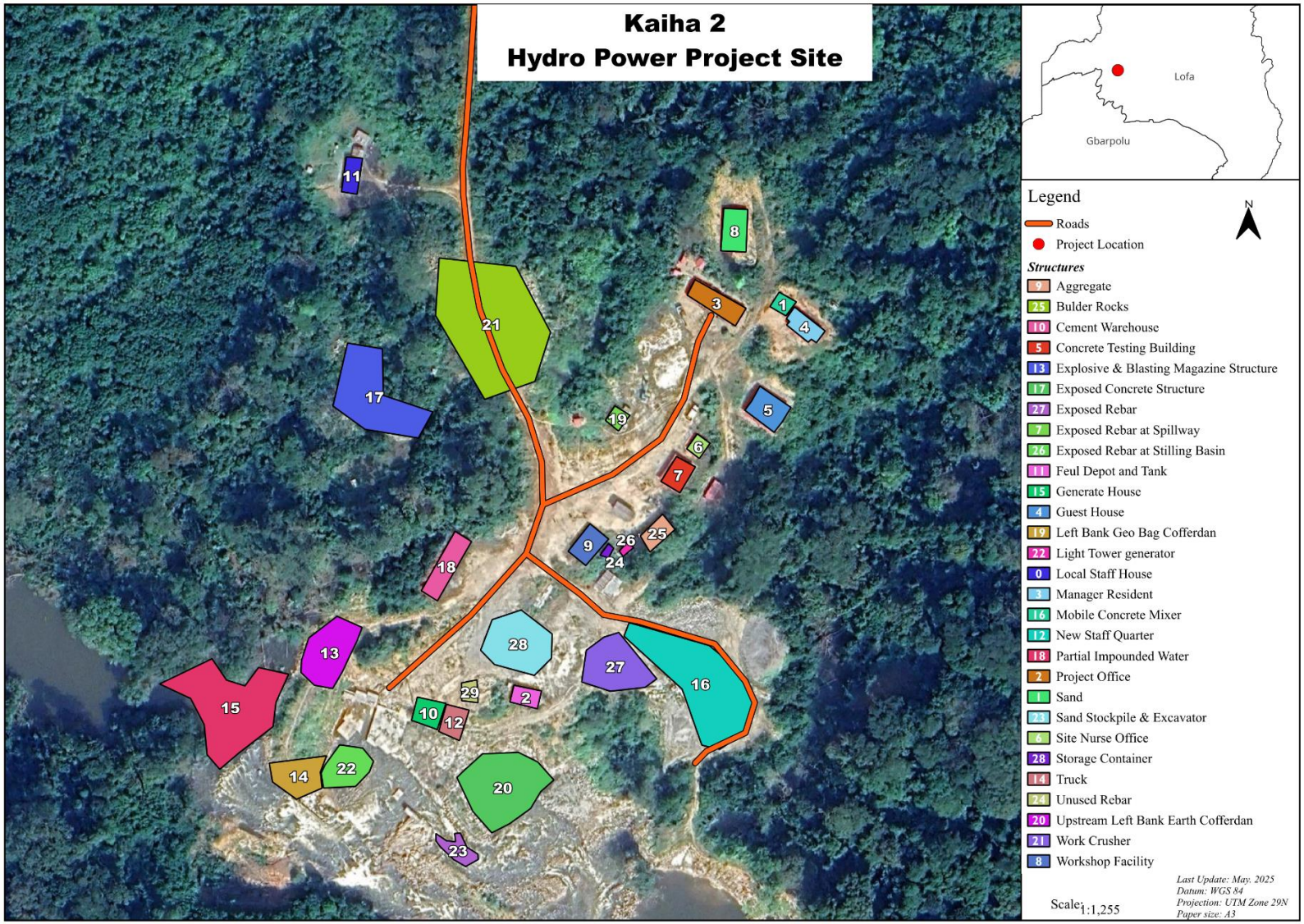

Figure 4-3 - Site Layout with Indicative Structure Locations

Table 4-1 - Pictorial of Project Status

<table>
<tr><th colspan="2">PHOTOGRAPHS & DESCRIPTION OF STATUS OF PROJECT COMPONENTS</th></tr>
<tr><th>Position Number on Figure 4-3: 20</th><th>Position Number on Figure 4-3: 18</th></tr>
<tr><td> 
Figure 4-4 - Upstream Left Bank Earth Cofferdam
The image shows temporary structure, made primarily of soil, is used to exclude water from the construction site. It helps to impound water, allowing the contractor to work in dry conditions at locations such as a dam, intake, or powerhouse. The structure is partially covered with vegetation, and a portion of it has been washed away by the impounded water. A remaining section still impounds water.</td><td> 
Figure 4-5 - Impounded Water
The water is not fully impounded due to the partial failure of the earth cofferdam, a portion of which has been washed away.</td></tr>
<tr><th>Position Number on Figure 4-3: 19</th><th>Position Number on Figure 4-3: 1</th></tr>
<tr><td> 
Figure 4-6 - Left Bank Geo-Bag Cofferdam
The picture depicts the partially washed-away Geo-Bag Cofferdam. Geo bags were stacked to form a cofferdam that prevents or redirects the flow of water. Geo bag cofferdams were used because they resist erosion better than traditional soil structures. However, as can be observed, many of the geo bags have deteriorated, and their soil contents are now being washed away by erosion.</td><td> 
Figure 4-7 - Excavated Sand
The photo shows a pile of sand that was excavated at the project site for use in construction. There are several such sand piles on-site; this photo captures two of them.</td></tr>
</table>

PHOTOGRAPHS & DESCRIPTION OF STATUS OF PROJECT COMPONENTS	
Position Number on Figure 4-3: 25	**Position Number on Figure 4-3: 9**
 *Figure 4-8 - Excavated Boulder Rocks* This picture shows a stockpile of boulder rocks located at the entrance of the construction site, on the left-hand side of the main gate.	 *Figure 4-9 - Aggregate Stockpile* There are various grades of aggregate stockpiles currently available onsite.
Position Number on Figure 4-3: 9	**Position Number on Figure 4-3: 27**
 *Figure 4-10 - Aggregate Stockpile* At the construction site, various grades of aggregate are available. The image above shows one of the aggregate grades present on site.	 *Figure 4-11 - Exposed Rebar* This is the proposed site for the powerhouse of the hydropower project. The reinforcement bars (rebar) embedded in the concrete structures at the site is shown due to incomplete construction activities. This creates a hazard.

PHOTOGRAPHS & DESCRIPTION OF STATUS OF PROJECT COMPONENTS	
Position Number on Figure 4-3: 9	**Position Number on Figure 4-3: 26**
 *Figure 4-12 - Exposed Rebar* In this photograph, Trokon Gargar is seen holding onto one of the exposed reinforcing steel bars (rebar) at the proposed powerhouse site. Multiple exposed rebars are present at different locations throughout the site (i.e., stilling basin, spillway, and powerhouse), where construction is incomplete.	 *Figure 4-13 - Exposed Rebar at Stilling Basin* The image depicts a stilling basin filled with water, in which reinforcing steel bars (rebar) embedded in concrete are exposed creating a hazard for any river users.
Position Number on Figure 4-3: 7	**Position Number on Figure 4-3: 17**
 *Figure 4-14 - Exposed Rebar at Spillway* The photo depicts a spillway structure situated in the middle of the river, with exposed rebar visible.	 *Figure 4-15 - Exposed Concrete Works* This photo shows a retaining concrete structure was built to prevent accumulated debris from falling into the construction area. It is surrounded by scaffolding, indicating that construction activities were ongoing when the contractor demobilised from site.

PHOTOGRAPHS & DESCRIPTION OF STATUS OF PROJECT COMPONENTS	
Position Number on Figure 4-3: 17	**Position Number on Figure 4-3: 17**
 *Figure 4-16 - Exposed Concrete Works* This photo depicts an intake structure at the project site. The structure appears to be unaffected by erosion and looks structurally sound.	 *Figure 4-17 - Exposed Concrete Works* This image shows the sideview of the retaining wall at the construction site.
Position Number on Figure 4-3: 21	**Position Number on Figure 4-3: 8**
 *Figure 4-18 - Rock Crushing Plant* The picture above shows the rock crushing plant used to produce various sizes of aggregate at the Kaiha 2 Hydropower construction site. The plant is not fully covered, leaving it exposed to rain, and it has not been in operation since December 2023.	 *Figure 4-19 - Workshop Facility* The image above shows the workshop facility at the construction site, where maintenance, fabrication, and repair tasks are carried out on equipment and vehicles to ensure smooth construction operations. At present, a pickup truck, a tractor, and several pieces of equipment are stationed there.

PHOTOGRAPHS & DESCRIPTION OF STATUS OF PROJECT COMPONENTS	
Position Number on Figure 4-3: 28	**Position Number on Figure 4-3: 10**
 *Figure 4-20 - Storage Container* This is a photo of a storage container located at the construction site, which contains some construction materials. The container was sealed and locked during our site visit, and the team was unable to determine its contents. It is partially covered by vegetation.	 *Figure 4-21 - Warehouse* This is a photograph of one of the warehouses located on the site. During our visit, the warehouse was locked, preventing access to its interior. It is presumed that the structure either currently contains or was previously used for the storage of construction materials. The area surrounding the warehouse is now overgrown with tall grasses and dense vegetation. In fact, much of the site's infrastructure and stored construction materials are obscured or partially covered by the encroaching plant growth, indicating a lack of recent maintenance or ongoing activity.
Position Number on Figure 4-3: 13	**Position Number on Figure 4-3: 11**
 *Figure 4-22 - Explosive and Blasting Magazine* The image above shows a concrete structure used to store explosives and blasting materials. It is located outside the main construction site and features a concrete slab roof and two wooden doors that are firmly sealed, with a 'No Smoking' sign displayed. The structure is now becoming overgrown with vegetation, including the trail leading to it.	 *Figure 4-23 - Fuel Depot and Contaminated Soil* This is a photo of the on-site fuel depot, where fuel is stored and dispensed for vehicles and construction equipment. The structure consists of a concrete base supporting an elongated fuel tank. During a heavy storm, the tank became dislodged from the concrete base. The resulting fuel spillage contributed to soil contamination.

PHOTOGRAPHS & DESCRIPTION OF STATUS OF PROJECT COMPONENTS	
Position Number on Figure 4-3: 22	**Position Number on Figure 4-3: 15**
 *Figure 4-24 - Light Tower Generators* The images show two of the four portable light tower generators on-site, which were used to provide illumination at night during the construction period. They are stored in pairs; however, their functionality could not be verified during the site visit.	 *Figure 4-25 - Generators* The photo depicts a stall sheltering two generators, likely used to supply electricity for lighting the construction site during nighttime operations. One of the generators appears to be dismantled, possibly undergoing maintenance or out of service, while the other remains intact and seemingly in working condition.
Position Number on Figure 4-3: 23	**Position Number on Figure 4-3: 14**
 *Figure 4-26 - Excavator and Sand Stockpile* This image shows one of the two excavators on site. One excavator is parked next to a sand pile, while the other is parked beside a truck at a different location.	 *Figure 4-27 - Truck* The photo above shows a DAF truck stationed on the construction site. There are two trucks of this kind, each parked in different locations across the site. Although their exact condition could not be verified, they appear to be immobile. Additionally, one side of the truck is surrounded by overgrown vegetation, suggesting that it has been stationary for an extended period.

PHOTOGRAPHS & DESCRIPTION OF STATUS OF PROJECT COMPONENTS	
Position Number on Figure 4-3: 16	**Position Number on Figure 4-3: 24**
	
Figure 4-28 - Mobile Concrete Mixer Trucks	*Figure 4-29 - Unused Rebar*
The images show two mobile concrete mixer trucks parked adjacent to the site manager's residence. These trucks are currently stationed in an open area, without any protective covering, leaving them exposed to the elements such as rain and direct sunlight. Prolonged exposure may affect the condition and functionality of the equipment over time.	The photo shows a pile of unused rebar on site, left without any protective covering. As a result, the rebar has been exposed to environmental elements such as rain and direct sunlight, leading to visible rusting. Prolonged exposure without proper storage or protection can compromise the structural integrity of the steel, potentially affecting its suitability for future construction use.

4.6. Decommissioning Activities

This subsection outlines the decommissioning and restoration activities that the DC will need to undertake, with the appointed DC preparing the schedules, costs and detailed methodologies for the decommissioning activities. The detailed methodologies will be prepared for RREA (with the Supervising Engineer approving on behalf of RREA or recommending to RREA if they should approve).

In summary, the decommissioning will involve the following critical activities:

- Comprehensive Site Assessment.
- Restoration of Natural Water Flow.
- Removing Exposed Rebar and Covering Exposed Concrete Works.
- Dismantling and Removal of Temporary Infrastructure.
- Waste Management.
- Slope Stabilisation, Site Clearance, and Site Rehabilitation.
- Handling Explosives & Blasting Magazine.
- Storage / Removal of Equipment.
- Implementing Community Safety Measures.
- Stakeholder Engagement.
- Site Inspection and Handover.
- Post Decommissioning Environmental Monitoring.

Full details of the scope of decommissioning activities are provided in Table 4-2.

Table 4-2 - General Decommissioning Activities

Component	Decommissioning Activities
Comprehensive Site Assessment	DC to conduct a comprehensive site assessment to inform the decommissioning activities and the preparation of the detailed decommissioning methodologies. This should be undertaken with the RREA Engineer and should include preparing an inventory of materials and hazardous materials that includes a material analysis to determine if they are clean, stable and suitable / correct size for reuse. Special attention should be played to materials that may come into contact with water-sensitive infrastructure. The inventory will also need to verify the quantity and condition of the explosives before any removal begins, and whether controlled explosion on site is required. RREA will also need to provide guidance on how structures that are to be retained on site will be secured for the duration of the temporary decommissioning. RREA to provide guidance on the ownership of plant and equipment as some of the equipment on site was likely the property of the contractor (and due to be demobilised) or may have been purchased for use on the project and due to be handed over to RREA at the end of construction. The guidance shall include advising who owns the various pieces of equipment and whether ownership has formally transferred. Following completion of the comprehensive site assessment conducted by RREA and DC, CARES shall make comment on the outputs from a Environmental, Social, Health and Safety perspective.
Removing Upstream Left Bank Earth Cofferdam and Releasing Impounded Water	The Upstream Left Bank Earth Cofferdam will be removed to restore the natural water flow. As indicated in **Error! Reference source not found.** and **Error! Reference source not found.** some water is still impounded and will need to be released in a controlled fashion to avoid sedimentation and erosion and reduce risks to settlements and river users downstream of the site. The remaining section shall be carefully dismantled in a manner that prevents increased turbidity downstream. Once the remaining section of the earth cofferdam is removed, the impounded water will be able to move freely, and the assumption is that the river will return to its natural flow pattern. During removal, silt curtains or turbidity barriers should be installed downstream to contain suspended particles and prevent them from dispersing into the main river flow (see Chapter 8 for monitoring their effectiveness). The recovered materials should be reused to cover exposed concrete works and other structures, and potentially for landscaping / site levelling.
Removing Left Bank Geo-Bag Cofferdam	The Left Bank Geo-Bag Cofferdam will be properly removed / managed to ensure minimal disruption to the river ecosystem. The Geo-Bag Cofferdam should be removed in phases, beginning at the downstream end and progressing upstream. This phased approach helps prevent sudden water release and minimizes the risk of sediment disturbance. All debris shall be cleared during the process. During the removal process, silt curtains or turbidity barriers should be installed downstream to contain any suspended particles and prevent them dispersing into the main river flow. The Geo-Bag fill shall be returned to its associated borrow pit or used for site levelling / landscaping. The bags are likely to be in such poor condition that it is unlikely they can be reused for the same purpose, but the material from which they are constructed may be recycled, possibly by local communities for other purposes.
Removing Exposed Rebar and Covering Exposed Concrete Works	Multiple exposed partially completed concrete structures are present on-site, with some of the concrete works situated in the middle of the river. This project component is largely expected to be effectively secured in-situ to prevent environmental, social, and health and safety hazards; with full removal likely to be more environmentally damaging than leaving them in-situ during decommissioning - especially when the intention is for the construction of the Kaiha 2 HPP to be completed when suitable financing can be secured.

Component	Decommissioning Activities
	To secure the concrete in-situ, some of the partially completed concrete structures will be covered utilizing material from the existing earth cofferdam / stock of blast rock to act as a protective measure to secure unfinished works and prevent environmental hazards, whilst some of the concrete structures (e.g., retaining wall for the penstock lining / earth dam) will have the scaffolding removed but the wall structure will remain and shall be backfilled behind. The RREA engineer (in consultation with the DC during the Comprehensive Site Assessment) will need to provide guidance on which concrete structures are at risk of erosion or exposure to water, which structures should be covered / backfilled, and which structures shall be dismantled and removed. The RREA Engineer would also need to determine the depth of material to be placed to protect the concrete works. However, the DC will need to provide the detailed methodology As part of securing the partially completed concrete works the exposed rebar (reinforcement bars) will be cut and removed from the partially completed concrete works and stilling basin to avoid harm to any user of the river and whilst ensuring worker safety. The removal of the exposed rebar that is embedded in cast concrete must be carried out by the DC with careful planning and strict adherence to safety protocols to prevent injury, structural damage, or equipment failure. All personnel involved should be properly trained and equipped with appropriate Personal Protective Equipment (PPE), including hard hats, safety goggles, gloves, steel-toe boots, and hearing protection. Exposed rebar should be cut using suitable tools such as rebar cutters, angle grinders, or oxy-acetylene torches, depending on the size and accessibility of the material. The offcuts of rebar shall be kept separately from other materials to support reuse / recycling and donated to the local community.
Dismantling and Removing Buildings and Other Structures	There are several structures on-site, including scaffolding, storage containers, staff accommodations, contractor offices, temporary power lines, generators, surveillance equipment, and guard posts. RREA will need to provide guidance on which of these structures should be dismantled and removed and which shall be donated to the local community. Any structures shall be dismantled with the focus on the recovery of materials for reuse and recycling.
Removing Excavated Material	Sand and other construction materials may be donated to communities undertaking public infrastructure projects such as schools, clinics, bridges, and other public buildings. Boulders and rocks should be repurposed for riprap (erosion control), retaining walls, or decorative landscaping on-site. Excavated materials may be returned to borrow pits for filling. The removal of excavated materials such as sand and boulder rock from the site must be carried out responsibly to comply with environmental regulations and minimize the impact on the surrounding area. Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance.
Removing Aggregate Stockpiles	Sand and other construction materials may be donated to communities undertaking public infrastructure projects such as schools, clinics, bridges, and other public buildings. Boulders and rocks should be repurposed for riprap (erosion control), retaining walls, or decorative landscaping on-site. Excavated materials may be returned to borrow pits for filling. The removal of excavated materials such as sand and boulder rock from the site must be carried out responsibly to comply with environmental regulations and minimize the impact on the surrounding area. Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance.

Component	Decommissioning Activities
Slope Stabilisation, Site Clearance and Rehabilitation.	The DC will design and implement landscaping and bioengineering works for slope stabilization along the right bank of the river. The design drawings will be prepared by the DC for RREA with the Supervising Engineer approving on behalf of RREA or recommending to RREA if they should approve. The DC should conduct restoration activities in disturbed areas with site landscaping within the whole boundary wall to give pleasant appearance to the site and surroundings. This will include the restoration of the site through levelling and revegetation measures using native species. The DC will also implement soil control measures. The design drawings and revegetation plan will be prepared by the DC for RREA with the Supervising Engineer approving on behalf of RREA or recommending to RREA if they should approve. The DC should undertake site clearance as part of the decommissioning and restoration activities. This should include the removal of all: • Construction debris and unused materials including from inside the water to allow the free flow of the water. • Aggregate stockpiles (sorting / reusing / properly disposing). • Items and equipment (mobile and non-mobile). • Surplus excavated material. • Hazardous materials. • Perishable and hazardous (e.g., fuel, lubricants, and chemicals) materials - items susceptible to spoilage or pose safety or environmental risks must be removed from the site and disposed of through appropriate channels in compliance with environmental standards.
Handling Explosives & Blasting Magazine	A concrete blasting magazine containing explosives is located outside the main construction site. An expert assessment must be carried out by appropriately certified and trained personnel which will need to be procured. The expert assessment should evaluate whether because depending on the type of explosive, due to the extended period of time over which the explosives (if any) may have been stored in the magazine, they may already have started to degrade to the point where moving them is extremely hazardous. Therefore, if they are of a type that may already have started to degrade, then a controlled onsite detonation may need to be conducted by the Liberian Armed Forces, with input from EPA vis a vis E&S oversight. If the expert assessment determines that the explosives can be moved it must also determine how and where the explosives will be transported and disposed of, in accordance with EPA's Guidelines for the Management of Hazardous Materials (2017), which require controlled storage, secure transport, and notification to the EPA prior to movement of Class 1 (explosive) materials.
Removing Fuel Depot & Contaminated Soils	The fuel depot and any contaminated soils will be disposed of under the guidance of the EPA. The contractor should conduct a comprehensive Environmental Site Assessment (ESA) to determine the extent of soil contamination caused by fuel. The ESA should include the identification of explosion risks, fire hazards, and inhalation hazards. An emergency response plan must be developed by the DC to address potential spills, fires, or exposure incidents. A contaminated land remediation action plan must be developed by the DC. Following the removal of the fuel depot, the contaminated land remediation action plan shall be implemented by the DC.
Removing All Equipment	There is a variety of equipment on-site, including a front roller, truck, brick-making machine, rock crusher, and pickup vehicle. Most of this equipment is currently exposed to the weather conditions and some of the machines are not in operational condition. All equipment should be assessed and removed from the site to a location specified by RREA. Ownership should be confirmed and where possible auctioned. All machinery that is no longer in operational condition, whose only value is for spare parts or scrap materials, should have all potentially hazardous fluids (diesel, crank-case oil, hydraulic oil) and lead-acid batteries removed for EPA approved disposal.

Component	Decommissioning Activities
Implementing Community Safety Measures	Other decommissioning works will be carried out by the DC as required to make the site safe for local community access and safety of wildlife that may frequent the area. This includes the construction of chain link fencing and the installation of signs and billboards for safety purposes and to prohibit intruders from entering the site. Whilst the DC will implement the fencing, signs, and safety billboards, RREA will be responsible for their maintenance over time. The design drawings will be prepared by the DC for RREA with the Supervising Engineer approving on behalf of RREA or recommending to RREA if they should approve.
Stakeholder Engagement GRM etc.	Grievance Redress Mechanism (GRM) shall be updated. RREA shall ensure ongoing consultations with PACs in line with the SEP.
Environmental and Social Management	The ESMP shall be implemented by the DC with CARES supervising its implementation. This shall include the DC conducting water quality monitoring for physical parameters before, during, and after the decommissioning activities. Other monitoring E&S monitoring measures will also be documented in the ESMP with their implementation by the DC supervised by CARES and EcoGreen.
Site Inspection and Handover Ceremony	Once the decommissioning and restoration activities are completed RREA shall organise a site inspection and handover ceremony whereby the site, construction materials and equipment are formally handed to representatives of the PACs. Once all the other decommissioning and restoration activities are completed, a Post-Decommissioning and Restoration Report should be prepared and submitted to EPA. This should be independently verified.

5. Decommissioning Alternatives

This chapte.1r describes the various decommissioning alternatives which were available and considered by RREA. Generally, a comparison of alternatives can help to determine the best method of achieving project objectives while minimising environmental and social impacts.

As indicated in Chapter 4, RREA plan to partially remove the completed structures whilst implementing protective measures to secure unfinished works and prevent environmental hazards. Alternative decommissioning approaches included full decommissioning and adaptive reuse.

5.1. Full Decommissioning

RREA do not intend to conduct full decommissioning. Based on the observations made during the site visit, stakeholder engagement, the desk study and professional opinion, the following can be considered as supporting this decision:

- The Kaiha2 HPP is intended to be revisited and construction completed once suitable financing can be obtained. By electing against full decommissioning, RREA are assuming it will make it easier to complete the project in the future. By making it easier to complete the project in the future it is assumed it would also cost less to complete the project and be easier to secure financing and therefore easier to achieve the anticipated project benefits.
- Construction of the Kaiha2 HPP was discontinued because the project has encountered several significant setbacks, including financing gaps, with alternative power supply options being explored for the Lofa County mini-grid project. With the project encountering financing gaps, and with partial decommissioning assumed to cost less than full decommissioning, securing financing for full decommissioning is likely to have been more challenging than securing financing for partial decommissioning.
- In addition to assuming that full decommissioning (and completing construction after full decommissioning) would have a greater financial cost than partial decommissioning, it can be assumed that full decommissioning would likely have greater disturbance to E&S conditions during the decommissioning (and during completing construction) process than a partial decommissioning.
- As reported in Section 4.4, an incident occurred in October 2024 when the temporary cofferdam partially failed following heavy rainfall during the peak of the rainy season. Consequently, it is assumed that the site is currently unsafe, and it is important that decommissioning measures are promptly implemented to reduce the health and safety (H&S) risks from the partially completed / currently abandoned project. The need for this to be carried out promptly is made even more important with the onset of the rainy season; whereby the safety of the infrastructure is likely to deteriorate further unless decommissioning measures are implemented. Partial decommissioning is assumed to enable the H&S risks to be reduced to an acceptable level more quickly than full decommissioning by reducing the time needed to stabilize the site.
- Full project decommissioning has been identified to pose potential substantial socioeconomic implications for PACs. For example, a 5.5km access road from Mbaloma Town to the HPP site has been developed. It is understood that the access road has become an infrastructural backbone for the area's rural economy, and that full project decommissioning including closure of the newly upgraded road might severely disrupt livelihoods relying on the transportation of goods, potentially leading to economic hardships.

5.2. Adaptive Reuse

RREA do not intend to adapt / convert the partially completed HPP into other uses. The following can be considered as supporting this decision:

- Considering the partially completed status of the HPP project, there are no useful alternatives for adapting the partially completed HPP into other uses that would not require significant continuation of the HPP construction

process. The adaptive reuse alternative would likely be more suitable for the Kaiha2 decommissioning if the dam construction had been completed then there may have been adaptive reuse options available such as provision of water for agriculture / domestic uses.

- The Kaiha2 HPP is intended to be revisited and construction completed once suitable financing can be obtained. If the temporary decommissioning of the Kaiha2 HPP involved converting into an alternative reuse, then this would likely make it more difficult to complete the project in the future. For example, if the adaptive reuse involved developing an irrigation scheme for agriculture, then the project design would need to be altered when financing is obtained for the HEP project. For example, it may be necessary to adjust the dam design to be able to regulate water flow for irrigation rather than energy generation. Similarly, the infrastructure design would also likely need to be modified to accommodate canals, pipelines and pumping stations to distribute the water effectively. In addition to making the HEP project more difficult to complete in the future (e.g., due to the need for a new HEP design which may need new approvals) there would be E&S risks associated with the new design. There would also be additional E&S risks associated with re-adapting the project to a HEP once the funding has been secured.
- Construction of the Kaiha2 HPP was discontinued because the project has encountered several significant setbacks, including financing gaps, with alternative power supply options being explored for the Lofa County mini-grid project. With the project encountering financing gaps, and with adaptive reuse made more challenging due to its partially completed status, it is assumed that partial decommissioning would cost less than adaptive reuse and therefore securing finance for adaptive reuse is likely to be more challenging than securing finance for partial decommissioning. This assumption is based upon the assumption that any adaptive reuse would need technical studies and / or designs to be completed, in addition to new approvals obtained. These would have financial implications.
- As reported in Section 4.4, an incident occurred in October 2024 when the temporary cofferdam failed following heavy rainfall during the peak of the rainy season. Consequently, it is assumed that the site is currently unsafe, and it is important that decommissioning measures are promptly implemented to reduce the health and safety (H&S) risks from the partially completed / currently abandoned project. The need for this to be carried out promptly is made even more important with the onset of the rainy season; whereby the safety of the infrastructure is likely to deteriorate further unless decommissioning measures are implemented. With adaptive reuse likely needing associated technical studies and / or studies to be completed and new approvals to be obtained, adaptive reuse would likely delay stabilising the site longer than partial decommissioning with greater associated health, safety and environmental risks.
- Pursuing the adaptive reuse option would also have E&S impacts associated with the reuse. For example, if the dam was completed, and an irrigation project developed for agriculture, then the potential E&S impacts of the irrigation project might include impacts such as excessive irrigation leading to soil degradation and a reduction in land productivity, a reduction in downstream water quality as a result of runoff from fertilizers and pesticides, biodiversity loss as a result of altering water flows and the disruption to ecosystems, change of land use accelerating soil erosion and causing sedimentation downstream, the resettlement / economic displacement of PAPs.
- Pursuing the adaptive reuse option would also likely have social impacts in terms of the benefits / positive impacts that were expected from the hydropower project, this could result in community agitations from unmet expectations for benefits such as employment and the provision of stable electricity. This was highlighted during stakeholder engagement (see Table 6-2) whereby the general view of stakeholders was that they do not want the Kaiha 2 project to be a failure and look forward to the project being completed once funding has been obtained. This was further highlighted by the suggestion that essential project components and materials should be securely stored on-site rather than transported elsewhere, to facilitate easier reactivation of the project once funding has been secured.
- During consultation (see Table 6-2) stakeholders enquired whether the temporary fencing would cover the entire fifteen acres of land or only the specific areas, with participants keen to be permitted to visit the site and carry out their livelihood activities such as fishing and sandmining. This adaptive reuse should not be encouraged as it may lead to increased erosion and sedimentation downstream.

6. Stakeholder Engagement and Public Participation

6.1. Project Area Description

The project area encompasses five districts (Lukambeh, Wahansa, Kolahun, Foya, and Voinjama) with stakeholder engagement taking place in Mbaloma, Lehuma, Bondowalahun, Kimbarlahun, Kpengbelahun, Sosomoilahun, Massabolahun, Samgbawollie, Bassor, Kpakuta Town, Johnny Town, and Mbabahun communities (see Table 6-1).

As indicated in Section 4.3 the area is mainly rural with poverty, illiteracy and unemployment widespread. The main source of livelihood in the project area is agriculture mainly practiced for subsistence purposes characterised by low levels of mechanisation, low productivity, limited access to improved farm inputs and poor post-harvest handling techniques (ERM and Earthtime, 2019). The Environmental and Social Compliance Audit described the project context as: *"The project area is predominantly agrarian, with limited income-generating opportunities primarily centred around farming, chainsaw activities and fishing. The Project Affected Persons (PAPs) and local community members engage in semi-skilled labour activities such as palm oil production, fishing, hunting, and small-scale trading for basic household goods and food" (Scere, 2024).*

6.2. Participation Summary

The consultation schedule was shared with the local liaison officer for coordination of upcoming meetings. A formal communication introducing the CARES Group was sent in advance to local authorities. Additionally, telephone calls were made to arrange consultative meetings, and town chiefs used town criers to inform residents and encourage their participation. All consultative meetings had been scheduled at least two days in advance to ensure adequate preparation.

Stakeholder and public engagement activities were conducted both within the immediate PACs and in the main urban centres of the five districts. The consultations were designed to ensure inclusivity, transparency, and active community involvement throughout the planning and implementation process.

At the time of reporting, a total of 311 individuals were consulted. This included local authorities and residents from the PACs. Figure 6-1 presents the gender distribution of participants from the stakeholder consultation records, which shows the gender distribution was as follows:

- Women - 194 participants (62.38%)
- Men - 117 participants (37.62%)

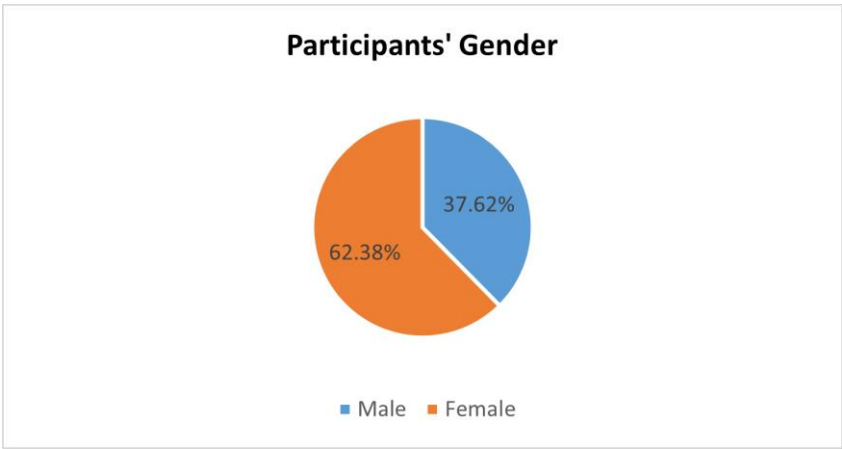

Figure 6-1 - Gender of Participants

6.3. Consultation Overview

Stakeholder engagement meetings concerning the temporary decommissioning of the Kaiha2 HPP were held across several PACs. These sessions were primarily facilitated by Mr. Moses Saah, the Community Outreach Officer (COO) from RREA, who formally introduced the CARES and EcoGreen teams to participants.

6.3.1. Meeting Structure

Each meeting began with an opening prayer, culturally adapted to reflect the dominant religious affiliation of the communities:

- In Wahansa, Lukambeh, and Kolahun Districts with a predominantly Muslim population - the sessions typically opened with an Islamic recitation.
- In Voinjama and Foya, where Christian populations are dominant, the opening prayer was offered by a community volunteer.

This approach helped foster respect and inclusion across the diverse communities involved.

6.3.2. Project Introduction and Rationale

Following the opening, Mr. Kokulo Yorgbor, Team Lead, formally introduced the project team and provided an overview of the Kaiha2 project. His presentation included:

- A brief history of the hydropower project's development and operational timeline.
- The circumstances surrounding its closure.
- The rationale for the proposed temporary decommissioning**,** emphasizing the need to protect existing infrastructure and equipment.
- A forward-looking perspective, including the exploration of a solar farm as an alternative energy source for the area.

Mr. Yorgbor underscored the importance of maintaining the site in a secure and sustainable condition to allow for the potential resumption of the Kaiha2 project in the future.

The team gathered extensive feedback during the consultation, which is documented in the consultation summary and recommendations.

6.3.3. Importance of Stakeholder Consultation

Throughout the consultations, Mr. Yorgbor emphasized the value of stakeholder engagement in:

- Raising public awareness.
- Addressing misconceptions and concerns.
- Ensuring community voices are heard and respected in decision-making processes.

To facilitate full understanding and participation, a local translator was present at all meetings to interpret the presentations and discussions for community members in their native language.

6.3.4. Participation and Documentation

Each session was documented through:

- Attendance logs to record participant numbers and demographics.
- Photographic evidence capturing community involvement.

Following the explanation about the project’s beginning, its current status, and the future plans, participants were given an opportunity to ask questions, share their views, and provide feedback on the overall direction and potential impacts of the project.

6.4. Challenges Encountered During the Consultation Meetings

While the stakeholder engagement process across the five districts was largely successful, several logistical and operational challenges were encountered. These obstacles, particularly related to infrastructure and communication limitations, had a direct impact on the planning, coordination, and execution of community meetings.

6.4.1. Poor Road Conditions

One of the most significant challenges was the poor state of road infrastructure in and around the PACs. Many of the access routes are unpaved, narrow, or damaged due to erosion and prolonged neglect. To ensure participants could easily access the meeting points, the consultant clustered communities that were located close to each other. On a few occasions, the consultant used their vehicle to transport elderly and vulnerable individuals to the meeting points.

These road conditions not only delayed the team's movement but also impacted the punctuality and participation of local residents who had to travel to meeting venues.

6.4.2. Limited Network Connectivity

Telecommunication network coverage in many parts of the project area is unreliable or completely unavailable, which created the following communication barriers:

- Difficulty in coordinating with local leaders and community representatives ahead of scheduled meetings.
- Challenges in relaying urgent updates or changes to meeting times or locations, often resulting in delays or reduced attendance.
- As part of the decommissioning process for the Kaiha 2 Hydropower Project, a series of stakeholder consultative meetings were conducted to ensure transparent, inclusive, and participatory engagement with all relevant parties. These meetings aimed to gather input, address concerns, and provide updates regarding the proposed decommissioning activities. Key stakeholders—including local community members, traditional leaders, local government representatives, environmental authorities, civil society organizations, and affected persons—were invited to contribute to the discussion. The consultative sessions were designed to foster mutual understanding, promote informed decision-making, and ensure that the social, environmental, and economic impacts of the decommissioning are responsibly managed. This section outlines the structure, key outcomes, and feedback gathered during these stakeholder engagements.

6.5. Summary of Stakeholder Consultation

As part of the decommissioning process for the Kaiha 2 Hydropower Project, a series of stakeholder consultative meetings were conducted to ensure transparent, inclusive, and participatory engagement with all relevant parties. These meetings aimed to gather input, address concerns, and provide updates regarding the proposed decommissioning activities. Key stakeholders - including local community members, traditional leaders, local government representatives, environmental authorities, civil society organizations, and affected persons - were invited to contribute to the discussion. The consultative sessions were designed to foster mutual understanding, promote informed decision-making, and ensure that the social, environmental, and economic impacts of the decommissioning are responsibly managed.

Table 6-1 presents a summary of the stakeholder consultation, outlining the structure, key outcomes, and feedback gathered during these stakeholder engagements.

Table 6-1 - Summary of Stakeholder Consultation

Community	Participants	Date of Meeting & Venue	Comments and Concerns of the Project	Perceptions on the Removal and Security of the Site and Infrastructures	Perceptions of the Current Project Alternatives (Solar Diesel Generator)	Other Project-Related Issues	Recommendations
Mbaloma **Lukambeh District**	43 Female 13 Male	08 May 2025 Mbaloma Town Hall	The locals welcome the project (temporary decommissioning) on the basis that the project will, at some point in time, commence. There was a missing view on the project decommissioning because the locals within this area were the custodians of the site. Locals inquire as to whether the temporary fencing will cover the entire fifteen acres of land or only specific portions that contain the site. The locals inquired as to whether the entire project infrastructure will be removed. The participants inquire as to whether the locals will be permitted to visit the site and carry out their livelihood activities at the site (namely: fishing, sandmining and pit sawing).	There was an overwhelming welcome regarding the security of the project infrastructure. The site should be partially closed to allow local access to livelihood activities derived from the river. Useful project materials, i.e. aggregate (fine and coarse).	RREA should ensure that the Solar Diesel Project is speedily done to dissuade locals' mindset about project failure.	The locals indicated that the development commitment made to the community has not been completed. As part of the project's contribution to their community.	A landmark development project should be undertaken within the community as a legacy of the Kaiha-2 Dam Project. The DC for the project should assist the community in preparing a level football page/field. The site should be partially closed to allow local access to livelihood activities derived from the river (fishing and sand mining).
Lehuma **Wahansa District**	2 Female 2 Male	10 May 2025 Wahansa Town Hall	The locals welcome the project on the basis that the project will, at some point in time, commence. The local inquiries as to whether the entire project infrastructure will be removed.	Useful project materials, i.e. aggregate (fine and coarse) should be given to the districts to enable community project implementation.	RREA should ensure that the Solar Diesel Project is speedily done to dissuade locals' mindset about project failure.	Some participants noted that they haven't received an electricity meter. Participants inquire as to whether a new transmission line will be stretched for the solar diesel project. Some women in the area noted that they have not receive compensation for affected crops along the corridor.	RREA should ensure the speedy implementation of the Solar Farm Project. Useful project materials like aggregates and sand should be given to the locals for community infrastructure. RREA should carry out electricity meter distribution for houses that haven't received.
Bondowalahun **Lukambeh District**	37 Female 3 Male	10 May 2025 Bondowalahun Town Hall	The participants welcome the project (temporary decommissioning) on the basis that the project will, at some point in time, commence. The participants inquiries as to whether the entire project infrastructure will be removed.	There was an overwhelming welcome regarding the security of the project infrastructure.	RREA should ensure that the Solar Diesel Project is speedily done to dissuade locals' mindset about project failure.	Electricity meter distribution should be done for newly constructed houses.	RREA should ensure the speedy implementation of the Solar Farm Project. Government should enable the project to be resumed when funds are available. Useful project materials, i.e. aggregate (fine and coarse) should be given to locals within the area.
Kimbarlahun **Lukambeh District**	3 Female 9 Male	10 May 2025 Kimbarlahun Town Hall	Majority of the participants in Kimbarlahun welcome the project (temporary decommissioning) on the basis that the project will, at some point in time, commence. The local inquiries as to whether the entire project infrastructure will be removed. Some participants cited mismanagement of project funds as the closure of the project. Participants expressed disappointment due to the delay of the project.	Participants expressed willingness to work with the Decommissioning contractors to ensure smooth implementation of the project. They are willing to offer an area to secure project infrastructure.	RREA should ensure that the Solar Diesel Project is speedily done.	The Participants noted that useful project materials like aggregates and sand should be given to the locals for community infrastructure. Participants inquire as to whether electricity meter distribution will commencement for newly constructed houses. Some participants indicated that they haven't received compensation for their crops that were affected during the early stage of the project.	RREA should ensure the speedy implementation of the Solar Farm Project. Useful project materials like aggregates and sand should be given to the locals for community infrastructure.

Community	Participants	Date of Meeting & Venue	Comments and Concerns of the Project	Perceptions on the Removal and Security of the Site and Infrastructures	Perceptions of the Current Project Alternatives (Solar Diesel Generator)	Other Project-Related Issues	Recommendations
Kpengbelahun **Lukambeh District**	9 Female 5 Male	10 May 2025 Kpengbelahun Town Hall	The locals welcome the project (temporary decommissioning) on the basis that the project will, at some point in time, commence. The local inquiries as to whether the entire project infrastructure will be removed. Participants inquired as to what have been the delay in project implementation.	There was an overwhelming welcome regarding the security of the project infrastructure. Participants expressed a willingness to work with the DC.	RREA should ensure that the Solar Diesel Project is speedily done to dissuade locals' mindset about project failure.	Some newly constructed houses are without an electricity meter. Participants inquire as to whether they will be given an electricity meter.	Useful project materials like aggregates, cement and sand should be given to the community to carry out development projects. The DC should work with the local authority to enable the smooth decommissioning of the site.
Sosomoilahun **Kolahun District**	7 Female 6 Male	10 May 2025 Sosomoilahun Town Hall	The locals welcome the project (temporary decommissioning) on the basis that the project will, at some point in time, commence. The local inquiries as to whether the entire project infrastructure will be removed.	There was an overwhelming welcome regarding the security of the project infrastructure.	RREA should work to expedite the Solar Diesel Project to change the local perception of potential project failure.	The Participants noted that useful project materials like aggregates and sand should be given to the locals for community infrastructure.	The participants recommended that the electricity meters should be distributed to newly constructed houses. RREA should enable the implementation of the solar farm and diesel plant.
Massabolahun **Wahansa District**	25 Females 22 Males	10 May 2025 Massabolahun Town Hall	The locals welcome the project (temporary decommissioning) on the basis that the project will, at some point in time, commence. The Local inquiries as to whether the entire project infrastructure will be removed. Participants inquire as to whether the decommissioning activities will create jobs for the locals.	There was an overwhelming welcome regarding the security of the project infrastructure. Useful project materials, i.e. aggregate (fine and coarse).	RREA should ensure that the Solar Diesel Project is speedily done to dissuade locals' mindset about project failure.	The Participants noted that useful project materials like aggregates and sand should be given to the locals for community infrastructure.	RREA should ensure the speedy implementation of the solar farm and diesel plant project. Locals should be hired to form part of the decommissioning activities if there is a need for such. The decommissioning contractor should work along with the local for the project implementation.
Samgbawollie **Foya District**	23 Females 3 Males	10 May 2025 Samgbawolli Town Hall	The locals welcome the project (temporary decommissioning) on the basis that the project will, at some point in time, commence. The locals expressed frustration about the delays in the implementation of the project. The Local inquiries as to whether the entire project infrastructure will be removed. Participants inquired as to when the diesel plant and solar project will be completed.	There was overwhelming frustration and discontent regarding the temporary decommissioning of the project.	RREA should ensure that the Solar Diesel Project is speedily done to dissuade locals' mindset about project failure.	Homes that are still not connected to service lines.	A request for construction equipment to be stored on-site rather than being relocated for safekeeping.
Bassor **Foya District**	5 Females 7 Males	10 May 2025 Bassor Town Hall	The locals welcome the project (temporary decommissioning) on the basis that the project will, at some point in time, commence. The Local inquiries as to whether the entire project infrastructure will be removed.	There was an overwhelming welcome regarding the security of the project infrastructure. The site should be partially closed to allow local access to livelihood activities derived from the river. Useful project materials, i.e. aggregate (fine and coarse).	RREA should ensure that the Solar Diesel Project is speedily done to dissuade locals' mindset about project failure.	The Participants noted that useful project materials like aggregates and sand should be given to the locals for community infrastructure.	Participants overwhelmingly recommended that the Solar farm and diesel plant project should be implemented.
Kpakuta Town **Voinjama District**	5 Females 6 Males	10 May 2025 Kpakuta Town Hall	The locals welcome the project (temporary decommissioning) on the basis that the project will, at some point in time, commence. The Local inquiries as to whether the entire project infrastructure will be removed.	There was an overwhelming welcome regarding the security of the project infrastructure.	RREA should ensure that the Solar Diesel Project is speedily done to dissuade locals' mindset about project failure.	The Participants noted that useful project materials like aggregates and sand should be given to the locals for community infrastructure.	The Participants noted that useful project materials like aggregates and sand should be given to the locals for community infrastructure.

Community	Participants	Date of Meeting & Venue	Comments and Concerns of the Project	Perceptions on the Removal and Security of the Site and Infrastructures	Perceptions of the Current Project Alternatives (Solar Diesel Generator)	Other Project-Related Issues	Recommendations
Johnny Town **Voinjama District**	13 Females 7 Males	12 May 2025 At the Town Chief's House	The locals welcome the project (temporary decommissioning) on the basis that the project will, at some point in time, commence. The Local inquiries as to whether the entire project infrastructure will be removed.	There was an overwhelming welcome regarding the security of the project infrastructure. The site should be partially closed to allow local access to livelihood activities derived from the river. Useful project materials, i.e. aggregate (fine and coarse).	RREA should ensure that the Solar Diesel Project is speedily done to dissuade locals' mindset about project failure.	The Participants noted that useful project materials like aggregates and sand should be given to the locals for community infrastructure.	The Participants noted that useful project materials like aggregates and sand should be given to the locals for community infrastructure.
Mbabahun **Kolahun District**	4 Females 2 Males	10 May 2025 Mbabahun Town Hall	The locals welcome the project (temporary decommissioning) on the basis that the project will, at some point in time, commence The Local inquiries as to what have been the delay for the project	Participants welcome the decommissioning of the project. Few participants noted that the project infrastructure should be kept at the site	RREA should ensure that the Solar Diesel Project be implemented	The Participants noted that useful project materials like aggregates and sand should be given to the locals for community infrastructure	The participants emphasized that valuable project materials, such as aggregates and sand, should be provided to the local community for the development of infrastructure.

6.6. Summary of Consultation - Local Leadership and Others

Table 6-2 presents a summary of consultation with local leadership etc.

Local authorities expressed concerns about being misrepresented or wrongly associated with past actions. There were rumours circulating within the county that a previous administration had sold a county-owned generator, which has caused ongoing public suspicion. As a result, the authorities were particularly anxious to clarify whether the halting of the Kaiha 2 Hydropower Project occurred under the current administration or the previous one.

They recommended that a formal public announcement be made via local radio stations to inform the wider community about the decommissioning activities. Additionally, they emphasized the importance of notifying all relevant stakeholders, including the security apparatus, to ensure transparency and prevent misinformation.

Table 6-2 - Summary of Consultation

Community	Individual Met (local Leaders, Position and Contact	Contacts	Date of Meeting	Perceptions of the Project (Temporary Decommissioning)	View on the Removal and Security of the Site and Infrastructures	Perceptions of the Current Project Alternatives (Solar Diesel Generator)	Recommendation
Lofa County Assistant Superintendent for Development	Hon. Francis Lassana 2 Males	0777726095	10 May 2025	The Sup. appreciated the Consultant Team and RREA for ensuring a consultation for the temporary decommissioning of the project is held Mr. Lassanan expressed frustration over the delay for the project implementation	The temporary decommissioning of the project without the locals being told will cause chaos.	The project alternative, which is the Solar Farm & Diesel Plant, should be implemented speedily.	The local law enforcement officer should be involved during the decommissioning activities at the site RREA should ensure that a public service announcement is made to provide clarity to the residents across the various districts
Lukambeh District Hon. Francis Dauda (Commissioner)	Proxy on behalf: Blama K. Sheriff School Principal & Community Health Assistant 2 Males	0880292827	10 May 2025	The consultation for the temporary decommissioning of the project is a positive step Following the closure, will the project resume? What becomes of the project materials like sand, crush rock and cement that are useful?	Essential project materials, such as fine and coarse aggregates, should be provided to each district involved in public construction projects, including schools, clinics, mosques, churches, and community halls.	RREA should ensure that the solar farm and the diesel plant project are implemented	The local leadership should be involved during the closure of the site. RREA should ensure the implementation of the solar farm project. Houses without meter should be connected as well.
Voinjama District	Hon. David Mawolo (Commissioner, Voinjama District 2 Males	0777431724	09 May 2025	The consultation for the temporary decommissioning of the project is a positive step. The commissioner appreciated the team for embarking on such a consultation.	The temporary decommissioning of the project without the locals being told will cause chaos. Useful project materials, i.e. aggregate (fine and coarse), should be given to each district that are undertaking a public project like schools, clinics, mosques and churches, and community hall construction.	RREA must prioritize the swift execution of the Solar Farm and Diesel Plant projects to dispel any perceptions of project failure among the county's residents.	RREA should ensure that a public service announcement is made to provide clarity to the residents across the various districts.

Community	Individual Met (local Leaders, Position and Contact	Contacts	Date of Meeting	Perceptions of the Project (Temporary Decommissioning)	View on the Removal and Security of the Site and Infrastructures	Perceptions of the Current Project Alternatives (Solar Diesel Generator)	Recommendation
Kolahun	Hon. Joseph K. Yarkoi (Commissioner, Kolahun District) 2 Males	0886720343	09 May 2025	The commissioner appreciated the team for embarking on such a consultation. The decision to have a consultation on the temporary decommissioning of the project is a constructive move. RREA should provide the reasons for the temporary decommissioning of the project and make them known to the locals.	Essential project materials, including both fine and coarse aggregate, should be provided to each district engaged in public construction projects such as schools, clinics, mosques, churches, and community halls.	RREA must prioritize the swift execution of the Solar Farm and Diesel Plant projects to dispel any perceptions of project failure among the county's residents.	RREA should ensure that a public service announcement is made to provide clarity to the residents across the various districts. The information should be aired on Harleyngee Community Radio (FM 102.5). The three locals' authorities within the district should ensure that information about the project is clearly disseminated to avoid protest within the area.
Foya District	Hon. Njamilah S. Borngui (Commissioner, Foya District) Joseph F. Mbokar Abraham Dominic Jendore-Assistant Superintendent for Development Kangunia Tamba-Inspector Munyah-Office of the Mayor	0776037572 0775804492 0775744305 0770539521 0777432985	09 May 2025	The local authority appreciated the Team and the Consultation effort. The consultation will ensure clarity is made to the locals. The locals are impatient for the delay. The consultation for the temporary decommissioning of the project is a positive step. The local leadership of Foya inquired as to what becomes of the useful materials, i.e. stone aggregates. The commissioner appreciated the team for embarking on such a consultation.	Each district engaged in public projects, such as the construction of schools, clinics, mosques, churches, and community halls, should be provided with essential project materials, including both fine and coarse aggregates.	RREA must prioritize the swift execution of the Solar Farm and Diesel Plant projects to dispel any perceptions of project failure among the county's residents. Gov't should see reasons to continue with the Project.	RREA should ensure that a public service announcement is made to provide clarity to the residents across the various districts. Appreciate the project alternatives, but Gov't should see reasons to continue with the project. RREA should ensure meters are given to residents.
Wahansa District	Hon. Sayon Akoi (General Town chief) Sangai Kollie (Chairlady) Marrious S. Kanneh (District Inspector) Anthony M. Seppo- (District Clerk) Hon.Salia M. (Dunnor-Paramount Chief) Joseph B.Morris-(Resident)	0880425073 0881063892 0555929704 0777162039 0776351592 0886131446	09 May 2025	The consultation regarding the temporary suspension of the project is a constructive move The commissioner appreciated the team for embarking on such a consultation There were rumors of GOL squandering the Project funds has led to delay	The temporary decommissioning of the project without the locals being told will cause chaos. Useful project materials, i.e. aggregate (fine and coarse), should be given to each district that are undertaking a public project like schools, clinics, mosques and churches, and community hall construction Instead of the materials being taken away, essential project equipment should be given to the district authorities for use in construction.	RREA must prioritize the swift execution of the Solar Farm and Diesel Plant projects to dispel any perceptions of project failure among the county's residents.	RREA should ensure that a public service announcement is made to provide clarity to the residents across the various districts.

6.7. Key Findings from the Consultation

During stakeholder engagement sessions held across the five project-affected districts, with several key observations and recommendations were made by community members and local authorities. These are summarized below:

- **General Reception of the Decommissioning Plan** - The decommissioning of the Kaiha2 HPP was generally well-received across all five districts. However, some residents expressed concerns about the prolonged delays and the proposed temporary closure of the facility.
- **Urgency for Alternative Energy Solutions** - A significant majority of participants emphasized the need for the swift implementation of the proposed solar farm and diesel plant. These alternatives were seen as critical to fulfilling the original goal of the Kaiha-2 project - namely, the electrification of the surrounding communities.
- **Utilization of Remaining Project Materials** - Many participants recommended that reusable project materials, such as aggregates and sand, be allocated to the districts for use in local community development initiatives.
- **On-Site Storage of Project Components** - In some PACs, stakeholders suggested that essential project components and materials be securely stored on-site, rather than transported elsewhere, to facilitate easier reactivation of the project in the future.
- **Community Awareness and Public Information** - County authorities, including Superintendents and District Commissioners, requested that public service announcements regarding the temporary decommissioning be broadcast across local media channels. They emphasized the importance of using local vernacular languages during local radio announcement to ensure effective communication and broad community understanding.
- **Security Presence During Decommissioning** - County officials also recommended the presence of security personnel during the decommissioning process to maintain order, protect valuable assets, and prevent unauthorized access to the project site. This suggestion was made in case RREA, in collaboration with the DC, decides to relocate construction equipment to another location for safety reasons. It was considered important for the equipment to be accompanied by security personnel to alleviate public concerns and prevent misunderstandings.

Risks Associated with Explosives and Site Security – In two of the districts—particularly those closest to the project site—community leaders and local authorities raised concerns about the presence of explosives and the need for strict site security. They acknowledged ongoing sensitization efforts led by RREA's Community Liaison Officer and emphasized the importance of continuing public awareness campaigns on the risks of trespassing. Recommendations were also made to maintain a consistent security presence on-site to safeguard both community members and project materials.

7. Review of Legal, Policy and Institutional Frameworks

CARES has identified and initially reviewed some relevant policies, laws, institutional mandates, guidelines and standards related to the environmental and social aspects of the proposed decommissioning works. These are briefly described in the following sections below.

7.1. Liberian Administrative Framework

7.1.1. Environmental Protection Institutional Framework

7.1.1.1. Environmental Protection Agency

The EPA is an autonomous statutory body, established under the Act creating the Environmental Protection Agency of the Republic of Liberia 2003, and hereafter referred to as the EPA Act, to address the country's environmental issues. The EPA became a fully functioning entity in 2006, with the appointment of a board of directors and establishment of a Policy Council.

The EPA was established to: 'coordinate, monitor, supervise and consult with relevant stakeholders on all activities in the protection of the environment and sustainable use of natural resources.'

As the lead national environmental agency, EPA is charged with executive authority for all environmental activities and programmes relating to environmental management in Liberia. The EPA also has a key responsibility for matters relating to the issuing of environmental impact assessment licenses and for compliance monitoring relating to environmental regulations and standards.

7.1.1.2. County and District Environmental Committees

To decentralize environmental management, the Environmental Protection Agency Act authorizes the establishment of County and District Environmental Committees and directs the National Environmental Policy Council to provide guidelines for their establishment. Each County Committee is composed of county and district officials, traditional leaders, private citizens, and two local representatives to the national legislature. The Committee is staffed by a County Environment Officer, hired by the EPA, but responsible to the County Committee.

The District Environment Committees are to be established by and report to the relevant County Environment Committee. They are charged with promoting environmental awareness and mobilizing the public to manage and monitor activities within the district to ensure that they do not have any significant impact on the environment. The District Committees are composed of district officials, mayors, chiefs, and private citizens and are staffed by a District Environment Officer hired by the EPA.

In addition to assisting the County and District Committees in the fulfilment of their responsibilities, the County and District Environment Officers are responsible for compiling reports to the EPA, promoting environmental awareness, and conducting public hearings on environmental impact assessment in the County and the District.

At present, two County Environmental Committees have been established; One in Sinoe County and another in Nimba County. However, EPA has established outstation offices in eight counties. The offices are staffed by Environmental Inspectors.

Once the County Environment Committees are established, some of the Inspectors may be reassigned as County Environment Officers.

EPA has an office in Lofa County.

7.1.1.3. Ministry of Mines and Energy

The Ministry of , Mines and Energy has the statutory responsibility for the development of mineral, water and energy resources in Liberia. It oversees land surveys in all parts of the country and coordinates, administers and regulates the use of public and private lands in Liberia, including mineral resources through granting of operation licenses as

well as regulating beach sand mining. It also works in combination with the Ministry of Agriculture and the University of Liberia to conduct training and research on land rehabilitation. Energy provision is administered through the same Ministry by the National Energy Committee, while water resources are the responsibility of the National Hydrological Service.

7.1.1.4. Ministry of Agriculture

The Ministry of Agriculture regulates forestry (as related to plant quarantine, agro-forestry and food crop related plantations), fishery and agriculture sectors and has specific responsibilities for soil conservation. It plans, executes, administers, manages and supervises agriculture programmes and provides extension services, trains local farmers in improved cultural practices, and supplies farm inputs to enhance food security.

7.1.1.5. Forestry Development Authority

The Forestry Development Authority (FDA), established in 1976, was historically the government agency with primary responsibility for environmental management in Liberia. Now an autonomous body, and mandated by the National Forestry Reform Law of 2006, the FDA has responsibility for the protection, management and conservation of government-owned forests and wildlife on a sustainable basis. It manages commercial, conservation and community uses of Liberia's forests. It provides long- and middle- range planning in the forestry sector as well as preparing forestry policy, law and administration. It exercises control of the commercial use of state-owned forests through the granting of concessions, supervises adherence to forest legislation and concession agreements, calculates and determines forestry fees, evaluates investment proposals, executes reforestation and forest research and training and monitors activities of timber companies. The 2006 law revised the institutional framework of the FDA and created a Department of Conservation which is made up of the Division of National Parks and the Division of Wildlife with the responsibility for development and management of protected areas and wildlife respectively.

7.1.1.6. Ministry of Finance Planning and Economic Affairs

The Ministry of Planning and Economic Affairs (MPEA) is responsible for intersectoral coordination for the development of policies, plans and programmes for the economic, financial, social, cultural and physical development of Liberia.

In fulfilling its various duties, it serves as the direct link between implementing Ministries / Agencies, NGOs, private voluntary organizations, and the international community. Coordination occurs at the national, sectoral and regional planning levels and involves the implementation of crosscutting initiatives.

7.1.1.7. Rural and Renewable Energy Agency

The Rural and Renewable Energy Agency (RREA) was established in January 2010 to facilitate and accelerate the economic transformation of rural Liberia by promoting the commercial development and supply of modern energy products and services to rural areas through the private sector and community initiatives with an emphasis, but not necessarily exclusive reliance, on locally available renewable resources.

7.1.1.8. Liberia Electricity Corporation

The Liberia Electricity Corporation was created in 1973 to generate, transmit, distribute, and sell electricity throughout the country at economically reasonable rates.

7.1.1.9. Other Relevant Governmental Institutions

Other relevant governmental institutions include the Ministry of Education, Ministry of Public Works, Ministry of Health and Social Welfare, Ministry of Foreign Affairs, the Liberia Water and Sewer Corporation, Liberia Maritime Authority (LiMA), Ministry of Justice (MoJ), Ministry of Internal Affairs (MIA), Ministry of Gender, Children and Social Protection (MoGCSP), National Disaster Management Agency (NDMA), Liberia Land Authority (LLA), Liberia Institute of Statistics and Geo-Information Services (LISGIS), and the National Public Health Institute of Liberia (NPHIL).

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7.1.2. Environmental Inspectors and Courts

To provide for enforcement of environmental requirements and standards, the Environmental Protection Agency Act provides for the appointment of Environmental Inspectors and the establishment of an Environmental Court system.

7.1.2.1. Environmental Inspectors

The Act authorizes the EPA to '…designate its officers and duly qualified public officers / civil servants to be environmental inspectors within such Counties and District limits.' Thus, Environmental Inspectors do not have to be EPA employees but can also be designated officers or civil servants in other branches of the government. Environmental Inspectors are authorized to enter premises, inspect activities, take samples, and review records to ensure compliance with environmental rules and regulations.

The exact nature of the inspector's enforcement authority is not defined in the Act, but the Act does state that the EPA is to '…establish the conditions, rules and regulations governing the qualifications, performance, powers and duties of the Environmental Inspectors.' The Environment Protection and Management Law (EPML) confirms that Environmental Inspectors can write Restoration Orders to correct an activity deemed to be noncompliant with environmental rules and regulations.

7.1.2.2. Environmental Courts

The Environmental Protection Agency Act defines a two-tiered court system to hear and rule on compliance with environmental rules and regulations.

The first tier is the Environmental Administrative Court. This court is to hear and rule on complaints relating to the environment. The complaints may concern the actions or decisions of the EPA or an Environmental Inspector or may be brought by a member of the public to stop activities they believe are damaging the environment.

The second tier is an Environmental Appeals Court, established at the Judicial Circuit level.

At present, the Environmental Court system has not been formally established. EPA's five-year strategic plan (starting July 2011) provides for an administrative court to handle environmental issues for an intermediate period before the full establishment of an environmental court under the judicial system.

7.2. National Legislative Framework

Table 7-1 describes the main categories of legislation in Liberia, whilst Table 7-2 and Table 7-3 provide a summary of relevant Liberian environmental legislation, policies and strategies. Table 7-4 lists the relevant international environmental conventions signed / ratified by the Government of Liberia.

Table 7-1 - Categories of Legislations in Liberia

Category	Description
Law	Laws are passed by the National Legislature of Liberia comprising of the Senate and the House of Representatives. Any citizen or group of citizens, Cabinet Ministers, Managing Directors of public corporations or agencies can propose a bill to the National Legislature for enactment. The draft bill is first passed over to the appropriate Steering Committee of the Legislature. In case of an environmental bill, this committee is generally the Committee on Natural Resources and the Environment. The Committee reviews, assesses and presents the bill to the Legislative Plenary with appropriate amendments for debate, public hearing and subsequent enactment by the Legislature.
Executive Order	The Executive Branch of government headed by the President can issue an Executive Order without the approval of the National Legislature. The Executive Orders have the power of the law provided that they do not contravene the existing law. The power of such orders has a limited time of existence.
Regulation	The national Legislature has empowered Cabinet Ministers and Managing Directors of public corporations and agencies to issue regulations for their respective functionaries without legislative approval or supervision, provided that such regulations are consistent with the statutory laws and the constitution of Liberia.

Table 7-2 - Summary of Applicable Environmental Laws

Categories	Title	Year	Description	Relevance to the Project
General	Constitution of the Republic of Liberia	1986	Article 7 of the Constitution sets the fundamental basis for the constitutional, legislative, and institutional frameworks for the protection and management of the environment. It also encourages public participation in the protection and management of the environment and the natural resources in Liberia.	General protection of the environment. Public participation in environmental publics.
	The Environment Protection Agency (EPA) Act	2003	The Act provides the EPA with the authority of government for the protection and management of the environment in Liberia. It provides for an Environmental Administrative Court to hear from aggrieved parties and requires that an ESIA be carried out for all activities and projects likely to have an adverse impact on the environment.	Establishment of EPA as authority for environmental matters.
	The Environmental Protection and Management Law (EPML)	2003	The law enables the EPA to protect the environment through the implementation of the Law. It arranges the rules, regulations, and procedures for the conduct of ESIAs and establishes regulations for environmental quality standards, pollution control and licensing, among others.	Establishes ESIA as a process for Environmental planning and decision-making.
	Decent Work Act	2015	This Law is the primary labour law designed to promote fair employment practices and protect workers' rights. Establishes the framework for workplace safety, fair remuneration, and workers' rights, including freedom of association and collective bargaining.	Establishes protections against discrimination, forced labour, and child labour while ensuring freedom of association and collective bargaining. Defines the roles of the National Tripartite Council, Minimum Wage Board, and Labour Inspectorate in overseeing labor policies and enforcement. Covers employment contracts, conditions for termination, and severance entitlements. Sets standards for wages, working hours, leave entitlements, and OHS. Provides guidelines for workplace injury compensation and dispute resolution mechanisms.

Categories	Title	Year	Description	Relevance to the Project
Forestry	Conservation of the Forests of the Republic of Liberia	1953	These Acts provided for the establishment of the Bureau of Forest Conservation within the Department of Agriculture and Commerce and describe the basic legal framework for forest and wildlife management in Liberia.	Establishes framework for management of forests.
	Supplementary Act for the Conservation of Forests	1957		
	The Act that created the Forestry Development Authority (FDA)	1976	These two acts established the FDA and defined its responsibilities, outlined forest offences and penalties, made provisions for an Advisory Conservation Committee and specified powers of forest officers with regard to trees in reserve areas. They gave the FDA the power to establish Government Forest Reserves, Native Authority Forest Reserves, Communal Forests and National Parks.	Establishes framework for categorization of types of forest resources.
	Amendment to the FDA Act	1988		
	National Forestry Law	2000	This Act makes provision for the management and conservation of forest resources of Liberia, defines ownership rights and other rights in forests, provides for the protection of the environment and wildlife in forests, regulates the trade in forest products and provides for various other matters relative to forestry and wildlife.	Defines ownership rights for types of forest resources.
	National New Forestry Reform Law	2006	This act amends the national forestry law of 2000 and the act creating the FDA. The administration of this Act provides for the FDA to exercise power under the law to ensure sustainable management of the Republic's forestland, conservation of the forest resources, and protection of the environment. It also has provisions for sustainable economic development with the participation of and for the benefit of all Liberians to contribute to poverty alleviation in the country.	Re-establishes framework for management of forest resources.
	Act to Establish the Community Rights Law with respect to Forest Lands	2009	The law creates a legal framework that defines and supports community rights in the management and use of community and traditional lands and forest resources.	Establishes traditional rights to forest resources
Biodiversity & Conservation	Wildlife and National Parks Act	1988	The Act identifies a number of protected areas and specifies policies and objectives regarding wildlife and conservation in the country.	Designates protected natural areas

Categories	Title	Year	Description	Relevance to the Project
	Protected Forest Areas Network Law	2003	The Act for the Establishment of a Protected Forest Areas Network required a biologically representative network of protected areas to be established covering at least 30 percent of the existing forest area, comprising about 1.5 million hectares.	Designates protected forested areas
	FDA Draft Hunting Regulations	Undated	These regulations include a list of "Fully Protected Animals of Liberia".	Designates protected animals
	National Wildlife Conservation and Protected Areas Management Act	2014	The law updates the 1988 law on wildlife and national parks. It includes a number of important provisions relating to biodiversity and protected areas.	Re-establishes protected natural areas
Health and Safety	Public Health Law	1976	This Law provides a framework for the management of public health and health systems in Liberia. The 1976 Law is currently being updated in order to effectively govern the decentralized health sector and accommodate the changes that have taken place since its promulgation. For example, in 2010 a new chapter was added to the Law to manage HIV / AIDS.	Defines the framework for managing public health
Various	Liberia Land Commission Act	2009	The objective of this act is to propose, advocate and coordinate reforms of land policy, laws and programs in Liberia. It does not have adjuratory or implementation role. The goal of the commission is "to develop comprehensive national land tenure and land use system that will provide equitable access to land and security of tenure so as to facilitate inclusive sustained growth and development, ensure peace and security and provide sustainable management of the environment".	Establishes framework for land rights reform
	Water Supply and Sanitation Act	2017	Established the Water and Sanitation Regulatory Agency to oversee water supply and sanitation services.	Agency with responsibility for issuing licenses, regulating tariffs, and setting service standards for water supply and sanitation.
Waste	Liberia Waste Management and Standards Regulations	2009	Established under EMPL to regulate waste disposal, pollution control, and hazardous materials management. Defines waste management obligations, including hazardous waste disposal, biomedical waste treatment, and industrial pollution mitigation.	Provisions include the requirement for every individual and entity responsible for managing waste under their control, ensuring proper disposal through licensed operators.

Table 7-3 - Relevant National Policies, Strategies and Plans

Title	Responsible Institution	Description	Relevance to the Project
National Environmental Policy (2003)	Environmental Protection Agency (EPA)	The policy provides a systematic and logical framework by which to address environmental issues. Section 4.7 of the policy calls for an ESIA on all major developmental, socioeconomic and land use activities in any form that may have adverse effects/impacts on the environment to one degree or another.	Emphasizes conservation and sustainable resource management. Hazardous waste requires strict adherence to environmental quality standards. EPA enforces impact assessment processes and monitoring frameworks. Promotes public participation in decision-making.
National Energy Policy (2009)	Ministry of Mines and Energy - specifically, the Department of Energy (DoE)	Introduced to address key energy challenges, including access, affordability, and sustainability. The policy aims to accelerate economic transformation, particularly in rural areas, by promoting modern energy services with a focus on renewable resources.	Encourages shift towards renewable energy. Emphasizes sustainable energy practices.
National Gender Policy (2009)	Ministry of Gender, Children and Social Protection	Introduced to promote gender equality and women's empowerment across various sectors. Serves as a framework for promoting gender equality, mainstreaming gender considerations into national development, and eliminating gender-based discrimination. The policy outlines strategies to address disparities in education, employment, health, and political participation.	Should ensure equitable access to employment. Women should be included in decision-making. Women and vulnerable may be disproportionally affected. Gender should be incorporated into the ESMP.
National WASH Policy (2012)	National WASH Commission (NWASHC)	Liberia's National Water, Sanitation, and Hygiene (WASH) Policy is designed to improve access to clean water, sanitation, and hygiene services across the country. It aligns with the National Water, Sanitation & Hygiene Commission Act of 2012, which established the National WASH Commission (NWSHC) as the principal regulatory body overseeing WASH initiatives.	Emphasizes protecting drinking water sources and ensuring sustainable water management. Outlines proper disposal methods to prevent contamination of water bodies. Mitigation measures may be required to maintain hygiene standards.
National Climate Change Policy and Response Strategy (2018)	Environmental Protection Agency (EPA)	Addresses climate-related risks and integrates adaptation and mitigation measures into national development planning. The policy with international frameworks such as the Paris Agreement and the United Nations Framework Convention on Climate Change (UNFCCC).	Emphasizes the need for emissions reduction and energy transition. Highlights the importance of protecting waterbodies. Integrates climate considerations into national planning.

Title	Responsible Institution	Description	Relevance to the Project
National Biodiversity Strategy and Action Plan (NBSAP) (2004)	Environmental Protection Agency (EPA)	The policy implements the United Nations Convention on Biological Diversity, of which Liberia is a member, on the national level.	Emphasizes conservation and sustainable resource management. Supports ecological restoration efforts. Promotes public participation in biodiversity conservation.
National Forestry Policy and Implementation Strategy (2006)	Forestry Development Authority (FDA)	The policy describes the main directions for the future of forestry development in Liberia, and updates earlier policies so they take into account the new Forestry Reform Law.	May impact forest areas. The policy ensures sustainable land use planning and conservation measures. Emphasizes maintaining ecological integrity of forested watersheds to prevent erosion and sedimentation. Decommissioning must align with conservation strategies to protect wildlife and forests. Promotes community involvement in forest management.
National Forest Management Strategy (2007)	Forestry Development Authority (FDA)	The strategy summarizes the FDA's approach to managing the national forest endowment. It includes objectives, goals, and management actions in pursuit of the overall aim to "conserve and sustainably manage all forest areas so that they will continue to produce a complete range of goods and services for the benefit of all Liberians and contribute to poverty alleviation in the nation" (FDA 2007, 4).	Emphasizes maintaining ecological integrity of forested watersheds to prevent erosion and sedimentation. Decommissioning hydropower infrastructure may impact forested areas. The strategy ensures sustainable land use planning and conservation measures. Decommissioning activities must align with conservation strategies to protect wildlife and forest ecosystems. The strategy promotes community involvement in forest management.
National Health Policy and National Health Plan (2007)	Ministry of Health	The document is a framework for health sector reforms in Liberia. The goal of the policy is to make health care delivery services throughout the country effective and efficient, thereby enhancing the quality of life of the population.	Policy emphasizes safe water access and sanitation measures. Workers involved in decommissioning must adhere to health and safety regulations to prevent injuries and exposure to hazardous materials. Policy supports health impact assessments to evaluate potential risks to local populations during decommissioning activities. Includes frameworks for managing health emergencies, ensuring communities are protected from environmental hazards linked to hydropower decommissioning. Promotes community participation in health-related decision-making.

Title	Responsible Institution	Description	Relevance to the Project
Land Right Policy (2013)	Liberia Land Authority (LLA)	The policy aims at addressing historic inequalities based on the principal that "practice has become the law and policy, rather than the law and policy guiding the practice". It defines Public Land, Government Land, Customary Land, and Private Land, as well as Protected Areas that will be conserved for the benefit of all Liberians.	Decommissioning may affect land ownership, particularly in areas with customary land rights. The policy ensures affected communities retain legal recognition of their land. Mandates fair compensation and resettlement planning for impacted landowners. Supports sustainable land use practices, ensuring that decommissioned sites do not contribute to land degradation. Promotes participatory decision-making, ensuring that local stakeholders are involved in land-related aspects of decommissioning.

Table 7-4 - Relevant International Environmental Conventions Signed / Ratified by Liberia

Convention	Year Ratified	Objectives
African Convention on Conservation of Nature and Natural Resources	1978	To encourage individual and joint action for the conservation.
Convention of International Trade in Endangered Species of Wild Fauna and Flora (CITES)	1981	To prevent trade of endangered or threatened species.
Convention Concerning the Protection of the World Cultural and Natural Heritage	2002	To recognize and protect cultural and natural heritage for future generations.
Framework Convention on Climate Change and the Kyoto Protocol	2002	To achieve stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climatic system. To strengthen the commitment of developed country parties with a view to reduce their overall emissions.
Ramsar Conventions on Wetlands of International Importance	2003	To manage wetland systems so that the human uses of these areas are undertaken in such a way as to retain their natural capital for future generations. To encourage and support countries to develop and implement national policy and legislative frameworks, education and awareness raising programs, as well as inventory, research and training projects.
Convention on Biological Diversity	2000	Promote conservation of biological diversity. Sustainable use of its components. Fair and equitable sharing arising out of the utilization of genetic resources.
Convention on the Conservation of Migratory Species of Wild Animals	2004	Aims to conserve terrestrial, marine and avian migratory species throughout their range.
Convention on Desertification	1998	To combat desertification and mitigates the effect of drought in countries experiencing serious droughts and/or desertification

Convention	Year Ratified	Objectives
International Tropical Timber Agreement	2008	Requires sustainable management of timber resource base, simultaneously encouraging the timber trade and the improved management of the forests.
International Covenant on Economic, Social and Cultural Rights	2004	ICESCR commits to work toward the granting of economic, social, and cultural rights to individuals, including labour rights and rights to health, education, and an adequate standard of living. ICESCR is part of the International Bill of Human Rights, along with the Universal Declaration of Human Rights (UDHR) and the International Covenant on Civil and Political Rights (ICCPR).
The Stockholm Convention on Persistent Organic Pollutants (POPs)	2002	Aims to protect human health and the environment from harmful chemicals that persist in ecosystems, bioaccumulate in living organisms, and pose serious health risks. Prohibits or limits the production, use, import, and export of certain POPs, requires measures to minimize emissions of POPs from industrial processes and waste management, mandates environmentally sound handling of POPs waste, establishes mechanisms for tracking POP levels and enforcing compliance, encourages collaboration between nations to address transboundary pollution.
Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal	2002	Encourages minimizing hazardous waste generation at the source. Limits the export and import of hazardous waste unless environmentally sound management is ensured. Requires safe handling, treatment, and disposal of hazardous waste. Establishes a system for tracking and controlling hazardous waste movements between countries. Promotes collaboration to prevent illegal waste trafficking and strengthen waste management capacity
Minamata Convention on Mercury	2024	International treaty designed to protect human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds. Phases out or restricts the use of mercury in products and industrial processes. Establishes measures to reduce mercury pollution and exposure. Regulates the handling, storage, and disposal of mercury-containing waste. Requires countries to report on their mercury-related activities and progress. Encourages collaboration to prevent mercury contamination and promote sustainable alternatives.

7.2.1.1. Constitution of Liberia

Article 7 of the 1986 Constitution of the Republic of Liberia sets the fundamental basis for the constitutional, legislative, and institutional frameworks for the protection and management of the environment. It also encourages public participation in the protection and management of the environment and the natural resources in Liberia.

With respect to acquisition of land, Article 24 gives the principles under which the government can expropriate land. These are as follows:

- Reasons for such expropriation are given.
- Prompt payment of just compensation.
- Expropriation or the compensation offered may be challenged freely by the owner of the property in a court of law with no penalty for having brought such action.
- When property taken for public use ceases to be so used, the Republic shall accord the former owner or those entitled to the property through such owner, the right of first refusal to reacquire the property.

7.2.1.2. The Environmental Protection Act

'An Act to establish a monitoring, coordinating and supervisory authority for the sustainable management of the environment in partnership with regulated Ministries and organizations and in a close and responsive relationship with the people of Liberia; and to provide high quality information and advice on the state of the environment and for matters connected therewith.'

The EPA was created by the Act creating the Environment Protection Agency of the Republic of Liberia, known as the Environment Protection Agency Act. The Act was approved on 26 November 2002 and published on 30 April 2003. The establishment of the EPA marked a significant step forward in the protection and management of the environment of Liberia.

Section 5 of the Act designates the EPA as the principal Liberian authority for environmental management which shall co-ordinate, monitor, supervise, and consult with relevant stakeholders on all the activities for environmental protection and the sustainable use of natural resources. Section 6 (b) of the Act stipulates that the EPA should propose environmental policies and strategies to the Policy Council and ensure the integration of environmental concerns in the overall national planning. Moreover, the EPA is empowered to carry out, among other things, the following aspects of environmental protection and management in Liberia:

- Establish environmental criteria, guidelines, specifications, and standards for production processes and the sustainable use of natural resources for the health and welfare of the present generation, and in order to prevent environmental degradation for the welfare of the future generations.
- Identify projects, activities, and programs for which environmental impact assessment must be conducted under this Law.
- Review and approve environmental impact statements and environmental impact assessments submitted in accordance with this Act.
- Monitor and assess projects, programs, and policies including activities being carried out by relevant ministries and bodies to ensure that the environment is not degraded by such activities and that environmental management objectives are adhered to and adequate early warning and monitoring on impending environmental emergencies is given.
- Review sectoral environmental laws and regulations and recommend for amendments and to initiate proposals for the enactment of environmental legislations in accordance with this Act or any other Act.
- Encourage the use of appropriate environmentally sound technologies and renewable sources of energy and natural resources.
- Function as the national clearinghouse for all activities relating to regional and international environment-related conventions, treaties and agreements, and as national liaison with the secretariat for all such regional and international instruments.

7.2.1.3. Act Adopting the Environmental Protection and Management Law of the Republic of Liberia

'An Act to establish a legal framework for the sustainable development, management and protection of the environment by the Environment Protection Agency in partnership with regulated Ministries and organizations and in a close and responsive relationship with the people of Liberia; and to provide high quality information and advice on the state of the environment and for matters connected therewith.'

Section 15 of the EPML states that business investors should present an environmental mitigation plan to the EPA, which should include the following sections:

- Objectives.
- Description of activities to be carried out by the project to mitigate any adverse effects on the environment.
- Period within which the mitigation measures shall be implemented.
- Proven efficacy of the mitigation measures of indicating their experimental nature.

Section 12 of the EPML requires environmental review for projects or activities that may have a significant impact on the environment. The project proponent shall submit to the EPA their plans for improving environmental performance, including:

- Identification of the major environmental effects.
- A comprehensive mitigation plan in accordance with section 15 of this Law.

Section 6 of EPML requires an Environmental Impact Assessment license or permit for the commencement of such projects, and Section 13 requires the preparation of an environmental impact study for such a project.

Section 24 of the EPML requires that the EPA should ensure that projects comply with their environmental mitigation plan through monitoring of operations. Where evidence of non-compliance occurs, the EPA shall impose remedial measures and may bring action before the Environmental Court or through the Ministry of Justice to enforce compliance.

Section 25 of the EPML gives responsibility to the EPA carrying out periodic environmental audits of activities or projects that are likely to have adverse effects on the environment.

Section 58 of the EPML requires that a license must be obtained from the EPA for any type of effluent discharge into the sewage system, also in case of operation of a sewage system. This license is provided by the EPA for a period that does not exceed 1 year.

Section 61 of the EPML prohibits pollution of all Liberian Waters. In case of water pollution, a sentence and / or a fine could be imposed on the polluting party. The latter is also responsible for the cost of the removal of the pollutant and the restoration, restitution or compensation as determined by a court of law.

Section 62 of the EPML bans pollution by solid waste of any land, coastal zone or surface water, street, road or site in or on any place to which the public has access, except in a container or at a place which has been specially indicated, provided or set apart for such purpose. In case of such pollution, a fine or a prison term is imposed on the polluting party. The latter is also responsible for the clean-up of the solid waste pollution it caused.

Section 64 of the EPML requires that a 'Solid and Hazardous Waste Disposal License' be acquired in case of generation, storage, handling, transport or disposal of hazardous waste, or ownership or operation of a waste disposal site. The EPA provides this license for a period of not more than one year. This license entails the party who is generating the waste to take up waste management measures such as treatment, determination or recycling and re-mediation.

Section 71 of the EPML requires that a "Pollution Emission License" is acquired for any project or activity which is likely to pollute the environment in excess of any standards or guidelines issued under the EPML. This license is provided by the EPA for a period of not more than one year.

Section 75 of the EPML prohibits the following activities in relation to a river, lake or wetland that are declared as protected areas by the EPA. These activities include:

- Use, erect, construct, place, alter, extend, remove or demolish any structure in, on, under, or over the bed.
- Excavate, drill, tunnel or disturb the bed otherwise.
- Introduce or plant any part of a plant, plant specimen or organism whether alien or indigenous, dead or alive in a river, lake or wetland.
- Introduce any animal or micro-organism whether alien or indigenous, dead or alive in a river, lake or wetland.
- Deposit any substance in a river, lake, or wetland or in or under the bed, which is likely to have adverse environmental effects on the river, lake or wetland.
- Direct or block a river, lake or wetland from its natural and normal course.
- Drain any river, lake or wetland.

Section 80 of the EPML, provides an outline framework for the Protection of Wild Animals and Birds and includes conservation areas. It differentiates wildlife protected areas in section 80 (4) - national park, wildlife reserve, and nature reserve - from wildlife management areas in section 80 (5) - wildlife sanctuary, and community wildlife area - while also stating that the Line Ministry can designate any other area as either as it sees fit.

Sections 83, 84 and 85 of the EPML, provide for the enabling environment for the conservation of biodiversity, charging the EPA with responsibility for a wide range of measures from preparing national conservation strategies to selecting and managing buffer zones to protected areas, to issuing guidelines for botanical gardens.

Section 91 of the EPML, states that the EPA may impose on the party that has caused or is likely to cause harm to the environment an "Environmental Restoration Order" requiring it to remedy / prevent the harm within 21 days of the service of the order. Section 92 allows the party to request the Agency to reconsider that order by giving reasons in writing within the same period.

Section 107 states that non-compliance with the restoration order convicts the responsible party to imprisonment and/or a fine.

7.2.1.4. National Energy Policy

In February 2007, the Government of Liberia (GoL), through the Ministry of Lands, Mines and Energy, with the support of the United States Agency for International Development (USAID) published the National Energy Policy (NEP). The principal objective of the NEP is to ensure universal access to modern energy services in an affordable, sustainable and environmentally friendly manner in order to foster the economic, political, and social development of Liberia.

The NEP recognizes the fact that energy is essential towards GoL Poverty Reduction Strategy (PRS) and the achievement of the Millennium Development Goals (MDGs).

The NEP assumes the implementation of proposed energy sector reforms founded on three essential features: (1) demonstrating the Government's resolve for good governance and ensuring financial transparency in all sector transactions; (2) overcoming the significant obstacles to private sector investment in energy supply; and (3) creating the requisite institutional and legal framework and an independent regulatory regime. In undertaking energy sector reform, the Government will also be addressing a key component of Liberia's commitment to the World Bank and other donors for debt relief under the program for Highly Indebted Poor Countries.

7.2.1.5. The Land Rights Policy

The Land Rights Policy (2013) concerns four land rights categories (Public Land, Government Land, Customary Land and Private Land), and a cross- cutting sub-category called Protected Areas, which must be conserved for the benefit of all Liberians.

For Public Land and Government Land, the Policy sets forth critical policy recommendations regarding how the Government transfers such land, and how the Government acquires land, especially through the exercise of eminent domain (i.e. forced acquisition).

With respect to the new category of Customary Land, there are several significant recommendations: Customary Land and Private Land are equally protected; and communities will self-define, be issued a deed, establish a legal entity, and strengthen their governance arrangements to make them fully representative and accountable. The Government also undertakes to support communities in implementing these recommendations.

The policy recommendations are designed to ensure the Government exercises eminent domain consistent with international best practices and in a manner that balances the Government's constitutional powers with the fundamental constitutional right of Private Land and Customary Land.

7.2.1.6. National Environmental and Occupational Health Policy

The Ministry of Health and Social Welfare has a Division of Environmental and Occupational Health; however, the Division lacks standards and policies specific to industries and/or occupational hazards. The National Environmental and Occupational Health Policy (NEOHP) was developed in 2007 to provide a framework for identifying policy needs and actions to improve occupational health and safety. It supplements the National Health Policy, which focuses on public health and health systems. The NEOHP identified the following key environmental and occupational health needs:

- Environmental Sanitation.
- Food Safety Services.
- Water Quality and Safety.
- Vector Control & Chemical Safety.
- Waste Management.

- Disaster Management.
- Health Promotion.
- Occupational Health Services.
- Port Health.
- Pollution Control.

7.2.1.7. Liberia Land Commission Act

The objective of this Act is to propose, advocate and coordinate reforms of land policy, laws and programmes in Liberia. It does not have adjudicatory or implementation role. The goal of the commission is:

'to develop a comprehensive national land tenure and land use system that will provide equitable access to land and security of tenure so as to facilitate inclusive sustained growth and development, ensure peace and security and provide sustainable management of the environment.'

7.2.1.8. Public Health Law

The Public Health Law (1976) establishes the legal framework for public health governance in Liberia. It covers a wide range of health-related regulations, including disease control, sanitation, food safety, and medical practice oversight.

Key Provisions include: defining measures for preventing and suppressing epidemics, including quarantine protocols and vaccination requirements; regulating housing sanitation, mosquito control, water pollution prevention, and sewage management; establishes standards for food handling, prohibits adulterated food, and regulates narcotic and hallucinogenic drugs; mandates birth and death registration, burial permits, and cemetery regulations; sets licensing requirements for healthcare practitioners and institutions; and defines the roles of local health authorities and enforcement mechanisms.

7.2.1.9. Water Supply and Sanitation Act

Liberia's Water Supply and Sanitation Act establishes the legal framework for managing water resources, sanitation services, and hygiene standards. It aligns with the country's Integrated Water Resource Management Policy and Water Supply and Sanitation Policy (WSSP), which were approved in 2008 and 2009, respectively. Key provisions include defining institutional roles for managing water supply and sanitation services; supporting investment in water and sanitation infrastructure to improve access; ensuring safe drinking water and sanitation to prevent disease outbreaks; encouraging stakeholder engagement in water resource management; and establishes safeguards to prevent water pollution and ensure sustainable usage.

7.2.1.10. Public Procurement and Concessions Act

The Public Procurement and Concessions Act (PPCA) regulates all forms of public procurement and concession agreements to ensure transparency, efficiency, and fairness in government contracting. Key provisions include establishing the Public Procurement and Concessions Commission (PPCC) to oversee procurement processes and concession agreements; ensures fair competition, transparency, and accountability in government procurement; defines procedures for awarding concessions, including prequalification, bidding, and contract execution; requires suppliers and contractors to register with the PPCC to participate in public procurement; and mandates regular audits and reporting to prevent corruption and ensure adherence to procurement laws.

7.2.1.11. Environmental Protection and Management Law

The Environmental Protection and Management Law (2002) establishes the legal framework for sustainable environmental governance, ensuring responsible resource management and pollution control. It is implemented by EPA in collaboration with relevant ministries and organizations. Key provisions include mandating EIAs for development projects to assess environmental risks and mitigation measures; regulating industrial emissions, hazardous waste disposal, and environmental quality standards; safeguarding forests, wetlands, and marine ecosystems from degradation; establishing enforcement mechanisms, including inspections and penalties for violations; and encouraging stakeholder engagement in environmental decision-making.

7.2.1.12. Liberia Waste Management & Standards Regulations

The Waste Management & Standards Regulations (2009) establish guidelines for the safe handling, disposal, and treatment of waste to protect public health and the environment. These regulations align with the EPML, 2003 and are enforced by the EPA. Key provisions include: defining responsibilities for individuals and industries in managing waste safely; requiring businesses to mitigate pollution and obtain waste discharge permits; mandating proper packaging, treatment, and disposal of medical waste to prevent contamination; establishing strict guidelines for handling, transporting, and disposing of hazardous materials; regulating the disposal of radioactive substances to minimize environmental risks; and, requiring industries and municipalities to obtain licenses for waste collection and disposal.

7.2.1.13. Hazardous Waste Management Regulations

The Hazardous Waste Management Regulations are governed by EPML and the Liberia Waste Management & Standards Regulations (2009). These regulations ensure the safe handling, disposal, and treatment of hazardous waste to protect human health and the environment. Key provisions: defining categories of hazardous waste, including industrial, biomedical, and radioactive substances; establishes guidelines for safe disposal, recycling, and treatment of hazardous materials; requires industries to obtain waste discharge permits and conduct environmental audits; regulates the handling, storage, and transport of hazardous chemicals to prevent contamination; and, mandates regular inspections and penalties for non-compliance.

7.2.1.14. Land Rights Act (2018)

Liberia's Land Rights Act (2018) fundamentally reshaped the country's land tenure system by legally recognizing customary land ownership alongside public, government, and private land. It was enacted to promote equitable land access, tenure security, and sustainable land management. Key provisions include: granting legal recognition to communities that traditionally occupied land, ensuring their rights without requiring formal deeds; establishing the Liberia Land Authority (LLA) to oversee land management and dispute resolution; defining legal procedures for acquiring, transferring, and managing land; encouraging local involvement in land governance to prevent conflicts and ensure fair land distribution; and defining four categories of land:

- Public Land - Available for allocation by the government.
- Government Land - Used for state functions and institutions.
- Customary Land - Recognized as belonging to indigenous communities.
- Private Land - Owned by individuals or entities with legal deeds.

7.2.1.15. Noise Pollution Control and Standards Regulations (2009)

The Noise Pollution Control and Standards Regulations (2009) establish guidelines for managing noise levels to protect public health and environmental quality. These regulations are overseen by EPA and align with the EPML, 2002. Key provisions include defining acceptable noise limits for residential, commercial, and industrial areas; regulating noise emissions from construction sites, factories, and transportation; establishing restrictions on loudspeakers, entertainment venues, and public events; requiring regular assessments and enforcement measures to prevent excessive noise pollution; encouraging stakeholder participation in noise management policies.

7.3. Liberia Environmental Quality Standards

Several environmental quality standards are partly prepared by EPA. Some of these environmental quality standards are:

- Air Quality Standards
- Water Quality Standards
- Noise Level Standards
- Waste Management Standards.

Air quality standards are not complete for ambient air quality. Existing ambient air quality standards are given in Table 7-5.

Water quality standards are only completed for the marine waters. Drinking, domestic, industrial, agricultural and other types of water standards are still incomplete. However, the Ministry of Health Water Testing Laboratory uses the drinking water standards presented in Table 7-6.

Noise level standards are complete for many environments. Relevant noise standards are presented in Table 7-7, Table 7-8 and Table 7-9. Other noise standards can be found in the EPML - Noise Pollution Control and Standards Regulations, 2009.

Table 7-5 - Liberia Ambient Air Quality Standards

Pollutant	Time Weighted Average	Industrial Area	Residential, Rural & Other Area	Controlled Areas***
Oxides of Sulphur (SOX)	Annual Average*	80 µg/m^3	60 µg/m^3	15 µg/m^3
	24 hours**	120 µg/m^3	80 µg/m^3	30 µg/m^3
	Month Average			
	24 hours		0.048 ppm / 125 µg/m^3	
	One hour			
	Instant Peak		500 µg/m^3	
	Instant Peak (10 min)		0.191 ppm	
Oxides of Nitrogen	Annual Average*	80 µg/m^3	60 µg/m^3	15 µg/m^3
	24 hours**	120 µg/m^3	80 µg/m^3	30 µg/m^3
	8 hours			
	Annual Average		0.2 ppm	
	Month Average		0.3 ppm	
	24 hours		0.4 ppm	
	One hour		0.8 ppm	
	Instant Peak		1.4 ppm	
Nitrogen Dioxide	Annual Average		0.05 ppm	
	Month Average		0.08 ppm	
	24 hours		0.1 ppm	
	One hour		0.2 ppm	
	Instant Peak		0.5 ppm	
Suspended Particulate matter	Annual Average*	360 µg/m^3	140 µg/m^3	70 µg/m^3
	24 hours	500 µg/m^3	200 µg/m^3	100 µg/m^3
	Mg/kg			
	Annual Average****		100 µg/m^3	
	24 hours ***		180 µg/m^3	
Suspended Particulate matter (<10 µg/m^3) (RPM)	Annual Average*	120 µg/m^3	60 µg/m^3	50 µg/m^3
	24 hours**	150 µg/m^3	100 µg/m^3	75 µg/m^3
Lead (PB)	Annual Average*	1.0 µg/m^3	0.75 µg/m^3	0.50 µg/m^3
	24 hours	1.5 µg/m^3	1.00 µg/m^3	0.75 µg/m^3
	Month Average		2.5	
	8 hours**	5.0 mg/m^3	2.0 mg/m^3	1.0 mg/m^3

Pollutant	Time Weighted Average	Industrial Area	Residential, Rural & Other Area	Controlled Areas***
Carbon monoxide (CO) / Carbon dioxide (CO_2)	1 hour	10.0 mg/m^3	4.0 mg/m^3	2.0 mg/m^3
Hydrocarbons (HC)	24 hours**			
VOC	24 hours**			
Ozone	1 hour		0.12 ppm	
	Instant Peak		1.25 ppm	

(Source: Environment Protection and Management Law- Air Quality & Standards Regulations; 2009)

* Annual Arithmetic mean of minimum 104measurements in a year taken twice a week 24 hourly at uniform interval.

** 24 hourly/8 hourly values should be met 98% of the time in a year. However, 2% of the time, it may exceed but not on two consecutive days. The 24-hour limit may not be exceeded more than three times in one year.

*** Not to be exceeded more than once per year average concentration

Table 7-6 - Liberian Drinking Water Quality Standards

Parameter	Unit	WHO	Class I	Class II	Class III
PH	-logH	-	6.5 – 8.0	6.0 – 9.0	5.5 – 9.0
Chloride	mg Cl/L	350	250.0	350.0	450.0
Sulphate	mg SO_4/L	250	150.0	200.0	250.0
Hardness	$CaCO_3$ mg/l	100-500	190.0	300.0	600.0
Iron Total	Fe mg/l	0.1	0.1	1.5	2.0
Manganese	Mn mg/l	0.1	0.1	0.3	0.8
Zinc Total	Zn mg/l	5	1.0	2.0	5.0
Coliform Bacteria	n/ml	0	0	0	5
Bacteria Total	n/ml	0	0	10	50
Dissolved Substance	mg/l	500	500.0	1000.0	1200.0
Suspended Solids	mg/l	-	10.0	30.0	50.0
Ammonia	mg NH_4/l	0.5	1.0	3.0	6.0
Nitrate	mg NO_3/l	50	40.0	60.0	80.0
Nitrite	mg NO_2/l	-	0.1	0.5	1.0
Phosphate	mg PO_4/l	-	0.01	0.02	0.05
Phenols	mg/l	0.001	0.001	0.02	0.05
Detergents	mg/l	-	1.0	2.0	3.0
Fluoride	F mg/l	1.5	1.5	1.5	2.0
Cyanide	Cn mg/l	0.05	n.d.	0.02	0.05
Lead	Pb mg/l	0.1	0.1	0.1	0.1
Mercury	Hg mg/l	0.01	n.d.	0.005	0.01
Copper	Cu mg/l	0.05	0.01	0.01	0.2
Cadmium	Cd mg/l	0.01	n.d.	0.001	0.01
Chromium Trivalent	Cr mg/l	-	0.5	0.5	0.8
Chromium Hexavalent	Cr mg/l	0.05	0.05	0.1	0.1

Parameter	Unit	WHO	Class I	Class II	Class III
Nickel	Ni mg/l	-	1.0	1.0	0.1
Silver	Ag mg/l	0.05	0.01	0.01	0.01
Vanadium	V mg/l	-	1.0	1.0	1.0
Boron	B mg/l	-	1.0	1.0	1.0
Arsenic	As mg/l	0.05	0.05	0.05	0.2
KEY					

Mg	Milligram
L	Liter
Ml	Millilitre
N	Count
n.d.	Non detectable
Water Classification	**Water can be used as**
Class I	Drinking water for the population, Water Supply for industry requiring drinking water.
Class II	For Fisheries, Cultivated fisheries, Organized public bath, Recreational water sports.
Class III	Industry supply except for industry requiring drinking water, irrigation or agricultural land.

Table 7-7 - Maximum Permissible Noise Levels for General Environment

Facility	Noise Limits B (A) (Leq)	
	Day	Night
Any building used as hospital, convalescence home, home for the aged, sanatorium and institutes of higher learning, conference rooms, public library, environmental or recreational sites.	45	35
Residential buildings	50	35
Mixed residential (with some commercial and entertainment)	55	45
Residential + industry or small-scale production + commerce	60	50
Industrial	70	60
Time Frame: use duration Day: 6.00 a.m. 10.00 p.m. Night: 10.00 p.m. 6.00 a.m. The time frame takes into consideration human activity		

Table 7-8 - Maximum Permissible Noise Levels (Continuous or intermittent noise) from a Factory or Workshop

Leq dB (A)	Duration (Daily)	Duration (Weekly)
85	8 hours	40 hours
88	4 hours	20 hours
91	2 hours	10 hours
94	1 hour	5 hours
97	30 minutes	2.5 hours
100	15 minutes	1.25 hours

103	7.5 minutes	37.5 minutes
106	3.75 minutes	18.75 minutes
109	1.875 minutes	9.375 minutes

Noise Levels shall not exceed a Leq of –

i) Factory / Workshops 85 dB (A)
ii) Offices 50 dB (A)
iii) Factory / Workshop Compound 75 dB (A)

Table 7-9 - Maximum Permissible Noise Levels for Residential & Commercial Areas

Facility	Limit Value in dB(C)
For any building used as a hospital, school, convalescent home, old age home or residential building.	109 dB (C)
For any building in an area used for residential and one or more of the following purposes: Commerce, small-scale production, entertainment, or any residential apartment in an area that is used for purposes of industry, commerce or small-scale production, or any building used for the purpose of industry, commerce or small-scale production.	114 dB (C)

7.4. International Standards and Guidelines

7.4.1. World Bank Safeguard Operational Policies

The World Bank has environmental and social policies known as the Safeguard Policies (Safeguard Operational Policies (OP)). These are the mechanisms for addressing environmental and social issues in project design, implementation, and operation; and they provide a framework for consultation with communities and for public disclosure. Examples of these requirements include conducting EIAs, consulting with affected communities about potential project impacts, and restoring the livelihoods of displaced people (World Bank, 2022).

The Safeguard Policies are as follows (further details on the relevant policies are provided in Table 7-10 below):

- OP 4.01 - Environmental Assessment
- OP 4.02 - Environmental Action Plans
- OP 4.03 - Performance Standards for the Private Sector
- OP 4.04 - Natural Habitats
- OP 4.09 - Pest Management
- OP 4.10 - Indigenous Peoples
- OP 4.11 - Physical Cultural Resources
- OP 4.12 - Involuntary Resettlement
- OP 4.36 - Forests
- OP 4.37 - Safety of Dams
- OP 7.50 - Projects on International Waterways
- OP 7.60 - Projects in Disputed Areas.

Whilst the LIRENAP remains under the OPs, for newer projects the World Bank now uses the Environmental and Social Framework (ESF).

Table 7-10 - Summary of Safeguard Policies

No.	Policy	Summary of Core Requirements	Relevance to the ESMP for Temporary Closure
OP / BP 4.01	Environmental Assessment	Screen early for potential impacts and select appropriate instrument to assess, minimize and mitigate potentially adverse impacts. The assessment considers the natural environment (air, water, and land); human health and safety; social aspects (involuntary resettlement, indigenous peoples, and physical cultural resources); and transboundary and global environmental aspects. The Area of Influence (AoI) should be determined with the advice of environmental specialists and set out in the EA Terms of Reference.	The ESMP for the temporary closure will be prepared and implemented in compliance with OP / BP 4.01. The ESMP will provide a basis for the management of environmental and social impacts during the temporary decommissioning works.
OP / BP 4.04	Natural Habitats	Supports natural habitat conservation and land use by financing projects designed to integrate into national and regional development the conservation of natural habitats and regional development the conservation of natural habitats and the maintenance of ecological functions. Support projects that affect non-critical habitats only if no alternatives are available and if acceptable mitigation measures are in place.	It is understood that the hydropower plant is in a farm-bush area with some disturbed natural forest in the area. Although any impacts to the disturbed natural forest will likely be local and would have already occurred during pre-construction / construction phases, Field monitoring to date and consultations with local communities have not confirmed the presence of critical habitats or endangered species—including primates such as chimpanzees or monkeys—within the project's area of influence. While local reports have mentioned occasional sightings of primates in distant forested zones, these animals remain confined to their natural habitats and are not affected by project activities. No amphibians or aquatic species of critical concern have been identified within the project-affected area. According to the Environmental Impact Assessment (EIA), an Important Bird Area (IBA) borders the eastern side of the site; however, this IBA lies outside the project's direct footprint, and neither ongoing activities nor the planned decommissioning appear to have any direct or indirect impact on it. Should any unforeseen ecological impacts be identified during the decommissioning process, appropriate mitigation measures will be included in the revised ESMP.
OP / BP 4.09	Pest Management	Promotes environmentally sound pest control strategies while minimizing reliance on synthetic chemical pesticides. It applies to agriculture and public health projects financed by the Bank.	Not applicable. Applies to agriculture and public health projects.

No.	Policy	Summary of Core Requirements	Relevance to the ESMP for Temporary Closure
OP / BP 4.11	Physical Cultural Resources	Investigate and develop an inventory of cultural resources potentially affected. Include mitigation measures when there are adverse impacts on physical cultural resources or avoid them if possible.	Physical cultural resources were assessed as part of the ESIA process with affected communities consulted, this should continue through the ESMP development process. In case any impacts to physical cultural resources are identified these should be incorporated into the ESMP.
OP / BP 4.12	Involuntary Resettlement	Avoid involuntary resettlement or displacement to the extent feasible, or to minimise and mitigate its adverse social and economic impacts. Assist displaced persons in their effort to improve or at least restore their standards of living. Displaced persons should be provided with opportunities for participation in the project and sharing in project profits. Pay compensation for affected assets at replacement cost through an approved RAP.	Potential livelihood / economic displacement and physical displacement are not expected to occur due to the temporary decommissioning works - any displacement would likely have occurred during the pre-construction / construction phases and the decision to discontinue with the project; however, this will need to be assessed as part of the ESMP preparation process, with potential livelihood impacts and risks mitigated against.
OP / BP 4.37	Safety of Dams	As there are serious consequences if a dam does not function properly or fails, the Bank is concerned about the safety of new dams it finances and existing dams on which a Bank-financed project is directly dependent. Bank-financed projects include construction of a new dam; it requires that the dam be designed and construction-supervised by experienced and competent professionals.	The dam is less than 15 metres in height and is classed as a small dam and the safety of the dam should have been addressed through the engineering design. As reported in Sections 4.4 and 4.5 the dam has only been partially completed and the cofferdam has partially failed; therefore, the safety of the dam has been jeopardised. The decommissioning process (including the preparation and implementation of this ESMP) is addressing this by making safe the partially completed works by the controlled release of the impounded water, dismantling and removing temporary infrastructures, decommissioning the exposed concrete structures; and through the slope stabilisation, site clearance, and site rehabilitation works.
OP / BP 7.50	Projects on International Waterways	This policy applies to projects on international waterways which include: (a) any river, canal, lake, or similar body of water that forms a boundary between, or any river or body of surface water that flows through, two or more states, whether Bank members or not; (b) any tributary or other body of surface water that is a component of any waterway described in (a) above; and, (c) any bay, gulf, strait, or channel bounded by two or more states or, if within one state, recognized as a necessary channel of communication between the open sea and other states - and any river flowing into such waters.	The Kaiha River is a tributary of the Mano River, which is an international waterway since it runs along the border between Sierra Leone and Liberia. However, it is understood that the requirement of riparian notification has been approved in accordance with the policy by the Regional Vice President based on paragraph 7(c) of OP 7.50 because: a) Kaiha River is a tributary of the Mano River that runs exclusively within Liberia; and b) Liberia and Sierra Leone are both the lowest downstream riparian's of the Mano River; and project would not cause appreciable harm to other riparian states.

7.4.2. International Finance Corporation (IFC) Guidelines

Whilst the IFC guidelines will not be practically applied during the decommissioning process the guidelines will be used as a reference to inform the risk assessment, identification of potential environmental and social impacts, development of appropriate mitigation measures and the framework in which they will be implemented by the DC.

The International Finance Corporation (IFC) Environmental, Health, and Safety (EHS) Guidelines - General EHS Guidelines, include guidelines on construction and decommissioning. This provides guidance on the prevention and control of hazards to the environment, Occupational Health and Safety (OHS), and community health and safety, as indicated below:

- Environment
  - Noise and Vibration
  - Soil Erosion
    - *Sediment mobilisation and transport.*
    - *Clean runoff management.*
    - *Road design.*
    - *Disturbance to water bodies.*
    - *Structural (slope) stability.*
  - Air Quality
  - Solid Waste
  - Hazardous Materials
  - Wastewater Discharges
  - Contaminated Land
- Occupational Health and Safety (OHS).
  - Over-Exertion
  - Slips and Falls
  - Work in Heights
  - Struck By Objects
  - Moving Machinery
  - Dust
  - Confined Spaces and Excavations
  - Other Site Hazards
- Community Health and Safety
  - General Site Hazards
  - Disease Prevention
  - Traffic Safety

The guidelines identify environmental, OHS, and community health and safety risks may be present during construction and decommissioning works, highlighting measures that should be implemented to manage the risks during construction and / or decommissioning activities.

The IFC guidelines on decommissioning activities will be used during the development of the ESMP with the project activities to be conducted by the temporary decommissioning works contractor to be reviewed against the guidance on the prevention and control of hazards to the environment, OHS, and community health and safety.

The EHS Guidelines for Electric Power Transmission and Distribution include information relevant to a power generation facility and a substation located within an electricity grid, in addition to power distribution from a substation to consumers located in residential, commercial and industrial areas. These guidelines identify the following potential issues:

- Environment
  - Terrestrial Habitat Alteration
  - Aquatic Habitat Alteration
  - Electric and Magnetic Fields

  - Hazardous Materials
- Occupational Health and Safety (OHS).
  - Live Power Lines
  - Working at Height
  - Electric and Magnetic Fields
  - Exposure to Chemicals
- Community Health and Safety
  - Electrocution
  - Electromagnetic Interference
  - Visual Amenity
  - Noise and Ozone
  - Aircraft Navigation Safety

The IFC Good Practice Note on Environmental, Health, and Safety Approaches for Hydropower Projects identify the following EHS issues associated with hydropower activities:

- Environment
  - General Management of Environmental Risks and Impacts.
  - Watershed Management Aspects.
  - Conversion of Aquatic and Terrestrial Habitats.
  - Changes in In-Stream Flows, including Water, Sediment and Aquatic Biota Flows.
  - Connectivity and Fish Entrainment.
  - Stream Morphology and Sediment Management.
- Occupational Health and Safety (OHS).
  - Construction OHS Aspects.
    - *Tunnelling.*
    - *Use of Explosives.*
    - *Traffic Safety.*
  - Rock Slide and Snow Avalanche Management.
  - Non-Ionizing Radiation.
  - Noise.
  - Confined Spaces and Working at Height.
  - Electrical Hazards.
- Community Health and Safety.
  - Dam Safety and Emergency Preparedness and Response.
  - Reservoir and Infrastructure Safety.
  - Reservoir Slope Failures.
  - General Health Issues.

8. Risks and Potential Impacts

This chapter presents the key safety, environmental and social risks of the decommissioning and restoration activities. These are presented in tabular format in Table 8-1. The risks have been identified based upon primary data and information collected during a site visit and stakeholder engagement activities; understanding of the scope of the planned decommissioning and restoration activities; and the secondary sources of data and information detailed in Section 3.1. The potential impact assessment rating was determined by professional judgement and a consideration of the likely magnitude, duration, frequency, and reversibility of the potential impacts.

Table 8-1 - Risks, Impact Assessment and Proposed Mitigation Measures

Component	Risks	Impact	Mitigation
Removing Upstream Left Bank Earth Cofferdam	The Upstream Left Bank Earth Cofferdam will be removed to release the impounded water and to restore the natural flow. Whilst this should reduce the risk of the water being accidentally and uncontrollably released; there is a risk this will cause a reduction in water quality (i.e., increased turbidity) and / or sedimentation and erosion downstream. Shift in water temperature, and may lower oxygen levels	Moderate	Remove the cofferdam in controlled stages to allow gradual water release and prevent sudden surges. Install silt curtains or turbidity barriers downstream to capture suspended sediments during the release. Schedule removal activities during favorable weather conditions and low-flow periods. Apply immediate erosion control measures (such as bank stabilization or revegetation) in downstream areas to limit potential erosion.
Removing Upstream Left Bank Earth Cofferdam	The Upstream Left Bank Earth Cofferdam will be removed to release the impounded water and to restore the natural flow. Whilst this should reduce the risk of the water being accidentally and uncontrollably released there is a potential risk to any settlements or river users downstream of the site.	Moderate	Dismantle the cofferdam in stages to gradually restore natural flow and prevent abrupt water surges. Develop and implement an emergency response plan, including predefined protocols for rapid intervention. Align removal schedules with favourable hydrological conditions. Inform downstream settlements or river users about the cofferdam removal and the scheduled timeline for its removal.
			Establish clear communication channels with downstream communities and local authorities, providing advance warnings and updates on water release activities.

Component	Risks	Impact	Mitigation
Removing Upstream Left Bank Earth Cofferdam	Removal of the Upstream Left Bank Earth Cofferdam can release accumulated sediments into the water, affecting aquatic ecosystems.	Minor	Install silt curtains or turbidity barriers downstream of the removal zone. Conduct removal in stages, allowing sediments to settle between phases. Implement temporary sediment traps or diversion channels to capture mobilized sediments.
Removing Upstream Left Bank Earth Cofferdam	Removal of the Upstream Left Bank Earth Cofferdam may introduce pollutants or alter water chemistry, impacting aquatic ecosystems or downstream communities.	Minor	Remove in stages to minimize sediment disturbance and reduce the likelihood of releasing pollutants. Ensure removal activities adhere to established water quality standards and promptly intervene if deviations occur.
Removing Upstream Left Bank Earth Cofferdam	Removal of the Upstream Left Bank Earth Cofferdam may cause a sudden change in water flow which can disturb the aquatic ecosystem.	Minor	Implement a staged removal process to ensure water flow increases gradually.
Removing Upstream Left Bank Earth Cofferdam	If the materials (i.e., earth) removed from the Upstream Left Bank Earth Cofferdam are not managed appropriately, several environmental and social risks could arise. Poorly managed materials could result in sedimentation in nearby waterbodies which may disrupt aquatic ecosystems, affecting water quality and harming local biodiversity. Poorly placed materials could encroach on natural habitats, leading to habitat destruction and ecological imbalance. On a community level, airborne dust and dirt could create nuisance effects, settling on drying clothes, windows, and other surfaces, impacting daily life. Failure to adhere to regulatory waste management standards may also result in compliance violations.	Moderate	Materials to be repurposed for landscaping and to cover partially exposed concrete works. Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance. Conduct regular inspections and audits to ensure adherence to regulatory waste management standards. Ensure that only experienced and trained personnel are assigned to the removal of the cofferdam

Component	Risks	Impact	Mitigation
Removing Upstream Left Bank Earth Cofferdam	There are additional H&S risks associated with removing the Upstream Left Bank Earth Cofferdam to release the impounded water in the rainy season when water levels will likely be higher. For example, an unstable structure during removal can pose a hazard to workers and nearby residents. However, there are also additional environmental and public H&S risks associated with an uncontrolled release of water which may be more likely with higher water levels.	Major ●	Conduct a structural stability assessment to understand the cofferdam's condition. Prepare a work plan to enable the safe removal during the rainy season. Evaluate weather forecasts to determine safe operational windows. Gradually dismantle the cofferdam in phases, using temporary supports as needed to maintain stability throughout each stage. Regulate water release incrementally to minimize sudden surges and manage downstream flow. Develop and implement an Emergency Response Plan with clear procedures for rapid evacuation, spill management etc. Suspend removal operations during extreme rainfall or adverse weather events. ensure that only experienced and trained personnel are assigned to the removal of the cofferdam Establish clear communication channels with downstream communities and local authorities, providing advance warnings and updates on water release activities.
Removing Left Bank Geo-Bag Cofferdam	The partially failed Left Bank Geo-Bag Cofferdam will be removed to ensure minimal disruption to the river ecosystem. There is a risk of water being accidentally and uncontrollably released; there is a risk this will cause a reduction in water quality (i.e., increased turbidity) and / or sedimentation and erosion downstream.	Moderate ●	Remove the cofferdam in controlled stages to allow a gradual, predictable release of water rather than an abrupt surge. Regulate water flow during removal, ensuring that discharge rates remain within safe and predictable limits. Install temporary silt curtains or turbidity barriers downstream to capture mobilized sediments. Implement bank stabilization measures to counteract potential erosion. Develop and implement an emergency response plan. Inform downstream communities about the operation schedule and water release events.

Component	Risks	Impact	Mitigation
Removing Left Bank Geo-Bag Cofferdam	The partially failed Left Bank Geo-Bag Cofferdam will be removed to ensure minimal disruption to the river ecosystem and to restore the natural water flow; however, there is a risk of a sudden water release which could lead to a reduction in water quality (i.e., increased turbidity) and sedimentation and erosion downstream of the site.	Moderate	Dismantle the cofferdam gradually to allow controlled water release. Install silt curtains or turbidity barriers downstream and implement bank stabilization measures to reduce erosion. Inform downstream communities about the removal schedule and water release events.
Removing Left Bank Geo-Bag Cofferdam	If the materials removed from the Left Bank Geo-Bag Cofferdam are not managed appropriately, several environmental and social risks could arise. The synthetic materials used in the Geo-Bags may degrade into microplastics, contaminating soil and water and potentially entering the food chain, posing risks to biodiversity and human health. Additionally, deteriorating bags and loose materials could obstruct waterways, increasing flood risks and harming aquatic ecosystems. Chemical leaching from degraded materials may further impact soil and water quality, affecting both local biodiversity and public health. Poor waste management could lead to accumulation and environmental degradation, exacerbating pollution concerns. Furthermore, failure to adhere to regulatory waste disposal standards could result in compliance violations.	Minor	Segregate synthetic geo-bag materials from other materials. Geo-Bag fill returned to borrow pits, whilst the geobags should be disposed of at an approved disposal site following their removal. Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance.

Component	Risks	Impact	Mitigation
Removing Exposed Rebar	As part of securing the partially completed concrete works the exposed rebar (reinforcement bars) will be cut and removed from the partially completed concrete works and stilling basin. There is a risk to worker safety during the cutting process from accidents with the cutting equipment and with sharp edges and flying debris, requiring strict safety protocols. The removal of exposed rebar embedded in cast concrete must be carried out with careful planning and strict adherence to safety protocols to prevent injury, structural damage, or equipment failure. All personnel involved should be properly trained and equipped with appropriate Personal Protective Equipment (PPE), including hard hats, safety goggles, gloves, steel-toe boots, and hearing protection.	Major 	Require all workers to wear appropriate PPE, including safety goggles or face shields, cut-resistant gloves, long-sleeved protective clothing, steel-toe boots, and hearing protection. Use certified and well-maintained cutting equipment. Inspect tools before each use to ensure they are functioning correctly. Exposed rebar should be cut using suitable tools such as rebar cutters, angle grinders, or oxy-acetylene torches, depending on the size and accessibility of the material. Demarcate the work area. Follow established safe cutting procedures, including proper positioning and two-hand operation. Provide specific training on the proper use of cutting equipment and hazard awareness related to sharp edges and flying debris. Maintain strict on-site supervision during the cutting operations. Implement procedures for the immediate removal and safe disposal of cut rebar fragments and metal shavings to reduce subsequent hazards.
Removing Exposed Rebar	The risk to worker safety is higher during removal of the exposed rebar situated in the middle of the river. This risk is increased when water levels are higher during / immediately after the rainy season.	Major 	Plan rebar removal during periods of low water levels. If water levels are high, delay operations until conditions improve. Develop and communicate an emergency action plan. Avoid using electric tools in a wet environment Use battery-powered or hydraulic tools in wet environment
Removing Exposed Rebar	The cutting of the rebar will generate metal dust and fumes which can temporarily degrade air quality and pose respiratory hazards for the workers involved.	Minor	Ensure workers use appropriate respiratory protection in addition to goggles, gloves, and hearing protection. Where feasible, employ wet cutting methods to suppress dust generation during the cutting process. Train workers in the proper use of PPE and safe cutting procedures to minimize exposure.

Component	Risks	Impact	Mitigation
Removing Exposed Rebar	The cutting of the rebar can generate high levels of noise presenting a risk to workers and affecting nearby communities and wildlife.	Major 	Require all workers to wear appropriate hearing protection (e.g., earplugs or earmuffs). Ensure cutting equipment is well-maintained and outfitted with noise reduction features. Schedule noisy operations to minimize disturbance. To maintain positive community relations, the public shall be kept informed about the decommissioning activities and any efforts to minimise disturbance, and procedures for prompt response and corrective action shall be documented within the GRM.
Removing Exposed Rebar	If cut rebar is not managed appropriately, several environmental and social risks may arise. Rusting can lead to the leaching of iron and other metals into soil and waterbodies, potentially contaminating ecosystems and posing public health risks. Accumulated debris may obstruct waterways, increasing flood risks and harming aquatic habitats. Sharp metal scraps can create hazardous conditions for wildlife and public safety, while improper disposal may degrade the visual landscape. Additionally, failure to adhere to regulatory waste management standards could result in compliance violations.	Moderate 	Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance. Collect all cut rebar immediately and store it in designated, covered containers. Segregate clean and contaminated rebar, directing all scrap to scrap dealers. Prevent debris from entering waterways. Adhere strictly to waste management regulations including records to ensure compliance. Safely secure metal scraps to eliminate public and wildlife safety hazards.
Covering Exposed Concrete Works	During covering the exposed concrete workers are likely to be required to access areas close to unstable or eroding platforms, both on the riverbank and in the middle of the river. Such work conditions increase the risk of falls and there is a risk of falling in the river. These risks are increased when working in the rainy season.	Major 	Inspect and secure unstable or eroding surfaces before work begins. Prepare a work plan that enables the activity to be safely conducted in the rainy season. Monitor weather conditions and water levels, postponing high-risk activities during heavy rainfall or rapidly changing conditions. Schedule work during periods of low rain and more stable conditions.
Covering Exposed Concrete Works	As the concrete structures are partially completed, it is unclear which structures are at risk of erosion or exposure to water, which structures should be covered / backfilled, and which structures shall be dismantled and removed.	Major 	Qualified structural engineers to conduct inspections and document the condition of all partially completed structures and to determine which structures require stabilization (cover, backfill) versus those slated for dimantling and removal.

Component	Risks	Impact	Mitigation
	This uncertainty about which structures are vulnerable means that personnel undertaking remedial work face additional health and safety risks through the unexpected collapse of partially complete concrete structures. This risk is particularly high if the stabilization choice (through covering, backfilling, or controlled dismantling) is not based on a clear assessment of condition. Covering unstable, partially completed structures may pose hazards during construction and maintenance. Covering the exposed concrete works may present structural integrity issues and shall make monitoring the structures harder.		Establish safe work perimeters around vulnerable structures and provide specialized training for personnel working on, or near unstable or partially complete works.
Covering Exposed Concrete Works	It is intended to cover the exposed concrete works utilizing the material from the existing earth cofferdam / stock of blast rock as a protective measure; however, there is a risk that the material may not be suitable for this purpose which may erode, leading to the release of concrete debris and sediment into the river which could cause an obstruction and disrupt aquatic ecosystems by altering turbidity, water chemistry, and sedimentation patterns. The unintended release of aggregate and dust could affect water quality and harm wildlife, especially species that depend on clear or stable water conditions.	Moderate	Conduct site trials to assess the erosion resistance and overall suitability of material for cover applications. Develop an adaptive management plan that allows for rapid changes in remediation techniques if the material fails to perform as intended. Schedule frequent site inspections to assess the integrity of the cover layer, looking for signs of deterioration, displacement, or early erosion.

Component	Risks	Impact	Mitigation
Demolition and Dismantling and Removing Buildings and Other Structures	If the waste from demolition, dismantling, and removal of buildings and other structures is not managed appropriately, several environmental and regulatory risks could arise. Improper handling of construction debris - including concrete, metal, and hazardous materials - may lead to contamination of soil and water, introducing pollutants into surrounding ecosystems. Accumulated debris can result in wasted materials that could otherwise be repurposed, increasing landfill pressure and resource depletion. Additionally, illegal or inappropriate dumping could further degrade environmental conditions and pose legal consequences. The transportation and processing of waste may contribute to emissions, logistical challenges, and safety risks. Failure to adhere to regulatory requirements could lead to compliance violations.	Moderate	Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance. Develop and implement a Comprehensive Waste Management Plan that specifies procedures for on-site waste segregation, temporary storage, handling, and final disposal. This plan should address all material streams, including concrete, metal, and hazardous substances. Segregate waste by type to facilitate recycling and reuse. Identify and repurpose materials where feasible to reduce landfill demand and resource depletion. Maintain records of all waste movements and disposals for audit and regulatory compliance. Targeted training on safe handling and processing of demolition debris, including hazardous materials. Equip workers with appropriate PPE and enforce safe work practices.
			Conduct routine inspections and audits to verify that waste management practices are followed.
Demolition and Dismantling and Removing Buildings and Other Structures	During the demolition, dismantling, and removal of buildings and other structures the workforce may be exposed to health and safety risks caused by hazardous material exposure, dust and particulate matter, and noise.	Moderate	Ensure all workers wear appropriate PPE, including respirators or dust masks, protective eyewear, gloves, hearing protection (earplugs / earmuffs), and coveralls when working in hazardous areas. Develop and enforce strict work procedures and training related to handling hazardous materials, controlling dust, and minimizing noise exposure.
Demolition and Dismantling and Removing Buildings and Other Structures	During the demolition, dismantling, and removal of buildings and other structures there may be noise and vibration impacts caused by heavy machinery and dismantling and demolition operations which can disrupt ecosystems and affect nearby communities.	Minor	Use heavy machinery with noise reduction features and low-vibration technology. All machinery to be regularly serviced and fully functioning. Schedule high-impact activities during daytime hours to minimize disturbance to local communities.
			To maintain positive community relations, the public shall be kept informed about the decommissioning activities and any efforts to minimise disturbance, and procedures for prompt response and corrective action shall be documented within the GRM.

Component	Risks	Impact	Mitigation
Removing Excavated Material	The excavation, handling, and transportation of excavated material like sand can produce dust and particulate matter. This airborne dust can travel into nearby communities and the surrounding environment and contribute to broader air quality degradation.	Minor	Utilize water sprays at excavation and handling points to reduce dust generation. Cover transport vehicles with tarpaulins or netting to contain dust during movement. Regularly clean access roads to prevent dust accumulation. To be discussed with the community and the Ministry of Public Works. Establish and enforce speed limits within community areas
Removing Excavated Material	During the removal of excavated material, there is a risk that the underlying top levels of soil will also be removed and / or be more susceptible to erosion. This may lead to increased turbidity in waterbodies downstream.	Negligible 	Implement immediate re-vegetation or overseeding using native grass species to stabilize soil surfaces. Adjust erosion control measures based on observed performance.
			Establish routine inspections.
Removing Excavated Material	The removed excavated material will likely be transported with heavy machinery and trucks. This can contribute to a reduction in air quality and an increase in greenhouse gas emissions.	Minor	Use well maintained machinery and trucks, implementing regular engine maintenance and tune-ups to ensure optimal performance No idling enforced. Consolidate transport operations to minimize the number of trips required. Cover open loads with tarpaulins to prevent dust dispersion during transit.

Component	Risks	Impact	Mitigation
Removing Excavated Material	If the removed excavated material is not managed appropriately, it could lead to the unnecessary disposal of materials that could otherwise be repurposed or recycled. Improper handling may also result in illegal dumping, contributing to environmental contamination and regulatory violations. Additionally, transporting and processing waste can create logistical challenges, emissions, and safety concerns. If the material is not managed properly, it might obstruct waterways, increasing flood risks and harming aquatic ecosystems, and degrade the visual landscape / effect community aesthetics.	Moderate 	The removal of excavated materials such as sand and boulder rock from the site must be carried out responsibly to comply with environmental regulations and minimize the impact on the surrounding area. Sand may be donated to communities undertaking public infrastructure projects such as schools, clinics, bridges, and other public buildings. Boulders and rocks should be repurposed for riprap (erosion control), retaining walls, or decorative landscaping on-site. Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance. Develop and implement a detailed waste management plan that addresses the entire lifecycle - from on-site segregation to final disposal or repurposing. Include clear protocols for waste sorting, stockpiling, transportation, and processing. Segregate excavated materials (e.g., concrete, metals, soil, and other aggregates) allowing for prioritization of reuse or recycling. Collaborate with local authorities to manage materials that can be repurposed. Ensure all handling, transportation, and disposal activities comply with regulations. Maintain detailed records and audit trails for all waste streams. Use appropriate equipment to transport and process waste. Develop optimized logistics plans to reduce the number of trips. Proactively design and monitor waste storage areas.

Component	Risks	Impact	Mitigation
Slope Stabilisation	While slope stabilisation engineering interventions can help prevent severe erosion, it can change the natural hydrology and soil structure potentially affecting nearby aquatic ecosystems.	Minor	Opt for bioengineering and soft stabilization methods such as vegetative stabilization, live staking, and the use of geotextile mats that integrate natural materials to support slope stability while preserving ecological function. Preserve all trees and vegetation that were not previously cleared / disturbed as part of construction activities i.e., clearing only permitted to take place on vegetation recently established around partially completed structures. Reprofile the riverbanks as per the original soil horizon structure and revegetate with indigenous species. Revegetate / landscape all disturbed areas as part of the decommissioning activities. The rehabilitation shall take place using local topsoil and indigenous plant species.
Site Clearance	Site clearance operations can produce dust and airborne particles from disturbed debris and miscellaneous materials. These particles - potentially mixed with chemical residues or fine particulates from hazardous substances can lead to deteriorated air quality, potentially affecting humans and wildlife.	Minor	Regularly clean access roads to prevent dust accumulation (to be discussed with the community and the Ministry of Public Works). Separate and safely handle any hazardous substances or chemical residues found in cleared materials. Provide PPE, such as N95 respirators, goggles, and dust masks, to workers in high-exposure areas.
Site Clearance	If hazardous materials are mixed with inert construction debris, there is a risk that these contaminants are leached into the soil and nearby waterbodies. This leaching can degrade soil quality, harm aquatic ecosystems, and compromise downstream water quality.	Moderate	Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance. Implement on-site waste segregation protocols by identifying and separating hazardous materials from inert construction debris. Train personnel to recognize hazardous substances so that they are correctly isolated and handled separately. Ensure all waste handling, storage, and disposal practices comply with relevant regulations. Conduct routine inspections and audits to verify that waste management practices are followed.

Component	Risks	Impact	Mitigation
Site Clearance	The site clearing process will generate large quantities of waste that, if not adequately sorted, reused and / or recycled will be disposed of in landfill or dumped. Not only does this contribute to the premature depletion of landfill capacity but represents lost opportunity for recycling and reusing valuable materials, whilst also having potential regulatory non-compliance impacts. If the material is dumped, this could cause physical obstruction which could increase flood risks and / or harm aquatic ecosystems, as well as have an aesthetic impact. There are also potential impacts caused by the transporting and processing of the waste.	Moderate	Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance. Develop and implement an integrated waste management plan that outlines procedures for on-site waste segregation, storage, processing, and final disposal or reuse. Incorporate clear protocols that ensure hazardous, inert, perishable, and recyclable materials are managed through separate waste streams. Establish dedicated waste separation zones with clearly labeled containers for construction debris, perishable items, hazardous materials, and other recyclables. Optimize logistics by consolidating waste transport to reduce the number of trips.
			Conduct routine inspections and audits to verify that waste management practices are followed.
			Collaborate with local authorities and communities to salvage and repurpose valuable construction materials.
Site Clearance	The process of clearing debris, when it includes hazardous substances, presents serious health and safety risks to workers and nearby residents.	Moderate	Conduct site surveys and risk assessments before starting clearance to identify all hazardous substances. Implement strict on-site segregation procedures to ensure hazardous materials are separated from inert debris. Provide workers with appropriate PPE, including respirators, gloves, eye protection, and coveralls, tailored to identified hazards. Deliver comprehensive training on the proper handling, removal, and disposal of hazardous materials, including emergency response protocols.
			Conduct routine inspections and audits to verify that waste management practices are followed.

Component	Risks	Impact	Mitigation
Site Clearance	Use of heavy machinery during site clearance activities can lead to the generation of noise and dust which can disrupt local communities.	Minor	Utilize water sprays at key operations (e.g., excavation and loading areas) to capture dust. Utilise heavy machinery with noise reduction technologies. Heavy machinery operations shall only take place during daytime. Regularly service equipment to ensure optimal functioning. Opt for well-maintained machinery to reduce both noise and particulate emissions.
Rehabilitation	Whilst rehabilitation activities will aim to restore the site's ecological functions and appearance, there is a risk that if improperly managed, the site will not replicate the complexity or services of the original. This risk is increased through the temporary nature of the decommissioning activities.	Moderate	Preserve all trees and vegetation that were not previously cleared / disturbed as part of construction activities i.e., clearing only permitted to take place on vegetation recently established around partially completed structures. Define clear restoration targets that strive to replicate both the complexity and functional aspects of the original environment. Develop a tailored rehabilitation plan that integrates both active restoration (e.g., planting native species, regrading soils) and passive recovery measures (e.g., establishing protective buffers to allow natural recolonization). Utilize bioengineering techniques that promote soil stabilization and habitat complexity, such as the use of living retaining walls, bio-rolls, or erosion control mats seeded with indigenous vegetation. Combine structural rehabilitation with soft, nature-based solutions.
			Set aside resources and responsibilities for ongoing monitoring, maintenance and protection.

Component	Risks	Impact	Mitigation
Rehabilitation	If rehabilitation activities use inappropriate vegetation species or there is a failure to manage soil quality, then there is a risk of persistent erosion or the invasion of undesirable species.	Minor	Select native species proven to thrive in the soil and climatic conditions. Implement soil stabilization measures to protect soil integrity during the establishment phase. Develop a clear rehabilitation plan that integrates appropriate plant species with structural erosion control measures. Use planting techniques that promote rapid ground cover, such as staggered or mixed seeding of complementary native species, to resist erosion and inhibit invasive growth.
Rehabilitation	If areas for rehabilitation do not include carefully designed interventions - such as organic amendments, contouring for water retention, or re-vegetation - the area might experience degraded water filtration and increased runoff potentially leading to reduced water quality downstream.	Minor	Incorporate compost or manure to improve soil structure and water retention. Regrading the land helps retain water in place, increasing infiltration and reducing the potential for erosion and sediment transport downstream. Establish native, deep-rooted vegetation to stabilize the soil and promote water uptake. Preserve all trees and vegetation that were not previously cleared / disturbed as part of construction activities i.e., clearing only permitted to take place on vegetation recently established around partially completed structures.

Component	Risks	Impact	Mitigation
Handling Explosives & Blasting Magazine	When handling the explosives / dismantling the blasting magazine there is always a risk of accidental detonation caused by improper handling, mechanical impact, or exposure to extreme environmental conditions. Therefore, workers involved in the handling and decommissioning process face significant safety risks with physical injuries and exposure to toxic chemicals the primary concerns. Accidental detonation also presents community H&S risks and would release hazardous substances into the environment, create a wide dispersion of debris, and could lead to habitat destruction. Accidental detonations can also generate shock waves, release fine particulates and toxic gases, and trigger fires. These secondary effects can impact air quality and disturb local wildlife and communities.	Major	Utilize Material Safety Data Sheets (MSDS) and risk assessments to inform safe handling, storage, and decommissioning protocols. Only trained personnel with certified experience in explosives and blasting operations should be permitted to handle or remove the explosives and associated magazine. Conduct a detailed hazard analysis and risk assessment specific to explosives handling and dismantling activities. Identify all potential triggering factors (e.g., improper handling, mechanical impact, or extreme environmental conditions etc.) and develop control strategies accordingly. Develop and enforce robust Standard Operating Procedures (SOPs) for the handling of explosives and the dismantling of the blasting magazine. Ensure SOPs cover all stages, from preparatory measures to post-operation cleanup. Establish stringent procedures for isolating and safely storing hazardous materials. Define and enforce exclusion zones. Develop a comprehensive emergency response plan that includes evacuation routes, spill containment, fire suppression, and medical response strategies.
Handling Explosives & Blasting Magazine	Decommissioning the Explosives and Blasting Magazine may involve a controlled explosion which can generate significant noise and vibration disturbance to local communities and wildlife.	Moderate	To maintain positive community relations, the public shall be kept informed about the decommissioning activities and any efforts to minimise disturbance, and procedures for prompt response and corrective action shall be documented within the GRM.

Component	Risks	Impact	Mitigation
Handling Explosives & Blasting Magazine	Explosives typically contain reactive chemicals and additives that may be toxic if leaked. During handling, storage, or decommissioning, accidental spills or degradation of these compounds can contaminate soil and water. Such contamination might affect local ecosystems or alter water quality in nearby waterbodies.	Moderate	Only trained personnel with certified experience in explosives and blasting operations should be permitted to handle or remove the explosives and associated magazine. Conduct detailed analyses of all explosive compounds, including reactive chemicals and additives, to determine their toxicity and potential environmental impacts. Utilize Material Safety Data Sheets (MSDS) and risk assessments to inform safe handling, storage, and decommissioning protocols. Implement strict segregation practices to ensure that reactive explosives are not mixed with other incompatible substances, reducing the risk of chemical reactions during degradation. Establish comprehensive emergency response plans that include immediate spill containment, neutralization, and decontamination protocols.
Handling Explosives & Blasting Magazine	Decommissioning a blasting magazine produces waste streams that require specialized handling. If not, then this can lead to regulatory non-compliance impacts.	Moderate	Rigorously adhere to all regulations regarding the handling, storage, and disposal of hazardous explosive materials. Maintain detailed records of all assessments, handling protocols, and disposal methods to ensure accountability. Provide comprehensive training for all personnel on handling degraded explosives, emergency response procedures, and emergency equipment usage.
Removing Fuel Depot & Contaminated Soils	There is some evidence of legacy spills, leaks and / or seepage of hydrocarbons surrounding the fuel depot which may have led to high concentrations in the surrounding soils. When these are disturbed during removal of the soil, there is a risk that contaminated material may migrate into nearby waterbodies potentially affecting human health and ecosystem integrity.	Moderate	Conduct assessment to delineate the extent and concentration of any hydrocarbon contamination. Segregate contaminated materials from clean soils immediately upon excavation and store them in sealed, leak-proof containers. Ensure that all hazardous waste is processed and disposed of in accordance with regulatory guidelines. Ensure that response equipment, such as spill containment kits and neutralizing agents, is readily available and that team members are trained in their use.

Component	Risks	Impact	Mitigation
Removing Fuel Depot & Contaminated Soils	Removing any contaminated soils surrounding the fuel depot can alter the natural soil composition and lead to increased erosion. This loss of topsoil might reduce its capacity to support vegetation during rehabilitation efforts.	Negligible 	Conduct pre-removal surveys to identify and carefully salvage uncontaminated topsoil. Store salvaged topsoil in secure, controlled areas for later use in rehabilitation.
Removing Fuel Depot & Contaminated Soils	Ecosystems that may have partially colonized the contaminated soil surrounding the fuel depot may experience habitat loss when the soils surrounding the fuel depot are removed or altered. The disturbance can impact microbial communities that play a critical role in biodegradation and natural soil recovery processes.	Minor	Incorporate organic amendments (e.g., compost, biochar) during soil restoration to enhance microbial habitat and promote soil regeneration. Focus on restoring soil structure and moisture retention, which are critical for microbial activity and overall ecosystem recovery. Employ low-impact removal techniques where possible to reduce the disruption of soil ecosystems.
Removing Fuel Depot & Contaminated Soils	Waste from the dismantled fuel depot and the contaminated soils must be handled properly as poorly contained waste increases the likelihood of secondary contamination incidents. Contaminated soils often require specialized treatment - such as stabilization, solidification, or thermal treatment - before they can be disposed of or reused. Inadequate treatment may allow residual contaminants to remain active, prolonging environmental harm and complicating future land remediation efforts.	Minor	Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance. Conduct laboratory analyses to determine the spectrum and concentration of contaminants. Clearly delineate waste streams so that contaminated soils, fuel residues, and other hazardous materials are isolated. Use sealed containers to prevent leaching or accidental releases during transport or temporary storage.
			Consult with regulatory bodies to ensure that all handling, transport, and treatment procedures meet current environmental and safety standards, and that all necessary permits are obtained. Audit of records of all assessments, handling protocols, and waste management processes.

Component	Risks	Impact	Mitigation
Removing Fuel Depot & Contaminated Soils	Workers involved in the excavation, transport, and treatment of contaminated soils from surrounding the fuel depot face health risks if proper safety procedures are not strictly followed.	Moderate	Develop and enforce clear SOPs for each stage of work - from excavation through transport to treatment - to ensure consistent adherence to safety protocols. Equip workers with appropriate PPE including chemical-resistant coveralls, gloves, eye and face protection, and respirators suitable for the contaminants present. Implement measures such as water sprays to limit dust generation during excavation and transport. Limit the duration of exposure.
Removing All Equipment	During the removal of a mix of heavy equipment (e.g., front roller, truck, brick-making machine, rock crusher and pickup vehicle) there is a risk of the release of residual fluids, degraded materials, and potential contaminants to the environment. This risk is increased and further complicated as ownership is unclear, with some assets not maintained and not operational. When dismantling or transporting these assets, leakage or accidental spills can occur. These substances can seep into soil or nearby waterbodies, leading to localised pollution and environmental degradation. Outdated or damaged machinery may have corroded parts that release heavy metals (such as lead or cadmium) and other contaminants, which further contribute to soil and water pollution risks during removal.	Moderate	Clarify ownership and responsibilities. Prepare an inventory of all equipment to identify potential hazards, such as residual fluids, corroded components, and degraded materials. Identify a suitable location for safe storage or consider constructing a shelter on-site to protect the equipment. Although all PACs have been informed about the potential relocation of the equipment, some of the machines are not in operational condition. Prior to dismantling any equipment, drain any residual fluids safely using spill containment systems such as bunding or secondary containment trays. Use certified absorption materials and spill kits to manage any unavoidable leaks during removal or transport. Isolate components known to have corroded parts or heavy metal contamination, and secure them in sealed, leak-proof containers for proper disposal or safe storage. Document and comply with all environmental regulations regarding hazardous waste disposal. Monitor any leakage or changes in soil and water quality during and after equipment removal. Develop and implement robust spill response and decontamination protocols. Ensure workers are specifically trained on emergency actions, and that all necessary decontamination and cleanup equipment is readily available.

Component	Risks	Impact	Mitigation
Removing All Equipment	Decommissioning activities generate a variety of waste materials, including metals, plastics, rubber, and electronic components. If not managed properly, these materials may be wasted instead of repurposed, leading to unnecessary resource consumption. Poor disposal practices can also result in inappropriate or illegal dumping, contributing to environmental contamination and regulatory compliance issues. Additionally, transporting and processing waste can create emissions and logistical challenges, while accumulated debris may obstruct waterways, increasing flood risks and harming aquatic ecosystems. Beyond these environmental concerns, mismanaged waste can negatively impact the visual landscape, diminishing the overall aesthetics of the site and surrounding areas.	Moderate 	Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance. Establish designated areas for segregating metals, plastics, rubber, electronic components, and other waste streams. Train personnel to correctly identify and classify materials, ensuring that reusable or recyclable items are not mixed with non-recyclables. Develop partnerships to recover valuable resources. Follow best practices and regulatory guidelines for the transport, processing, and disposal of hazardous and non-hazardous waste. Develop a rehabilitation plan that includes landscape restoration.
			Audit of records of all assessments, handling protocols, and waste management processes. Collaborate with local authorities and communities to salvage and repurpose valuable construction materials.
Implementing Community Safety Measures	Installation of chain link fencing may close the site to livelihood activities such as fishing and sand mining.	Minor	The chain link fencing will not encircle the entire fifeen acres of the site - just the areas which present a public health and safety risk / areas at risk of erosion. The fenced area shall be determined by RREA and DC following completion of the Comprehensive Site Assessment. Whilst the site will not be entirely closed the local community will not be encouraged to undertake livelihood actitivites as these could contribute to erosion.

Component	Risks	Impact	Mitigation
Implementing Community Safety Measures	During installation, improper handling of waste construction materials (e.g., packaging waste or surplus materials) must be handled appropriately.	Negligible 	Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance. Clearly separate packaging waste, surplus materials, and hazardous wastes as they are generated. Establish dedicated, clearly marked areas for temporary storage of waste materials. Follow waste management guidelines to ensure proper disposal and recycling practices.
			Audit of records of all assessments, handling protocols, and waste management processes.
Implementing Community Safety Measures	Over time, exposure to weather elements may cause corrosion or physical degradation of the fence, signs and / or billboards. Without regular maintenance by RREA, the compromised safety features might release fragments or rust particles into the environment, and faded signage could reduce overall site safety. Any lapses in upkeep (e.g., broken fence panels, faded safety signs) can lead to accidents or unwanted entry to the site which compromise safety; furthermore, this can erode public confidence in the project being completed.	Minor	Choose corrosion-resistant materials (e.g., galvanized steel, stainless steel, aluminum) for fences and structural components. Utilize weatherproof materials or coatings for signs and billboards to maintain their integrity and color over prolonged exposure. Apply high-performance paints and sealants specifically designed for outdoor conditions.

9. Environmental and Social Monitoring Plan

This chapter presents the Environmental and Social Monitoring Plan, which is the monitoring framework to guide compliance with the mitigation measures identified in Chapter 8. The monitoring framework provides indicators, frequencies, responsibilities, and feedback mechanisms to facilitate adaptive management, which are provided in tabular format in Table 9-1.

The monitoring plan is also provided as risk-specific Environmental and Social Protection Plans (ESPPs). This is provided in Section 9.1 and addresses the following key areas: water quality, soil, sediment and erosion control; community risks / health and safety; ecosystem protection / improvement; noise and air quality; waste management; and worker health and safety.

Table 9-1 - Environmental and Social Monitoring Plan

Component	Mitigation	Monitoring	Responsibility	ESPP
Removing Upstream Left Bank Earth Cofferdam	Remove the cofferdam in controlled stages to allow gradual water release and prevent sudden surges. Install silt curtains or turbidity barriers downstream to capture suspended sediments during the release. Schedule removal activities during favorable weather conditions and low-flow periods. Apply immediate erosion control measures (such as bank stabilization or revegetation) in downstream areas to limit potential erosion.	Conduct water quality testing before removal to establish baseline, then conduct daily monitoring of key water quality indicators (e.g., turbidity, temperature sediment) during decommissioning.	Decommissioning Contractor (DC).	Water Quality, Soil, Sediment and Erosion Control
Removing Upstream Left Bank Earth Cofferdam	Dismantle the cofferdam in stages to gradually restore natural flow and prevent abrupt water surges. Develop and implement an emergency response plan, including predefined protocols for rapid intervention. Align removal schedules with favourable hydrological conditions. Inform downstream settlements or river users about the cofferdam removal and the scheduled timeline for its removal.	Conduct daily inspections / monitoring to ensure adherence to implementing ESMP mitigation measures including staged dismantling.	DC, CARES Group, RREA	Community Risks / Health and Safety (H&S)
	Establish clear communication channels with downstream communities and local authorities, providing advance warnings and updates on water release activities.	Number of community engagement and sensitisation campaigns about project activities conducted.	RREA	Community Risks / H&S

Component	Mitigation	Monitoring	Responsibility	ESPP
Removing Upstream Left Bank Earth Cofferdam	Install silt curtains or turbidity barriers downstream of the removal zone. Conduct removal in stages, allowing sediments to settle between phases. Implement temporary sediment traps or diversion channels to capture mobilized sediments.	Conduct water quality testing before removal to establish baseline, then conduct daily monitoring of key water quality indicators (e.g., turbidity, temperature sediment) during removal.	DC	Water Quality, Soil, Sediment and Erosion Control
Removing Upstream Left Bank Earth Cofferdam	Remove in stages to minimize sediment disturbance and reduce the likelihood of releasing pollutants. Ensure removal activities adhere to established water quality standards and promptly intervene if deviations occur.	Conduct water quality testing before removal to establish baseline, then conduct daily monitoring of key water quality indicators (e.g., pH, dissolved oxygen, turbidity, pollutant levels, sediment) during removal.	DC	Water Quality, Soil, Sediment and Erosion Control
Removing Upstream Left Bank Earth Cofferdam	Implement a staged removal process to ensure water flow increases gradually.	Conduct daily inspections / monitoring to ensure adherence to implementing ESMP mitigation measures including staged dismantling.	DC, CARES Group, RREA	Ecosystem Protection / Improvement
Removing Upstream Left Bank Earth Cofferdam	Materials to be repurposed for landscaping and to cover partially exposed concrete works. Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance.	Daily monitoring of dust levels and water quality. Daily inspections of waste management to promptly correct improper practices.	DC	Waste Management Ecosystem Protection / Improvement Noise & Air Quality
	Conduct regular inspections and audits to ensure adherence to regulatory waste management standards. Ensure that only experienced and trained personnel are assigned to the removal of the cofferdam	Conduct daily inspections / monitoring and weekly audits to ensure adherence to regulatory waste management standards.	DC, CARES Group, RREA	Waste Management

Component	Mitigation	Monitoring	Responsibility	ESPP
Removing Upstream Left Bank Earth Cofferdam	Conduct a structural stability assessment to understand the cofferdam's condition. Prepare a work plan to enable the safe removal during the rainy season. Evaluate weather forecasts to determine safe operational windows. Gradually dismantle the cofferdam in phases, using temporary supports as needed to maintain stability throughout each stage. Regulate water release incrementally to minimize sudden surges and manage downstream flow. Develop and implement an Emergency Response Plan with clear procedures for rapid evacuation, spill management etc. Suspend removal operations during extreme rainfall or adverse weather events. ensure that only experienced and trained personnel are assigned to the removal of the cofferdam	Conduct daily inspections / monitoring to ensure adherence to implementing ESMP mitigation measures.	DC, CARES Group, RREA	Worker H&S Community Risks / H&S
	Establish clear communication channels with downstream communities and local authorities, providing advance warnings and updates on water release activities.	Number of community engagement and sensitisation campaigns about project activities conducted.	RREA	Community Risks / H&S
Removing Left Bank Geo-Bag Cofferdam	Remove the cofferdam in controlled stages to allow a gradual, predictable release of water rather than an abrupt surge. Regulate water flow during removal, ensuring that discharge rates remain within safe and predictable limits. Install temporary silt curtains or turbidity barriers downstream to capture mobilized sediments. Implement bank stabilization measures to counteract potential erosion. Develop and implement an emergency response plan. Inform downstream communities about the operation schedule and water release events.	Conduct water quality testing before removal to establish baseline, then conduct daily monitoring of key water quality indicators (e.g., turbidity, sediment) during removal.	DC	Water Quality, Soil, Sediment and Erosion Control

Component	Mitigation	Monitoring	Responsibility	ESPP
Removing Left Bank Geo-Bag Cofferdam	Dismantle the cofferdam gradually to allow controlled water release. Install silt curtains or turbidity barriers downstream and implement bank stabilization measures to reduce erosion. Inform downstream communities about the removal schedule and water release events.	Conduct water quality testing before removal to establish baseline, then conduct daily monitoring of key water quality indicators (e.g., turbidity, sediment) during removal.	DC	Water Quality, Soil, Sediment and Erosion Control
Removing Left Bank Geo-Bag Cofferdam	Segregate synthetic geo-bag materials from other materials. Geo-Bag fill returned to borrow pits, whilst the geobags should be disposed of at an approved disposal site following their removal. Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance.	Daily inspections / monitoring to ensure all waste management practices meet regulatory requirements and to identify any potential environmental degradation early.	DC, CARES Group, RREA	Waste Management
Removing Exposed Rebar	Require all workers to wear appropriate PPE, including safety goggles or face shields, cut-resistant gloves, long-sleeved protective clothing, steel-toe boots, and hearing protection. Use certified and well-maintained cutting equipment. Inspect tools before each use to ensure they are functioning correctly. Exposed rebar should be cut using suitable tools such as rebar cutters, angle grinders, or oxy-acetylene torches, depending on the size and accessibility of the material. Demarcate the work area. Follow established safe cutting procedures, including proper positioning and two-hand operation. Provide specific training on the proper use of cutting equipment and hazard awareness related to sharp edges and flying debris. Maintain strict on-site supervision during the cutting operations. Implement procedures for the immediate removal and safe disposal of cut rebar fragments and metal shavings to reduce subsequent hazards.	The DCs site-specific health and safety plan should be signed off by RREA, CARES Group, and DC prior to commencing decommissioning. Records of PPE issuance and training delivery.	DC	Worker H&S

Component	Mitigation	Monitoring	Responsibility	ESPP
Removing Exposed Rebar	Plan rebar removal during periods of low water levels. If water levels are high, delay operations until conditions improve. Develop and communicate an emergency action plan. Avoid using electric tools in a wet environment Use battery-powered or hydraulic tools in wet environment	Emergency action plan to be signed off my RREA, CARES Group, and DC. Monitor water levels and weather conditions during operations and cease work immediately if conditions become unsafe.	DC	Worker H&S
Removing Exposed Rebar	Ensure workers use appropriate respiratory protection in addition to goggles, gloves, and hearing protection. Where feasible, employ wet cutting methods to suppress dust generation during the cutting process. Train workers in the proper use of PPE and safe cutting procedures to minimize exposure.	Monitor air quality during cutting operations, ensuring they remain within safe limits. Records of PPE issuance and training delivery.	DC	Worker H&S Noise & Air Quality
Removing Exposed Rebar	Require all workers to wear appropriate hearing protection (e.g., earplugs or earmuffs). Ensure cutting equipment is well-maintained and outfitted with noise reduction features. Schedule noisy operations to minimize disturbance. To maintain positive community relations, the public shall be kept informed about the decommissioning activities and any efforts to minimise disturbance, and procedures for prompt response and corrective action shall be documented within the GRM.	Monitor noise levels during cutting operations, ensuring they remain within acceptable limits and triggering operational adjustments if necessary.	DC	Noise & Air Quality
Removing Exposed Rebar	Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance. Collect all cut rebar immediately and store it in designated, covered containers. Segregate clean and contaminated rebar, directing all scrap to scrap dealers. Prevent debris from entering waterways. Adhere strictly to waste management regulations including records to ensure compliance. Safely secure metal scraps to eliminate public and wildlife safety hazards.	Daily inspections / weekly monitoring to ensure all waste management practices meet regulatory requirements.	DC, CARES Group, RREA	Waste Management

Component	Mitigation	Monitoring	Responsibility	ESPP
Covering Exposed Concrete Works	Inspect and secure unstable or eroding surfaces before work begins. Prepare a work plan that enables the activity to be safely conducted in the rainy season. Monitor weather conditions and water levels, postponing high-risk activities during heavy rainfall or rapidly changing conditions. Schedule work during periods of low rain and more stable conditions.	Weekly progress reporting of decommissioning activities.	DC	Worker H&S
Covering Exposed Concrete Works	Qualified structural engineers to conduct inspections and document the condition of all partially completed structures and to determine which structures require stabilization (cover, backfill) versus those slated for dimantling and removal.	Report detailing assessment to be signed off by qualified structural engineers.	RREA, DC	Worker H&S
	Establish safe work perimeters around vulnerable structures and provide specialized training for personnel working on, or near unstable or partially complete works.	Records of training undertaken.	DC	Worker H&S
Covering Exposed Concrete Works	Conduct site trials to assess the erosion resistance and overall suitability of material for cover applications. Develop an adaptive management plan that allows for rapid changes in remediation techniques if the material fails to perform as intended.	Weekly progress reporting of decommissioning activities.	DC	Water Quality, Soil, Sediment and Erosion Control Ecosystem Protection / Improvement
	Schedule frequent site inspections to assess the integrity of the cover layer, looking for signs of deterioration, displacement, or early erosion.	Quarterly site inspections to assess the integrity of the cover layer, looking for signs of deterioration, displacement, or early erosion. This should continue until RREA decide what to do as a permanent solution.	RREA	Water Quality, Soil, Sediment and Erosion Control Ecosystem Protection / Improvement

Component	Mitigation	Monitoring	Responsibility	ESPP
Demolition and Dismantling and Removing Buildings and Other Structures	Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance. Develop and implement a Comprehensive Waste Management Plan that specifies procedures for on-site waste segregation, temporary storage, handling, and final disposal. This plan should address all material streams, including concrete, metal, and hazardous substances. Segregate waste by type to facilitate recycling and reuse. Identify and repurpose materials where feasible to reduce landfill demand and resource depletion. Maintain records of all waste movements and disposals for audit and regulatory compliance. Targeted training on safe handling and processing of demolition debris, including hazardous materials. Equip workers with appropriate PPE and enforce safe work practices.	Weekly progress reporting of decommissioning activities. Waste Management Plan signed off by RREA, CARES Group, and DC.	DC	Waste Management Worker H&S
	Conduct routine inspections and audits to verify that waste management practices are followed.	Daily inspections / monitoring to ensure all waste management practices meet regulatory requirements.	DC, CARES Group, RREA	Waste Management
Demolition and Dismantling and Removing Buildings and Other Structures	Ensure all workers wear appropriate PPE, including respirators or dust masks, protective eyewear, gloves, hearing protection (earplugs / earmuffs), and coveralls when working in hazardous areas. Develop and enforce strict work procedures and training related to handling hazardous materials, controlling dust, and minimizing noise exposure.	Implement daily air quality and noise level monitoring to ensure that levels remain within safe limits and adjust controls as necessary. Records of PPE issuance and training delivery.	DC	Noise & Air Quality Worker H&S
Demolition and Dismantling and Removing Buildings and Other Structures	Use heavy machinery with noise reduction features and low-vibration technology. All machinery to be regularly serviced and fully functioning. Schedule high-impact activities during daytime hours to minimize disturbance to local communities.	Implement daily noise monitoring to ensure levels remain within acceptable limits. Records of recent service history of the machinery.	DC	Noise & Air Quality Worker H&S

Component	Mitigation	Monitoring	Responsibility	ESPP
	To maintain positive community relations, the public shall be kept informed about the decommissioning activities and any efforts to minimise disturbance, and procedures for prompt response and corrective action shall be documented within the GRM.	Number of community engagement and sensitisation campaigns about project activities conducted.	RREA	Community Risks / H&S
Removing Excavated Material	Utilize water sprays at excavation and handling points to reduce dust generation. Cover transport vehicles with tarpaulins or netting to contain dust during movement. Regularly clean access roads to prevent dust accumulation. To be discussed with the community and the Ministry of Public Works. Establish and enforce speed limits within community areas	Establish air quality baseline before removal, then conduct daily monitoring of dust levels during decommissioning to ensure particulate levels remain within acceptable limits and adjust controls if necessary.	DC	Noise & Air Quality
Removing Excavated Material	Implement immediate re-vegetation or overseeding using native grass species to stabilize soil surfaces. Adjust erosion control measures based on observed performance.	Conduct water quality testing before removal to establish baseline, then conduct daily monitoring of key water quality indicators (e.g., turbidity, sediment) during removal.	DC	Water Quality, Soil, Sediment and Erosion Control
	Establish routine inspections.	Establish routine inspections.	RREA	Water Quality, Soil, Sediment and Erosion Control
Removing Excavated Material	Use well maintained machinery and trucks, implementing regular engine maintenance and tune-ups to ensure optimal performance No idling enforced. Consolidate transport operations to minimize the number of trips required. Cover open loads with tarpaulins to prevent dust dispersion during transit.	Establish air quality baseline before removal, then conduct daily monitoring during decommissioning to ensure air quality remains within acceptable limits and adjust controls if levels exceed acceptable limits.	DC	Noise & Air Quality
Removing Excavated Material	The removal of excavated materials such as sand and boulder rock from the site must be carried out responsibly to comply with environmental regulations and minimize the impact on the surrounding area. Sand may be donated to communities	Establish baseline prior to removal then implement daily monitoring of air quality, water quality, and soil conditions near the site.	DC	Noise & Air Quality Soil Quality

Component	Mitigation	Monitoring	Responsibility	ESPP
	undertaking public infrastructure projects such as schools, clinics, bridges, and other public buildings. Boulders and rocks should be repurposed for riprap (erosion control), retaining walls, or decorative landscaping on-site. Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance. Develop and implement a detailed waste management plan that addresses the entire lifecycle - from on-site segregation to final disposal or repurposing. Include clear protocols for waste sorting, stockpiling, transportation, and processing. Segregate excavated materials (e.g., concrete, metals, soil, and other aggregates) allowing for prioritization of reuse or recycling. Collaborate with local authorities to manage materials that can be repurposed. Ensure all handling, transportation, and disposal activities comply with regulations. Maintain detailed records and audit trails for all waste streams. Use appropriate equipment to transport and process waste. Develop optimized logistics plans to reduce the number of trips. Proactively design and monitor waste storage areas.	Conduct daily inspections / monitoring to verify that waste management practices are followed.	DC, CARES Group, RREA	Waste Management

Component	Mitigation	Monitoring	Responsibility	ESPP
Slope Stabilisation	Opt for bioengineering and soft stabilization methods such as vegetative stabilization, live staking, and the use of geotextile mats that integrate natural materials to support slope stability while preserving ecological function. Preserve all trees and vegetation that were not previously cleared / disturbed as part of construction activities i.e., clearing only permitted to take place on vegetation recently established around partially completed structures. Reprofile the riverbanks as per the original soil horizon structure and revegetate with indigenous species. Revegetate / landscape all disturbed areas as part of the decommissioning activities. The rehabilitation shall take place using local topsoil and indigenous plant species.	Revegetation / slope stabilisation plan to be signed off by RREA, CARES Group, and DC before decommissioning. Conduct water quality testing before removal to establish baseline, then conduct daily monitoring of key water quality indicators (e.g., pH, dissolved oxygen, turbidity, pollutant levels, sediment) during removal.	DC	Ecosystem Protection / Improvement Water Quality, Soil, Sediment and Erosion Control
Site Clearance	Regularly clean access roads to prevent dust accumulation (to be discussed with the community and the Ministry of Public Works). Separate and safely handle any hazardous substances or chemical residues found in cleared materials. Provide PPE, such as N95 respirators, goggles, and dust masks, to workers in high-exposure areas.	Collect air quality measurements before decommissioning to establish baseline, then conduct daily monitoring during decommissioning activities. Records of PPE issuance.	DC	Noise & Air Quality Worker H&S
Site Clearance	Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance. Implement on-site waste segregation protocols by identifying and separating hazardous materials from inert construction debris. Train personnel to recognize hazardous substances so that they are correctly isolated and handled separately. Ensure all waste handling, storage, and disposal practices comply with relevant regulations.	Establish baseline before decommissioning, then institute a weekly monitoring programme to check water quality near any storage and processing areas. Implement continuous monitoring of waste handling processes.	DC	Waste Management Water Quality, Soil, Sediment and Erosion Control
	Conduct routine inspections and audits to verify that waste management practices are followed.	Conduct daily inspections / monitoring to verify that waste management practices are followed.	DC, CARES Group, RREA	Waste Management

Component	Mitigation	Monitoring	Responsibility	ESPP
Site Clearance	Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance. Develop and implement an integrated waste management plan that outlines procedures for on-site waste segregation, storage, processing, and final disposal or reuse. Incorporate clear protocols that ensure hazardous, inert, perishable, and recyclable materials are managed through separate waste streams. Establish dedicated waste separation zones with clearly labeled containers for construction debris, perishable items, hazardous materials, and other recyclables. Optimize logistics by consolidating waste transport to reduce the number of trips.	Conduct routine inspections to verify that waste management practices are followed. Waste Management Plan signed off by RREA, CARES Group, and DC.	DC	Waste Management
	Conduct routine inspections and audits to verify that waste management practices are followed.	Conduct daily inspections / monitoring to verify that waste management practices are followed.	DC, CARES Group, RREA	Waste Management
	Collaborate with local authorities and communities to salvage and repurpose valuable construction materials.	Waste Management Plan signed off by RREA, CARES Group, and DC.	RREA	Waste Management
Site Clearance	Conduct site surveys and risk assessments before starting clearance to identify all hazardous substances. Implement strict on-site segregation procedures to ensure hazardous materials are separated from inert debris. Provide workers with appropriate PPE, including respirators, gloves, eye protection, and coveralls, tailored to identified hazards. Deliver comprehensive training on the proper handling, removal, and disposal of hazardous materials, including emergency response protocols.	Weekly progress reporting of decommissioning activities. Records of PPE issuance and training delivery.	DC	Worker H&S
	Conduct routine inspections and audits to verify that waste management practices are followed.	Conduct daily inspections / monitoring to verify that waste management practices are followed.	DC, CARES Group, RREA	Waste Management

Component	Mitigation	Monitoring	Responsibility	ESPP
Site Clearance	Utilize water sprays at key operations (e.g., excavation and loading areas) to capture dust. Utilise heavy machinery with noise reduction technologies. Heavy machinery operations shall only take place during daytime. Regularly service equipment to ensure optimal functioning. Opt for well-maintained machinery to reduce both noise and particulate emissions.	Establish baseline, then conduct daily dust and noise monitoring.	DC	Noise & Air Quality
Rehabilitation	Preserve all trees and vegetation that were not previously cleared / disturbed as part of construction activities i.e., clearing only permitted to take place on vegetation recently established around partially completed structures. Define clear restoration targets that strive to replicate both the complexity and functional aspects of the original environment. Develop a tailored rehabilitation plan that integrates both active restoration (e.g., planting native species, regrading soils) and passive recovery measures (e.g., establishing protective buffers to allow natural recolonization). Utilize bioengineering techniques that promote soil stabilization and habitat complexity, such as the use of living retaining walls, bio-rolls, or erosion control mats seeded with indigenous vegetation. Combine structural rehabilitation with soft, nature-based solutions.	Weekly progress reporting of decommissioning activities. Rehabilitation Plan signed off by RREA, CARES Group and DC.	DC	Ecosystem Protection / Improvement
	Set aside resources and responsibilities for ongoing monitoring, maintenance and protection.	Set aside resources and responsibilities for post-decommissioning monitoring, maintenance, and protection.	RREA	Ecosystem Protection / Improvement
Rehabilitation	Select native species proven to thrive in the soil and climatic conditions. Implement soil stabilization measures to protect soil integrity during the establishment phase. Develop a clear rehabilitation plan that integrates appropriate plant species with structural erosion control measures. Use planting techniques that promote rapid ground cover, such as staggered or mixed seeding of complementary native species, to resist erosion and inhibit invasive growth.	Rehabilitation Plan signed off by RREA, CARES Group, and DC.	DC	Ecosystem Protection / Improvement

Component	Mitigation	Monitoring	Responsibility	ESPP
Rehabilitation	Incorporate compost or manure to improve soil structure and water retention. Regrading the land helps retain water in place, increasing infiltration and reducing the potential for erosion and sediment transport downstream. Establish native, deep-rooted vegetation to stabilize the soil and promote water uptake. Preserve all trees and vegetation that were not previously cleared / disturbed as part of construction activities i.e., clearing only permitted to take place on vegetation recently established around partially completed structures.	Establish baseline, then monitor water quality downstream. Rehabilitation Plan signed off by RREA, CARES Group, and DC.	DC	Ecosystem Protection / Improvement Water Quality, Soil, Sediment and Erosion Control
Handling Explosives & Blasting Magazine	Utilize Material Safety Data Sheets (MSDS) and risk assessments to inform safe handling, storage, and decommissioning protocols. Only trained personnel with certified experience in explosives and blasting operations should be permitted to handle or remove the explosives and associated magazine. Conduct a detailed hazard analysis and risk assessment specific to explosives handling and dismantling activities. Identify all potential triggering factors (e.g., improper handling, mechanical impact, or extreme environmental conditions etc.) and develop control strategies accordingly. Develop and enforce robust Standard Operating Procedures (SOPs) for the handling of explosives and the dismantling of the blasting magazine. Ensure SOPs cover all stages, from preparatory measures to post-operation cleanup. Establish stringent procedures for isolating and safely storing hazardous materials. Define and enforce exclusion zones. Develop a comprehensive emergency response plan that includes evacuation routes, spill containment, fire suppression, and medical response strategies.	Risk Assessment, Standard Operating Procedures (SOPs) and Comprehensive Emergency Response Plan signed off by RREA, CARES Group, and DC.	DC	Worker H&S Waste Management Community Risks / H&S

Component	Mitigation	Monitoring	Responsibility	ESPP
Handling Explosives & Blasting Magazine	To maintain positive community relations, the public shall be kept informed about the decommissioning activities and any efforts to minimise disturbance, and procedures for prompt response and corrective action shall be documented within the GRM.	Records of community engagement and sensitisation campaigns about project activities conducted.	RREA	Noise & Air Quality
Handling Explosives & Blasting Magazine	Only trained personnel with certified experience in explosives and blasting operations should be permitted to handle or remove the explosives and associated magazine. Conduct detailed analyses of all explosive compounds, including reactive chemicals and additives, to determine their toxicity and potential environmental impacts. Utilize Material Safety Data Sheets (MSDS) and risk assessments to inform safe handling, storage, and decommissioning protocols. Implement strict segregation practices to ensure that reactive explosives are not mixed with other incompatible substances, reducing the risk of chemical reactions during degradation. Establish comprehensive emergency response plans that include immediate spill containment, neutralization, and decontamination protocols.	Risk Assessment, Standard Operating Procedures (SOPs) and Comprehensive Emergency Response Plan signed off by RREA, CARES Group, and DC.	DC	Worker H&S Waste Management Water Quality, Soil, Sediment and Erosion Control
Handling Explosives & Blasting Magazine	Rigorously adhere to all regulations regarding the handling, storage, and disposal of hazardous explosive materials. Maintain detailed records of all assessments, handling protocols, and disposal methods to ensure accountability. Provide comprehensive training for all personnel on handling degraded explosives, emergency response procedures, and emergency equipment usage.	Conduct routine inspections to verify that waste management practices are followed. Waste Management Plan signed off by RREA, CARES Group, and DC.	DC	Waste Management
		Audit of records of all assessments, handling protocols, and waste management processes.	CARES Group	Waste Management

Component	Mitigation	Monitoring	Responsibility	ESPP
Removing Fuel Depot & Contaminated Soils	Conduct assessment to delineate the extent and concentration of any hydrocarbon contamination. Segregate contaminated materials from clean soils immediately upon excavation and store them in sealed, leak-proof containers. Ensure that all hazardous waste is processed and disposed of in accordance with regulatory guidelines. Ensure that response equipment, such as spill containment kits and neutralizing agents, is readily available and that team members are trained in their use.	Establish baseline, then monitor soil, water, and air quality.	DC	Water Quality, Soil, Sediment and Erosion Control
Removing Fuel Depot & Contaminated Soils	Conduct pre-removal surveys to identify and carefully salvage uncontaminated topsoil. Store salvaged topsoil in secure, controlled areas for later use in rehabilitation.	Weekly progress reporting of decommissioning activities.	DC	Water Quality, Soil, Sediment and Erosion Control
Removing Fuel Depot & Contaminated Soils	Incorporate organic amendments (e.g., compost, biochar) during soil restoration to enhance microbial habitat and promote soil regeneration. Focus on restoring soil structure and moisture retention, which are critical for microbial activity and overall ecosystem recovery. Employ low-impact removal techniques where possible to reduce the disruption of soil ecosystems.	Weekly progress reporting of decommissioning activities.	DC	Water Quality, Soil, Sediment and Erosion Control
Removing Fuel Depot & Contaminated Soils	Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance. Conduct laboratory analyses to determine the spectrum and concentration of contaminants. Clearly delineate waste streams so that contaminated soils, fuel residues, and other hazardous materials are isolated. Use sealed containers to prevent leaching or accidental releases during transport or temporary storage.	Weekly progress reporting of decommissioning activities.	DC	Waste Management

Component	Mitigation	Monitoring	Responsibility	ESPP
	Consult with regulatory bodies to ensure that all handling, transport, and treatment procedures meet current environmental and safety standards, and that all necessary permits are obtained. Audit of records of all assessments, handling protocols, and waste management processes.	Audit of records of all assessments, handling protocols, and waste management processes.	RREA	Waste Management
Removing Fuel Depot & Contaminated Soils	Develop and enforce clear SOPs for each stage of work - from excavation through transport to treatment - to ensure consistent adherence to safety protocols. Equip workers with appropriate PPE including chemical-resistant coveralls, gloves, eye and face protection, and respirators suitable for the contaminants present. Implement measures such as water sprays to limit dust generation during excavation and transport. Limit the duration of exposure.	Establish baseline then monitor air quality to detect any change in dust or contaminant concentrations.	DC	Worker H&S Noise & Air Quality
Removing All Equipment	Clarify ownership and responsibilities. Prepare an inventory of all equipment to identify potential hazards, such as residual fluids, corroded components, and degraded materials. Identify a suitable location for safe storage or consider constructing a shelter on-site to protect the equipment. Although all PACs have been informed about the potential relocation of the equipment, some of the machines are not in operational condition.	Audit of records of all assessments.	DC / RREA	Waste Management Water Quality, Soil, Sediment and Erosion Control

Component	Mitigation	Monitoring	Responsibility	ESPP
	Prior to dismantling any equipment, drain any residual fluids safely using spill containment systems such as bunding or secondary containment trays. Use certified absorption materials and spill kits to manage any unavoidable leaks during removal or transport. Isolate components known to have corroded parts or heavy metal contamination, and secure them in sealed, leak-proof containers for proper disposal or safe storage. Document and comply with all environmental regulations regarding hazardous waste disposal. Monitor any leakage or changes in soil and water quality during and after equipment removal. Develop and implement robust spill response and decontamination protocols. Ensure workers are specifically trained on emergency actions, and that all necessary decontamination and cleanup equipment is readily available.	Establish baseline, then monitor soil, water, and air quality.	DC	Waste Management Water Quality, Soil, Sediment and Erosion Control
Removing All Equipment	Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance. Establish designated areas for segregating metals, plastics, rubber, electronic components, and other waste streams. Train personnel to correctly identify and classify materials, ensuring that reusable or recyclable items are not mixed with non-recyclables. Develop partnerships to recover valuable resources. Follow best practices and regulatory guidelines for the transport, processing, and disposal of hazardous and non-hazardous waste. Develop a rehabilitation plan that includes landscape restoration.	Establish baseline, then monitor local water quality during decommissioning.	DC	Waste Management Water Quality, Soil, Sediment and Erosion Control
	Audit of records of all assessments, handling protocols, and waste management processes. Collaborate with local authorities and communities to salvage and repurpose valuable construction materials.	Audit of records of all assessments, handling protocols, and waste management processes. Waste Management Plan signed off by RREA, CARES Group, and DC.	RREA	Waste Management

Component	Mitigation	Monitoring	Responsibility	ESPP
Implementing Community Safety Measures	The chain link fencing will not encircle the entire fifeen acres of the site - just the areas which present a public health and safety risk / areas at risk of erosion. The fenced area shall be determined by RREA and DC following completion of the Comprehensive Site Assessment. Whilst the site will not be entirely closed the local community will not be encouraged to undertake livelihood actitivites as these could contribute to erosion.	The number of community complaints will be monitored.	DC, RREA	Community Risks / H&S
Implementing Community Safety Measures	Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance. Clearly separate packaging waste, surplus materials, and hazardous wastes as they are generated. Establish dedicated, clearly marked areas for temporary storage of waste materials. Follow waste management guidelines to ensure proper disposal and recycling practices.	Daily inspections of waste handling areas to promptly correct improper practices.	DC	Waste Management
	Audit of records of all assessments, handling protocols, and waste management processes.	Audit of records of all assessments, handling protocols, and waste management processes.	CARES Group	Waste Management
Implementing Community Safety Measures	Choose corrosion-resistant materials (e.g., galvanized steel, stainless steel, aluminum) for fences and structural components. Utilize weatherproof materials or coatings for signs and billboards to maintain their integrity and color over prolonged exposure. Apply high-performance paints and sealants specifically designed for outdoor conditions.	Implement a strict maintenance schedule with routine inspections (e.g., quarterly or biannually) to monitor corrosion levels, physical deterioration, and the signage condition. Use checklists and document findings to prioritize repair and replacement work.	RREA, DC	Community Risks / H&S

9.1. Environmental and Social Protection Plans (ESPPs)

9.1.1. Water Quality, Soil, Sediment and Erosion Control

Table 9-2 presents the ESPP for water quality, soil, sediment and erosion control.

Table 9-2 - ESPP for Water Quality, Soil, Sediment, and Erosion Control

Mitigation	Monitoring	Responsibility
Remove the cofferdam in controlled stages to allow gradual water release and prevent sudden surges. Install silt curtains or turbidity barriers downstream to capture suspended sediments during the release. Schedule removal activities during favorable weather conditions and low-flow periods. Apply immediate erosion control measures (such as bank stabilization or revegetation) in downstream areas to limit potential erosion.	Conduct water quality testing before removal to establish baseline, then conduct daily monitoring of key water quality indicators (e.g., turbidity, temperature sediment) during decommissioning.	Decommissioning Contractor (DC).
Install silt curtains or turbidity barriers downstream of the removal zone. Conduct removal in stages, allowing sediments to settle between phases. Implement temporary sediment traps or diversion channels to capture mobilized sediments.	Conduct water quality testing before removal to establish baseline, then conduct daily monitoring of key water quality indicators (e.g., turbidity, temperature sediment) during removal.	DC
Remove in stages to minimize sediment disturbance and reduce the likelihood of releasing pollutants. Ensure removal activities adhere to established water quality standards and promptly intervene if deviations occur.	Conduct water quality testing before removal to establish baseline, then conduct daily monitoring of key water quality indicators (e.g., pH, dissolved oxygen, turbidity, pollutant levels, sediment) during removal.	DC
Remove the cofferdam in controlled stages to allow a gradual, predictable release of water rather than an abrupt surge. Regulate water flow during removal, ensuring that discharge rates remain within safe and predictable limits. Install temporary silt curtains or turbidity barriers downstream to capture mobilized sediments. Implement bank stabilization measures to counteract potential erosion. Develop and implement an emergency response plan. Inform downstream communities about the operation schedule and water release events.	Conduct water quality testing before removal to establish baseline, then conduct daily monitoring of key water quality indicators (e.g., turbidity, sediment) during removal.	DC

Mitigation	Monitoring	Responsibility
Dismantle the cofferdam gradually to allow controlled water release. Install silt curtains or turbidity barriers downstream and implement bank stabilization measures to reduce erosion. Inform downstream communities about the removal schedule and water release events.	Conduct water quality testing before removal to establish baseline, then conduct daily monitoring of key water quality indicators (e.g., turbidity, sediment) during removal.	DC
Conduct site trials to assess the erosion resistance and overall suitability of material for cover applications. Develop an adaptive management plan that allows for rapid changes in remediation techniques if the material fails to perform as intended.	Weekly progress reporting of decommissioning activities.	DC
Schedule frequent site inspections to assess the integrity of the cover layer, looking for signs of deterioration, displacement, or early erosion.	Quarterly site inspections to assess the integrity of the cover layer, looking for signs of deterioration, displacement, or early erosion. This should continue until RREA decide what to do as a permanent solution.	RREA
Implement immediate re-vegetation or overseeding using native grass species to stabilize soil surfaces. Adjust erosion control measures based on observed performance.	Conduct water quality testing before removal to establish baseline, then conduct daily monitoring of key water quality indicators (e.g., turbidity, sediment) during removal.	DC
Establish routine inspections.	Establish routine inspections.	RREA
Opt for bioengineering and soft stabilization methods such as vegetative stabilization, live staking, and the use of geotextile mats that integrate natural materials to support slope stability while preserving ecological function. Preserve all trees and vegetation that were not previously cleared / disturbed as part of construction activities i.e., clearing only permitted to take place on vegetation recently established around partially completed structures. Reprofile the riverbanks as per the original soil horizon structure and revegetate with indigenous species. Revegetate / landscape all disturbed areas as part of the decommissioning activities. The rehabilitation shall take place using local topsoil and indigenous plant species.	Revegetation / slope stabilisation plan to be signed off by RREA, CARES Group, and DC before decommissioning. Conduct water quality testing before removal to establish baseline, then conduct daily monitoring of key water quality indicators (e.g., pH, dissolved oxygen, turbidity, pollutant levels, sediment) during removal.	DC

Mitigation	Monitoring	Responsibility
Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance. Implement on-site waste segregation protocols by identifying and separating hazardous materials from inert construction debris. Train personnel to recognize hazardous substances so that they are correctly isolated and handled separately. Ensure all waste handling, storage, and disposal practices comply with relevant regulations.	Establish baseline before decommissioning, then institute a weekly monitoring programme to check water quality near any storage and processing areas. Implement continuous monitoring of waste handling processes.	DC
Incorporate compost or manure to improve soil structure and water retention. Regrading the land helps retain water in place, increasing infiltration and reducing the potential for erosion and sediment transport downstream. Establish native, deep-rooted vegetation to stabilize the soil and promote water uptake. Preserve all trees and vegetation that were not previously cleared / disturbed as part of construction activities i.e., clearing only permitted to take place on vegetation recently established around partially completed structures.	Establish baseline, then monitor water quality downstream. Rehabilitation Plan signed off by RREA, CARES Group, and DC.	DC
Only trained personnel with certified experience in explosives and blasting operations should be permitted to handle or remove the explosives and associated magazine. Conduct detailed analyses of all explosive compounds, including reactive chemicals and additives, to determine their toxicity and potential environmental impacts. Utilize Material Safety Data Sheets (MSDS) and risk assessments to inform safe handling, storage, and decommissioning protocols. Implement strict segregation practices to ensure that reactive explosives are not mixed with other incompatible substances, reducing the risk of chemical reactions during degradation. Establish comprehensive emergency response plans that include immediate spill containment, neutralization, and decontamination protocols.	Risk Assessment, Standard Operating Procedures (SOPs) and Comprehensive Emergency Response Plan signed off by RREA, CARES Group, and DC.	DC

Mitigation	Monitoring	Responsibility
Conduct assessment to delineate the extent and concentration of any hydrocarbon contamination. Segregate contaminated materials from clean soils immediately upon excavation and store them in sealed, leak-proof containers. Ensure that all hazardous waste is processed and disposed of in accordance with regulatory guidelines. Ensure that response equipment, such as spill containment kits and neutralizing agents, is readily available and that team members are trained in their use.	Establish baseline, then monitor soil, water, and air quality.	DC
Conduct pre-removal surveys to identify and carefully salvage uncontaminated topsoil. Store salvaged topsoil in secure, controlled areas for later use in rehabilitation.	Weekly progress reporting of decommissioning activities.	DC
Incorporate organic amendments (e.g., compost, biochar) during soil restoration to enhance microbial habitat and promote soil regeneration. Focus on restoring soil structure and moisture retention, which are critical for microbial activity and overall ecosystem recovery. Employ low-impact removal techniques where possible to reduce the disruption of soil ecosystems.	Weekly progress reporting of decommissioning activities.	DC
Clarify ownership and responsibilities. Prepare an inventory of all equipment to identify potential hazards, such as residual fluids, corroded components, and degraded materials. Identify a suitable location for safe storage or consider constructing a shelter on-site to protect the equipment. Although all PACs have been informed about the potential relocation of the equipment, some of the machines are not in operational condition.	Audit of records of all assessments.	DC / RREA

Mitigation	Monitoring	Responsibility
Prior to dismantling any equipment, drain any residual fluids safely using spill containment systems such as bunding or secondary containment trays. Use certified absorption materials and spill kits to manage any unavoidable leaks during removal or transport. Isolate components known to have corroded parts or heavy metal contamination, and secure them in sealed, leak-proof containers for proper disposal or safe storage. Document and comply with all environmental regulations regarding hazardous waste disposal. Monitor any leakage or changes in soil and water quality during and after equipment removal. Develop and implement robust spill response and decontamination protocols. Ensure workers are specifically trained on emergency actions, and that all necessary decontamination and cleanup equipment is readily available.	Establish baseline, then monitor soil, water, and air quality.	DC
Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance. Establish designated areas for segregating metals, plastics, rubber, electronic components, and other waste streams. Train personnel to correctly identify and classify materials, ensuring that reusable or recyclable items are not mixed with non-recyclables. Develop partnerships to recover valuable resources. Follow best practices and regulatory guidelines for the transport, processing, and disposal of hazardous and non-hazardous waste. Develop a rehabilitation plan that includes landscape restoration.	Establish baseline, then monitor local water quality during decommissioning.	DC

9.1.2. Community Risks / Health and Safety

Table 9-3 presents the ESPP for community risks / health and safety.

Table 9-3 - ESPP for Community Risks / Health and Safety

Mitigation	Monitoring	Responsibility
Dismantle the cofferdam in stages to gradually restore natural flow and prevent abrupt water surges. Develop and implement an emergency response plan, including predefined protocols for rapid intervention. Align removal schedules with favourable hydrological conditions. Inform downstream settlements or river users about the cofferdam removal and the scheduled timeline for its removal.	Conduct daily inspections / monitoring to ensure adherence to implementing ESMP mitigation measures including staged dismantling.	DC, CARES Group, RREA
Establish clear communication channels with downstream communities and local authorities, providing advance warnings and updates on water release activities.	Number of community engagement and sensitisation campaigns about project activities conducted.	RREA
Conduct a structural stability assessment to understand the cofferdam's condition. Prepare a work plan to enable the safe removal during the rainy season. Evaluate weather forecasts to determine safe operational windows. Gradually dismantle the cofferdam in phases, using temporary supports as needed to maintain stability throughout each stage. Regulate water release incrementally to minimize sudden surges and manage downstream flow. Develop and implement an Emergency Response Plan with clear procedures for rapid evacuation, spill management etc. Suspend removal operations during extreme rainfall or adverse weather events. ensure that only experienced and trained personnel are assigned to the removal of the cofferdam	Conduct daily inspections / monitoring to ensure adherence to implementing ESMP mitigation measures.	DC, CARES Group, RREA
Establish clear communication channels with downstream communities and local authorities, providing advance warnings and updates on water release activities.	Number of community engagement and sensitisation campaigns about project activities conducted.	RREA
To maintain positive community relations, the public shall be kept informed about the decommissioning activities and any efforts to minimise disturbance, and procedures for prompt response and corrective action shall be documented within the GRM.	Number of community engagement and sensitisation campaigns about project activities conducted.	RREA

Mitigation	Monitoring	Responsibility
Utilize Material Safety Data Sheets (MSDS) and risk assessments to inform safe handling, storage, and decommissioning protocols. Only trained personnel with certified experience in explosives and blasting operations should be permitted to handle or remove the explosives and associated magazine. Conduct a detailed hazard analysis and risk assessment specific to explosives handling and dismantling activities. Identify all potential triggering factors (e.g., improper handling, mechanical impact, or extreme environmental conditions etc.) and develop control strategies accordingly. Develop and enforce robust Standard Operating Procedures (SOPs) for the handling of explosives and the dismantling of the blasting magazine. Ensure SOPs cover all stages, from preparatory measures to post-operation cleanup. Establish stringent procedures for isolating and safely storing hazardous materials. Define and enforce exclusion zones. Develop a comprehensive emergency response plan that includes evacuation routes, spill containment, fire suppression, and medical response strategies.	Risk Assessment, Standard Operating Procedures (SOPs) and Comprehensive Emergency Response Plan signed off by RREA, CARES Group, and DC.	DC
The chain link fencing will not encircle the entire fifeen acres of the site - just the areas which present a public health and safety risk / areas at risk of erosion. The fenced area shall be determined by RREA and DC following completion of the Comprehensive Site Assessment. Whilst the site will not be entirely closed the local community will not be encouraged to undertake livelihood actitivites as these could contribute to erosion.	The number of community complaints will be monitored.	DC, RREA
Choose corrosion-resistant materials (e.g., galvanized steel, stainless steel, aluminum) for fences and structural components. Utilize weatherproof materials or coatings for signs and billboards to maintain their integrity and color over prolonged exposure. Apply high-performance paints and sealants specifically designed for outdoor conditions.	Implement a strict maintenance schedule with routine inspections (e.g., quarterly or biannually) to monitor corrosion levels, physical deterioration, and the signage condition. Use checklists and document findings to prioritize repair and replacement work.	RREA, DC

9.1.3. Ecosystem Protection / Improvement

Table 9-4 presents the ESPP for ecosystem protection / improvement.

Table 9-4 - ESPP for Ecosystem Protection / Improvement

Mitigation	Monitoring	Responsibility
Implement a staged removal process to ensure water flow increases gradually.	Conduct daily inspections / monitoring to ensure adherence to implementing ESMP mitigation measures including staged dismantling.	DC, CARES Group, RREA
Materials to be repurposed for landscaping and to cover partially exposed concrete works. Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance.	Daily monitoring of dust levels and water quality. Daily inspections of waste management to promptly correct improper practices.	DC
Conduct site trials to assess the erosion resistance and overall suitability of material for cover applications. Develop an adaptive management plan that allows for rapid changes in remediation techniques if the material fails to perform as intended.	Weekly progress reporting of decommissioning activities.	DC
Schedule frequent site inspections to assess the integrity of the cover layer, looking for signs of deterioration, displacement, or early erosion.	Quarterly site inspections to assess the integrity of the cover layer, looking for signs of deterioration, displacement, or early erosion. This should continue until RREA decide what to do as a permanent solution.	RREA
Opt for bioengineering and soft stabilization methods such as vegetative stabilization, live staking, and the use of geotextile mats that integrate natural materials to support slope stability while preserving ecological function. Preserve all trees and vegetation that were not previously cleared / disturbed as part of construction activities i.e., clearing only permitted to take place on vegetation recently established around partially completed structures. Reprofile the riverbanks as per the original soil horizon structure and revegetate with indigenous species. Revegetate / landscape all disturbed areas as part of the decommissioning activities. The rehabilitation shall take place using local topsoil and indigenous plant species.	Revegetation / slope stabilisation plan to be signed off by RREA, CARES Group, and DC before decommissioning. Conduct water quality testing before removal to establish baseline, then conduct daily monitoring of key water quality indicators (e.g., pH, dissolved oxygen, turbidity, pollutant levels, sediment) during removal.	DC

Mitigation	Monitoring	Responsibility
Preserve all trees and vegetation that were not previously cleared / disturbed as part of construction activities i.e., clearing only permitted to take place on vegetation recently established around partially completed structures. Define clear restoration targets that strive to replicate both the complexity and functional aspects of the original environment. Develop a tailored rehabilitation plan that integrates both active restoration (e.g., planting native species, regrading soils) and passive recovery measures (e.g., establishing protective buffers to allow natural recolonization). Utilize bioengineering techniques that promote soil stabilization and habitat complexity, such as the use of living retaining walls, bio-rolls, or erosion control mats seeded with indigenous vegetation. Combine structural rehabilitation with soft, nature-based solutions.	Weekly progress reporting of decommissioning activities. Rehabilitation Plan signed off by RREA, CARES Group and DC.	DC
Set aside resources and responsibilities for ongoing monitoring, maintenance and protection.	Set aside resources and responsibilities for post-decommissioning monitoring, maintenance, and protection.	RREA
Select native species proven to thrive in the soil and climatic conditions. Implement soil stabilization measures to protect soil integrity during the establishment phase. Develop a clear rehabilitation plan that integrates appropriate plant species with structural erosion control measures. Use planting techniques that promote rapid ground cover, such as staggered or mixed seeding of complementary native species, to resist erosion and inhibit invasive growth.	Rehabilitation Plan signed off by RREA, CARES Group, and DC.	DC
Incorporate compost or manure to improve soil structure and water retention. Regrading the land helps retain water in place, increasing infiltration and reducing the potential for erosion and sediment transport downstream. Establish native, deep-rooted vegetation to stabilize the soil and promote water uptake. Preserve all trees and vegetation that were not previously cleared / disturbed as part of construction activities i.e., clearing only permitted to take place on vegetation recently established around partially completed structures.	Establish baseline, then monitor water quality downstream. Rehabilitation Plan signed off by RREA, CARES Group, and DC.	DC

9.1.4. Noise and Air Quality

Table 9-5 presents the ESPP for noise and air quality.

Table 9-5 - ESPP for Noise and Air Quality

Mitigation	Monitoring	Responsibility
Materials to be repurposed for landscaping and to cover partially exposed concrete works. Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance.	Daily monitoring of dust levels and water quality. Daily inspections of waste management to promptly correct improper practices.	DC
Ensure workers use appropriate respiratory protection in addition to goggles, gloves, and hearing protection. Where feasible, employ wet cutting methods to suppress dust generation during the cutting process. Train workers in the proper use of PPE and safe cutting procedures to minimize exposure.	Monitor air quality during cutting operations, ensuring they remain within safe limits. Records of PPE issuance and training delivery.	DC
Require all workers to wear appropriate hearing protection (e.g., earplugs or earmuffs). Ensure cutting equipment is well-maintained and outfitted with noise reduction features. Schedule noisy operations to minimize disturbance. To maintain positive community relations, the public shall be kept informed about the decommissioning activities and any efforts to minimise disturbance, and procedures for prompt response and corrective action shall be documented within the GRM.	Monitor noise levels during cutting operations, ensuring they remain within acceptable limits and triggering operational adjustments if necessary.	DC
Ensure all workers wear appropriate PPE, including respirators or dust masks, protective eyewear, gloves, hearing protection (earplugs / earmuffs), and coveralls when working in hazardous areas. Develop and enforce strict work procedures and training related to handling hazardous materials, controlling dust, and minimizing noise exposure.	Implement daily air quality and noise level monitoring to ensure that levels remain within safe limits and adjust controls as necessary. Records of PPE issuance and training delivery.	DC
Use heavy machinery with noise reduction features and low-vibration technology. All machinery to be regularly serviced and fully functioning. Schedule high-impact activities during daytime hours to minimize disturbance to local communities.	Implement daily noise monitoring to ensure levels remain within acceptable limits. Records of recent service history of the machinery.	DC
Utilize water sprays at excavation and handling points to reduce dust generation. Cover transport vehicles with tarpaulins or netting to contain dust during movement. Regularly clean access roads to prevent dust accumulation. To be discussed with the community and the Ministry of Public Works. Establish and enforce speed limits within community areas	Establish air quality baseline before removal, then conduct daily monitoring of dust levels during decommissioning to ensure particulate levels remain within acceptable limits and adjust controls if necessary.	DC

Mitigation	Monitoring	Responsibility
Use well maintained machinery and trucks, implementing regular engine maintenance and tune-ups to ensure optimal performance No idling enforced. Consolidate transport operations to minimize the number of trips required. Cover open loads with tarpaulins to prevent dust dispersion during transit.	Establish air quality baseline before removal, then conduct daily monitoring during decommissioning to ensure air quality remains within acceptable limits and adjust controls if levels exceed acceptable limits.	DC
The removal of excavated materials such as sand and boulder rock from the site must be carried out responsibly to comply with environmental regulations and minimize the impact on the surrounding area. Sand may be donated to communities undertaking public infrastructure projects such as schools, clinics, bridges, and other public buildings. Boulders and rocks should be repurposed for riprap (erosion control), retaining walls, or decorative landscaping on-site. Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance. Develop and implement a detailed waste management plan that addresses the entire lifecycle - from on-site segregation to final disposal or repurposing. Include clear protocols for waste sorting, stockpiling, transportation, and processing. Segregate excavated materials (e.g., concrete, metals, soil, and other aggregates) allowing for prioritization of reuse or recycling. Collaborate with local authorities to manage materials that can be repurposed. Ensure all handling, transportation, and disposal activities comply with regulations. Maintain detailed records and audit trails for all waste streams. Use appropriate equipment to transport and process waste. Develop optimized logistics plans to reduce the number of trips. Proactively design and monitor waste storage areas.	Establish baseline prior to removal then implement daily monitoring of air quality, water quality, and soil conditions near the site.	DC
Utilize water sprays at key operations (e.g., excavation and loading areas) to capture dust. Utilise heavy machinery with noise reduction technologies. Heavy machinery operations shall only take place during daytime. Regularly service equipment to ensure optimal functioning. Opt for well-maintained machinery to reduce both noise and particulate emissions.	Establish baseline, then conduct daily dust and noise monitoring.	DC
To maintain positive community relations, the public shall be kept informed about the decommissioning activities and any efforts to minimise disturbance, and procedures for prompt response and corrective action shall be documented within the GRM.	Records of community engagement and sensitisation campaigns about project activities conducted.	RREA

Mitigation	Monitoring	Responsibility
Develop and enforce clear SOPs for each stage of work - from excavation through transport to treatment - to ensure consistent adherence to safety protocols. Equip workers with appropriate PPE including chemical-resistant coveralls, gloves, eye and face protection, and respirators suitable for the contaminants present. Implement measures such as water sprays to limit dust generation during excavation and transport. Limit the duration of exposure.	Establish baseline then monitor air quality to detect any change in dust or contaminant concentrations.	DC

9.1.5. Waste Management

Table 9-6 presents the ESPP for waste management.

Table 9-6 - ESPP for Waste Management

Mitigation	Monitoring	Responsibility
Materials to be repurposed for landscaping and to cover partially exposed concrete works. Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance.	Daily monitoring of dust levels and water quality. Daily inspections of waste management to promptly correct improper practices.	DC
Conduct regular inspections and audits to ensure adherence to regulatory waste management standards. Ensure that only experienced and trained personnel are assigned to the removal of the cofferdam	Conduct daily inspections / monitoring and weekly audits to ensure adherence to regulatory waste management standards.	DC, CARES Group, RREA
Segregate synthetic geo-bag materials from other materials. Geo-Bag fill returned to borrow pits, whilst the geobags should be disposed of at an approved disposal site following their removal. Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance.	Daily inspections / monitoring to ensure all waste management practices meet regulatory requirements and to identify any potential environmental degradation early.	DC, CARES Group, RREA

Mitigation	Monitoring	Responsibility
Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance. Collect all cut rebar immediately and store it in designated, covered containers. Segregate clean and contaminated rebar, directing all scrap to scrap dealers. Prevent debris from entering waterways. Adhere strictly to waste management regulations including records to ensure compliance. Safely secure metal scraps to eliminate public and wildlife safety hazards.	Daily inspections / weekly monitoring to ensure all waste management practices meet regulatory requirements.	DC, CARES Group, RREA
Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance. Develop and implement a Comprehensive Waste Management Plan that specifies procedures for on-site waste segregation, temporary storage, handling, and final disposal. This plan should address all material streams, including concrete, metal, and hazardous substances. Segregate waste by type to facilitate recycling and reuse. Identify and repurpose materials where feasible to reduce landfill demand and resource depletion. Maintain records of all waste movements and disposals for audit and regulatory compliance. Targeted training on safe handling and processing of demolition debris, including hazardous materials. Equip workers with appropriate PPE and enforce safe work practices.	Weekly progress reporting of decommissioning activities. Waste Management Plan signed off by RREA, CARES Group, and DC.	DC
Conduct routine inspections and audits to verify that waste management practices are followed.	Daily inspections / monitoring to ensure all waste management practices meet regulatory requirements.	DC, CARES Group, RREA
Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance. Implement on-site waste segregation protocols by identifying and separating hazardous materials from inert construction debris. Train personnel to recognize hazardous substances so that they are correctly isolated and handled separately. Ensure all waste handling, storage, and disposal practices comply with relevant regulations.	Establish baseline before decommissioning, then institute a weekly monitoring programme to check water quality near any storage and processing areas. Implement continuous monitoring of waste handling processes.	DC
Conduct routine inspections and audits to verify that waste management practices are followed.	Conduct daily inspections / monitoring to verify that waste management practices are followed.	DC, CARES Group, RREA

Mitigation	Monitoring	Responsibility
Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance. Develop and implement an integrated waste management plan that outlines procedures for on-site waste segregation, storage, processing, and final disposal or reuse. Incorporate clear protocols that ensure hazardous, inert, perishable, and recyclable materials are managed through separate waste streams. Establish dedicated waste separation zones with clearly labeled containers for construction debris, perishable items, hazardous materials, and other recyclables. Optimize logistics by consolidating waste transport to reduce the number of trips.	Conduct routine inspections to verify that waste management practices are followed. Waste Management Plan signed off by RREA, CARES Group, and DC.	DC
Conduct routine inspections and audits to verify that waste management practices are followed.	Conduct daily inspections / monitoring to verify that waste management practices are followed.	DC, CARES Group, RREA
Collaborate with local authorities and communities to salvage and repurpose valuable construction materials.	Waste Management Plan signed off by RREA, CARES Group, and DC.	RREA
Conduct routine inspections and audits to verify that waste management practices are followed.	Conduct daily inspections / monitoring to verify that waste management practices are followed.	DC, CARES Group, RREA
Utilize Material Safety Data Sheets (MSDS) and risk assessments to inform safe handling, storage, and decommissioning protocols. Only trained personnel with certified experience in explosives and blasting operations should be permitted to handle or remove the explosives and associated magazine. Conduct a detailed hazard analysis and risk assessment specific to explosives handling and dismantling activities. Identify all potential triggering factors (e.g., improper handling, mechanical impact, or extreme environmental conditions etc.) and develop control strategies accordingly. Develop and enforce robust Standard Operating Procedures (SOPs) for the handling of explosives and the dismantling of the blasting magazine. Ensure SOPs cover all stages, from preparatory measures to post-operation cleanup. Establish stringent procedures for isolating and safely storing hazardous materials. Define and enforce exclusion zones. Develop a comprehensive emergency response plan that includes evacuation routes, spill containment, fire suppression, and medical response strategies.	Risk Assessment, Standard Operating Procedures (SOPs) and Comprehensive Emergency Response Plan signed off by RREA, CARES Group, and DC.	DC

Mitigation	Monitoring	Responsibility
Only trained personnel with certified experience in explosives and blasting operations should be permitted to handle or remove the explosives and associated magazine. Conduct detailed analyses of all explosive compounds, including reactive chemicals and additives, to determine their toxicity and potential environmental impacts. Utilize Material Safety Data Sheets (MSDS) and risk assessments to inform safe handling, storage, and decommissioning protocols. Implement strict segregation practices to ensure that reactive explosives are not mixed with other incompatible substances, reducing the risk of chemical reactions during degradation. Establish comprehensive emergency response plans that include immediate spill containment, neutralization, and decontamination protocols.	Risk Assessment, Standard Operating Procedures (SOPs) and Comprehensive Emergency Response Plan signed off by RREA, CARES Group, and DC.	DC
Rigorously adhere to all regulations regarding the handling, storage, and disposal of hazardous explosive materials. Maintain detailed records of all assessments, handling protocols, and disposal methods to ensure accountability.	Conduct routine inspections to verify that waste management practices are followed. Waste Management Plan signed off by RREA, CARES Group, and DC.	DC
Provide comprehensive training for all personnel on handling degraded explosives, emergency response procedures, and emergency equipment usage.	Audit of records of all assessments, handling protocols, and waste management processes.	CARES Group
Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance. Conduct laboratory analyses to determine the spectrum and concentration of contaminants. Clearly delineate waste streams so that contaminated soils, fuel residues, and other hazardous materials are isolated. Use sealed containers to prevent leaching or accidental releases during transport or temporary storage.	Weekly progress reporting of decommissioning activities.	DC
Consult with regulatory bodies to ensure that all handling, transport, and treatment procedures meet current environmental and safety standards, and that all necessary permits are obtained. Audit of records of all assessments, handling protocols, and waste management processes.	Audit of records of all assessments, handling protocols, and waste management processes.	RREA

Mitigation	Monitoring	Responsibility
Clarify ownership and responsibilities. Prepare an inventory of all equipment to identify potential hazards, such as residual fluids, corroded components, and degraded materials. Identify a suitable location for safe storage or consider constructing a shelter on-site to protect the equipment. Although all PACs have been informed about the potential relocation of the equipment, some of the machines are not in operational condition.	Audit of records of all assessments.	DC / RREA
Prior to dismantling any equipment, drain any residual fluids safely using spill containment systems such as bunding or secondary containment trays. Use certified absorption materials and spill kits to manage any unavoidable leaks during removal or transport. Isolate components known to have corroded parts or heavy metal contamination, and secure them in sealed, leak-proof containers for proper disposal or safe storage. Document and comply with all environmental regulations regarding hazardous waste disposal. Monitor any leakage or changes in soil and water quality during and after equipment removal. Develop and implement robust spill response and decontamination protocols. Ensure workers are specifically trained on emergency actions, and that all necessary decontamination and cleanup equipment is readily available.	Establish baseline, then monitor soil, water, and air quality.	DC
Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance. Establish designated areas for segregating metals, plastics, rubber, electronic components, and other waste streams. Train personnel to correctly identify and classify materials, ensuring that reusable or recyclable items are not mixed with non-recyclables. Develop partnerships to recover valuable resources. Follow best practices and regulatory guidelines for the transport, processing, and disposal of hazardous and non-hazardous waste. Develop a rehabilitation plan that includes landscape restoration.	Establish baseline, then monitor local water quality during decommissioning.	DC
Audit of records of all assessments, handling protocols, and waste management processes. Collaborate with local authorities and communities to salvage and repurpose valuable construction materials.	Audit of records of all assessments, handling protocols, and waste management processes. Waste Management Plan signed off by RREA, CARES Group, and DC.	RREA

Mitigation	Monitoring	Responsibility
Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance. Clearly separate packaging waste, surplus materials, and hazardous wastes as they are generated. Establish dedicated, clearly marked areas for temporary storage of waste materials. Follow waste management guidelines to ensure proper disposal and recycling practices.	Daily inspections of waste handling areas to promptly correct improper practices.	DC
Audit of records of all assessments, handling protocols, and waste management processes.	Audit of records of all assessments, handling protocols, and waste management processes.	CARES Group

9.1.6. Worker Health and Safety

Table 9-7 presents the ESPP for worker health and safety.

Table 9-7 - ESPP for Worker Health and Safety

Mitigation	Monitoring	Responsibility
Conduct a structural stability assessment to understand the cofferdam's condition. Prepare a work plan to enable the safe removal during the rainy season. Evaluate weather forecasts to determine safe operational windows. Gradually dismantle the cofferdam in phases, using temporary supports as needed to maintain stability throughout each stage. Regulate water release incrementally to minimize sudden surges and manage downstream flow. Develop and implement an Emergency Response Plan with clear procedures for rapid evacuation, spill management etc. Suspend removal operations during extreme rainfall or adverse weather events. ensure that only experienced and trained personnel are assigned to the removal of the cofferdam	Conduct daily inspections / monitoring to ensure adherence to implementing ESMP mitigation measures.	DC, CARES Group, RREA

Mitigation	Monitoring	Responsibility
Require all workers to wear appropriate PPE, including safety goggles or face shields, cut-resistant gloves, long-sleeved protective clothing, steel-toe boots, and hearing protection. Use certified and well-maintained cutting equipment. Inspect tools before each use to ensure they are functioning correctly. Exposed rebar should be cut using suitable tools such as rebar cutters, angle grinders, or oxy-acetylene torches, depending on the size and accessibility of the material. Demarcate the work area. Follow established safe cutting procedures, including proper positioning and two-hand operation. Provide specific training on the proper use of cutting equipment and hazard awareness related to sharp edges and flying debris. Maintain strict on-site supervision during the cutting operations. Implement procedures for the immediate removal and safe disposal of cut rebar fragments and metal shavings to reduce subsequent hazards.	The DCs site-specific health and safety plan should be signed off by RREA, CARES Group, and DC prior to commencing decommissioning. Records of PPE issuance and training delivery.	DC
Plan rebar removal during periods of low water levels. If water levels are high, delay operations until conditions improve. Develop and communicate an emergency action plan. Avoid using electric tools in a wet environment Use battery-powered or hydraulic tools in wet environment	Emergency action plan to be signed off my RREA, CARES Group, and DC. Monitor water levels and weather conditions during operations and cease work immediately if conditions become unsafe.	DC
Ensure workers use appropriate respiratory protection in addition to goggles, gloves, and hearing protection. Where feasible, employ wet cutting methods to suppress dust generation during the cutting process. Train workers in the proper use of PPE and safe cutting procedures to minimize exposure.	Monitor air quality during cutting operations, ensuring they remain within safe limits. Records of PPE issuance and training delivery.	DC
Inspect and secure unstable or eroding surfaces before work begins. Prepare a work plan that enables the activity to be safely conducted in the rainy season. Monitor weather conditions and water levels, postponing high-risk activities during heavy rainfall or rapidly changing conditions. Schedule work during periods of low rain and more stable conditions.	Weekly progress reporting of decommissioning activities.	DC
Qualified structural engineers to conduct inspections and document the condition of all partially completed structures and to determine which structures require stabilization (cover, backfill) versus those slated for dimantling and removal.	Report detailing assessment to be signed off by qualified structural engineers.	RREA, DC

Mitigation	Monitoring	Responsibility
Establish safe work perimeters around vulnerable structures and provide specialized training for personnel working on, or near unstable or partially complete works.	Records of training undertaken.	DC
Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance. Develop and implement a Comprehensive Waste Management Plan that specifies procedures for on-site waste segregation, temporary storage, handling, and final disposal. This plan should address all material streams, including concrete, metal, and hazardous substances. Segregate waste by type to facilitate recycling and reuse. Identify and repurpose materials where feasible to reduce landfill demand and resource depletion. Maintain records of all waste movements and disposals for audit and regulatory compliance. Targeted training on safe handling and processing of demolition debris, including hazardous materials. Equip workers with appropriate PPE and enforce safe work practices.	Weekly progress reporting of decommissioning activities. Waste Management Plan signed off by RREA, CARES Group, and DC.	DC
Ensure all workers wear appropriate PPE, including respirators or dust masks, protective eyewear, gloves, hearing protection (earplugs / earmuffs), and coveralls when working in hazardous areas. Develop and enforce strict work procedures and training related to handling hazardous materials, controlling dust, and minimizing noise exposure.	Implement daily air quality and noise level monitoring to ensure that levels remain within safe limits and adjust controls as necessary. Records of PPE issuance and training delivery.	DC
Use heavy machinery with noise reduction features and low-vibration technology. All machinery to be regularly serviced and fully functioning. Schedule high-impact activities during daytime hours to minimize disturbance to local communities.	Implement daily noise monitoring to ensure levels remain within acceptable limits. Records of recent service history of the machinery.	DC
Regularly clean access roads to prevent dust accumulation (to be discussed with the community and the Ministry of Public Works). Separate and safely handle any hazardous substances or chemical residues found in cleared materials. Provide PPE, such as N95 respirators, goggles, and dust masks, to workers in high-exposure areas.	Collect air quality measurements before decommissioning to establish baseline, then conduct daily monitoring during decommissioning activities. Records of PPE issuance.	DC

Mitigation	Monitoring	Responsibility
Conduct site surveys and risk assessments before starting clearance to identify all hazardous substances. Implement strict on-site segregation procedures to ensure hazardous materials are separated from inert debris. Provide workers with appropriate PPE, including respirators, gloves, eye protection, and coveralls, tailored to identified hazards. Deliver comprehensive training on the proper handling, removal, and disposal of hazardous materials, including emergency response protocols.	Weekly progress reporting of decommissioning activities. Records of PPE issuance and training delivery.	DC
Utilize Material Safety Data Sheets (MSDS) and risk assessments to inform safe handling, storage, and decommissioning protocols. Only trained personnel with certified experience in explosives and blasting operations should be permitted to handle or remove the explosives and associated magazine. Conduct a detailed hazard analysis and risk assessment specific to explosives handling and dismantling activities. Identify all potential triggering factors (e.g., improper handling, mechanical impact, or extreme environmental conditions etc.) and develop control strategies accordingly. Develop and enforce robust Standard Operating Procedures (SOPs) for the handling of explosives and the dismantling of the blasting magazine. Ensure SOPs cover all stages, from preparatory measures to post-operation cleanup. Establish stringent procedures for isolating and safely storing hazardous materials. Define and enforce exclusion zones. Develop a comprehensive emergency response plan that includes evacuation routes, spill containment, fire suppression, and medical response strategies.	Risk Assessment, Standard Operating Procedures (SOPs) and Comprehensive Emergency Response Plan signed off by RREA, CARES Group, and DC.	DC
Only trained personnel with certified experience in explosives and blasting operations should be permitted to handle or remove the explosives and associated magazine. Conduct detailed analyses of all explosive compounds, including reactive chemicals and additives, to determine their toxicity and potential environmental impacts. Utilize Material Safety Data Sheets (MSDS) and risk assessments to inform safe handling, storage, and decommissioning protocols. Implement strict segregation practices to ensure that reactive explosives are not mixed with other incompatible substances, reducing the risk of chemical reactions during degradation. Establish comprehensive emergency response plans that include immediate spill containment, neutralization, and decontamination protocols.	Risk Assessment, Standard Operating Procedures (SOPs) and Comprehensive Emergency Response Plan signed off by RREA, CARES Group, and DC.	DC

Mitigation	Monitoring	Responsibility
Develop and enforce clear SOPs for each stage of work - from excavation through transport to treatment - to ensure consistent adherence to safety protocols. Equip workers with appropriate PPE including chemical-resistant coveralls, gloves, eye and face protection, and respirators suitable for the contaminants present. Implement measures such as water sprays to limit dust generation during excavation and transport. Limit the duration of exposure.	Establish baseline then monitor air quality to detect any change in dust or contaminant concentrations.	DC
The chain link fencing will not encircle the entire fifeen acres of the site - just the areas which present a public health and safety risk / areas at risk of erosion. The fenced area shall be determined by RREA and DC following completion of the Comprehensive Site Assessment. Whilst the site will not be entirely closed the local community will not be encouraged to undertake livelihood actitivites as these could contribute to erosion.	The number of community complaints will be monitored.	DC, RREA

10. Conclusion

This ESMP has been prepared to support the decommissioning of the partially completed 2.6MW Kaiha 2 HPP. A decision was made to halt and temporarily decommission the hydropower component of the project as the project has encountered several significant setbacks, including financing gaps, with alternative power supply options being explored for the Lofa County mini-grid project.

As the decision to decommission the Kaiha 2 HPP has associated Environmental and Social (E&S) risks, RREA appointed CARES to prepare this Environmental and Social Management Plan (ESMP) following Liberian environmental laws and World Bank Safeguards. The ESMP will then be implemented during decommissioning to manage the identified environmental, social, and health and safety risks, with CARES responsible for monitoring its implementation.

This ESMP has included the preparation of an overall Environmental and Social Monitoring Plan framework documenting the mitigation measures to be implemented, the monitoring measures to assess the effectiveness, and the institutional responsibilities. Furthermore, the ESMP has provided risk-specific Environmental and Social Protection Plans (ESPPs) covering the following six areas:

- Water Quality, Soil, Sediment and Erosion Control.
- Community Risks / Health and Safety.
- Ecosystem Protection / Improvement.
- Noise and Air Quality.
- Waste Management.
- Worker Health and Safety.

The major and moderate risks identified (see Chapter 8), along with proposed mitigation measures, monitoring and implementation responsibilities are provided in Table 10-1 below.

Table 10-1 - Major and Moderate Risks Identified, Proposed Mitigation Measures, Monitoring and Institutional Responsibilities

Component	Risks	Impact	Mitigation	Monitoring	Responsibility
Removing Upstream Left Bank Earth Cofferdam	The Upstream Left Bank Earth Cofferdam will be removed to release the impounded water and to restore the natural flow. Whilst this should reduce the risk of the water being accidentally and uncontrollably released; there is a risk this will cause a reduction in water quality (i.e., increased turbidity) and / or sedimentation and erosion downstream. Shift in water temperature, and may lower oxygen levels	Moderate	Remove the cofferdam in controlled stages to allow gradual water release and prevent sudden surges. Install silt curtains or turbidity barriers downstream to capture suspended sediments during the release. Schedule removal activities during favorable weather conditions and low-flow periods. Apply immediate erosion control measures (such as bank stabilization or revegetation) in downstream areas to limit potential erosion.	Conduct water quality testing before removal to establish baseline, then conduct daily monitoring of key water quality indicators (e.g., turbidity, temperature sediment) during decommissioning.	Decommissioning Contractor (DC).
Removing Upstream Left Bank Earth Cofferdam	The Upstream Left Bank Earth Cofferdam will be removed to release the impounded water and to restore the natural flow. Whilst this should reduce the risk of the water being accidentally and uncontrollably released there is a potential risk to any settlements or river users downstream of the site.	Moderate	Dismantle the cofferdam in stages to gradually restore natural flow and prevent abrupt water surges. Develop and implement an emergency response plan, including predefined protocols for rapid intervention. Align removal schedules with favourable hydrological conditions. Inform downstream settlements or river users about the cofferdam removal and the scheduled timeline for its removal.	Conduct daily inspections / monitoring to ensure adherence to implementing ESMP mitigation measures including staged dismantling.	DC, CARES Group, RREA

Component	Risks	Impact	Mitigation	Monitoring	Responsibility
			Establish clear communication channels with downstream communities and local authorities, providing advance warnings and updates on water release activities.	Number of community engagement and sensitisation campaigns about project activities conducted.	RREA
Removing Upstream Left Bank Earth Cofferdam	If the materials (i.e., earth) removed from the Upstream Left Bank Earth Cofferdam are not managed appropriately, several environmental and social risks could arise. Poorly managed materials could result in sedimentation in nearby waterbodies which may disrupt aquatic ecosystems, affecting water quality and harming local biodiversity. Poorly placed materials could encroach on natural habitats, leading to habitat destruction and ecological imbalance. On a community level, airborne dust and dirt could create nuisance effects, settling on drying clothes, windows, and other surfaces, impacting daily life. Failure to adhere to regulatory waste management standards may also result in compliance violations.	Moderate 	Materials to be repurposed for landscaping and to cover partially exposed concrete works. Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance.	Daily monitoring of dust levels and water quality. Daily inspections of waste management to promptly correct improper practices.	DC
			Conduct regular inspections and audits to ensure adherence to regulatory waste management standards. Ensure that only experienced and trained personnel are assigned to the removal of the cofferdam	Conduct daily inspections / monitoring and weekly audits to ensure adherence to regulatory waste management standards.	DC, CARES Group, RREA
Removing Upstream Left Bank Earth Cofferdam	There are additional H&S risks associated with removing the Upstream Left Bank Earth Cofferdam to release the impounded water in the rainy season when	Major 	Conduct a structural stability assessment to understand the cofferdam's condition. Prepare a work plan to enable the safe removal during the rainy season.	Conduct daily inspections / monitoring to ensure adherence to implementing ESMP mitigation measures.	DC, CARES Group, RREA

Component	Risks	Impact	Mitigation	Monitoring	Responsibility
	water levels will likely be higher. For example, an unstable structure during removal can pose a hazard to workers and nearby residents. However, there are also additional environmental and public H&S risks associated with an uncontrolled release of water which may be more likely with higher water levels.		Evaluate weather forecasts to determine safe operational windows. Gradually dismantle the cofferdam in phases, using temporary supports as needed to maintain stability throughout each stage. Regulate water release incrementally to minimize sudden surges and manage downstream flow. Develop and implement an Emergency Response Plan with clear procedures for rapid evacuation, spill management etc. Suspend removal operations during extreme rainfall or adverse weather events. ensure that only experienced and trained personnel are assigned to the removal of the cofferdam		
			Establish clear communication channels with downstream communities and local authorities, providing advance warnings and updates on water release activities.	Number of community engagement and sensitisation campaigns about project activities conducted.	RREA
Removing Left Bank Geo-Bag Cofferdam	The partially failed Left Bank Geo-Bag Cofferdam will be removed to ensure minimal disruption to the river ecosystem. There is a risk of water being accidentally and uncontrollably released; there is a risk this will cause a	Moderate	Remove the cofferdam in controlled stages to allow a gradual, predictable release of water rather than an abrupt surge. Regulate water flow during removal, ensuring that	Conduct water quality testing before removal to establish baseline, then conduct daily monitoring of key water quality indicators (e.g., turbidity, sediment) during removal.	DC

Component	Risks	Impact	Mitigation	Monitoring	Responsibility
	reduction in water quality (i.e., increased turbidity) and / or sedimentation and erosion downstream.		discharge rates remain within safe and predictable limits. Install temporary silt curtains or turbidity barriers downstream to capture mobilized sediments. Implement bank stabilization measures to counteract potential erosion. Develop and implement an emergency response plan. Inform downstream communities about the operation schedule and water release events.		
Removing Left Bank Geo-Bag Cofferdam	The partially failed Left Bank Geo-Bag Cofferdam will be removed to ensure minimal disruption to the river ecosystem and to restore the natural water flow; however, there is a risk of a sudden water release which could lead to a reduction in water quality (i.e., increased turbidity) and sedimentation and erosion downstream of the site.	Moderate 	Dismantle the cofferdam gradually to allow controlled water release. Install silt curtains or turbidity barriers downstream and implement bank stabilization measures to reduce erosion. Inform downstream communities about the removal schedule and water release events.	Conduct water quality testing before removal to establish baseline, then conduct daily monitoring of key water quality indicators (e.g., turbidity, sediment) during removal.	DC
Removing Exposed Rebar	As part of securing the partially completed concrete works the exposed rebar (reinforcement bars) will be cut and removed from the partially completed concrete works and stilling basin. There is a risk to worker safety during the cutting process from accidents with the cutting equipment and	Major 	Require all workers to wear appropriate PPE, including safety goggles or face shields, cut-resistant gloves, long-sleeved protective clothing, steel-toe boots, and hearing protection. Use certified and well-maintained cutting equipment.	The DCs site-specific health and safety plan should be signed off by RREA, CARES Group, and DC prior to commencing decommissioning. Records of PPE issuance and training delivery.	DC

Component	Risks	Impact	Mitigation	Monitoring	Responsibility
	with sharp edges and flying debris, requiring strict safety protocols. The removal of exposed rebar embedded in cast concrete must be carried out with careful planning and strict adherence to safety protocols to prevent injury, structural damage, or equipment failure. All personnel involved should be properly trained and equipped with appropriate Personal Protective Equipment (PPE), including hard hats, safety goggles, gloves, steel-toe boots, and hearing protection.		Inspect tools before each use to ensure they are functioning correctly. Exposed rebar should be cut using suitable tools such as rebar cutters, angle grinders, or oxy-acetylene torches, depending on the size and accessibility of the material. Demarcate the work area. Follow established safe cutting procedures, including proper positioning and two-hand operation. Provide specific training on the proper use of cutting equipment and hazard awareness related to sharp edges and flying debris. Maintain strict on-site supervision during the cutting operations. Implement procedures for the immediate removal and safe disposal of cut rebar fragments and metal shavings to reduce subsequent hazards.		
Removing Exposed Rebar	The risk to worker safety is higher during removal of the exposed rebar situated in the middle of the river. This risk is increased when water levels are higher during / immediately after the rainy season.	Major 	Plan rebar removal during periods of low water levels. If water levels are high, delay operations until conditions improve. Develop and communicate an emergency action plan. Avoid using electric tools in a wet environment	Emergency action plan to be signed off my RREA, CARES Group, and DC. Monitor water levels and weather conditions during operations and cease work immediately if conditions become unsafe.	DC

Component	Risks	Impact	Mitigation	Monitoring	Responsibility
			Use battery-powered or hydraulic tools in wet environment		
Removing Exposed Rebar	The cutting of the rebar can generate high levels of noise presenting a risk to workers and affecting nearby communities and wildlife.	Major 	Require all workers to wear appropriate hearing protection (e.g., earplugs or earmuffs). Ensure cutting equipment is well-maintained and outfitted with noise reduction features. Schedule noisy operations to minimize disturbance. To maintain positive community relations, the public shall be kept informed about the decommissioning activities and any efforts to minimise disturbance, and procedures for prompt response and corrective action shall be documented within the GRM.	Monitor noise levels during cutting operations, ensuring they remain within acceptable limits and triggering operational adjustments if necessary.	DC
Removing Exposed Rebar	If cut rebar is not managed appropriately, several environmental and social risks may arise. Rusting can lead to the leaching of iron and other metals into soil and waterbodies, potentially contaminating ecosystems and posing public health risks. Accumulated debris may obstruct waterways, increasing flood risks and harming aquatic habitats. Sharp metal scraps can create hazardous conditions for wildlife and public safety, while improper disposal may	Moderate 	Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance. Collect all cut rebar immediately and store it in designated, covered containers. Segregate clean and contaminated rebar, directing all scrap to scrap dealers. Prevent debris from entering waterways.	Daily inspections / weekly monitoring to ensure all waste management practices meet regulatory requirements.	DC, CARES Group, RREA

Component	Risks	Impact	Mitigation	Monitoring	Responsibility
	degrade the visual landscape. Additionally, failure to adhere to regulatory waste management standards could result in compliance violations.		Adhere strictly to waste management regulations including records to ensure compliance. Safely secure metal scraps to eliminate public and wildlife safety hazards.		
Covering Exposed Concrete Works	During covering the exposed concrete workers are likely to be required to access areas close to unstable or eroding platforms, both on the riverbank and in the middle of the river. Such work conditions increase the risk of falls and there is a risk of falling in the river. These risks are increased when working in the rainy season.	Major	Inspect and secure unstable or eroding surfaces before work begins. Prepare a work plan that enables the activity to be safely conducted in the rainy season. Monitor weather conditions and water levels, postponing high-risk activities during heavy rainfall or rapidly changing conditions. Schedule work during periods of low rain and more stable conditions.	Weekly progress reporting of decommissioning activities.	DC
Covering Exposed Concrete Works	As the concrete structures are partially completed, it is unclear which structures are at risk of erosion or exposure to water, which structures should be covered / backfilled, and which structures shall be dismantled and removed. This uncertainty about which structures are vulnerable means that personnel undertaking remedial work face additional health and safety risks through the unexpected collapse of partially complete concrete structures. This risk is	Major	Qualified structural engineers to conduct inspections and document the condition of all partially completed structures and to determine which structures require stabilization (cover, backfill) versus those slated for dimantling and removal.	Report detailing assessment to be signed off by qualified structural engineers.	RREA, DC
			Establish safe work perimeters around vulnerable structures and provide specialized training for personnel working on, or near unstable or partially complete works.	Records of training undertaken.	DC

Component	Risks	Impact	Mitigation	Monitoring	Responsibility
	particularly high if the stabilization choice (through covering, backfilling, or controlled dismantling) is not based on a clear assessment of condition. Covering unstable, partially completed structures may pose hazards during construction and maintenance. Covering the exposed concrete works may present structural integrity issues and shall make monitoring the structures harder.				
Covering Exposed Concrete Works	It is intended to cover the exposed concrete works utilizing the material from the existing earth cofferdam / stock of blast rock as a protective measure; however, there is a risk that the material may not be suitable for this purpose which may erode, leading to the release of concrete debris and sediment into the river which could cause an obstruction and disrupt aquatic ecosystems by altering turbidity, water chemistry, and sedimentation patterns. The unintended release of aggregate and dust could affect water quality and harm wildlife, especially species that depend on clear or stable water conditions.	Moderate	Conduct site trials to assess the erosion resistance and overall suitability of material for cover applications. Develop an adaptive management plan that allows for rapid changes in remediation techniques if the material fails to perform as intended.	Weekly progress reporting of decommissioning activities.	DC
			Schedule frequent site inspections to assess the integrity of the cover layer, looking for signs of deterioration, displacement, or early erosion.	Quarterly site inspections to assess the integrity of the cover layer, looking for signs of deterioration, displacement, or early erosion. This should continue until RREA decide what to do as a permanent solution.	RREA

Component	Risks	Impact	Mitigation	Monitoring	Responsibility
Demolition and Dismantling and Removing Buildings and Other Structures	If the waste from demolition, dismantling, and removal of buildings and other structures is not managed appropriately, several environmental and regulatory risks could arise. Improper handling of construction debris - including concrete, metal, and hazardous materials - may lead to contamination of soil and water, introducing pollutants into surrounding ecosystems. Accumulated debris can result in wasted materials that could otherwise be repurposed, increasing landfill pressure and resource depletion. Additionally, illegal or inappropriate dumping could further degrade environmental conditions and pose legal consequences. The transportation and processing of waste may contribute to emissions, logistical challenges, and safety risks. Failure to adhere to regulatory requirements could lead to compliance violations.	Moderate 	Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance. Develop and implement a Comprehensive Waste Management Plan that specifies procedures for on-site waste segregation, temporary storage, handling, and final disposal. This plan should address all material streams, including concrete, metal, and hazardous substances. Segregate waste by type to facilitate recycling and reuse. Identify and repurpose materials where feasible to reduce landfill demand and resource depletion. Maintain records of all waste movements and disposals for audit and regulatory compliance. Targeted training on safe handling and processing of demolition debris, including hazardous materials. Equip workers with appropriate PPE and enforce safe work practices.	Weekly progress reporting of decommissioning activities. Waste Management Plan signed off by RREA, CARES Group, and DC.	DC
			Conduct routine inspections and audits to verify that waste management practices are followed.	Daily inspections / monitoring to ensure all waste management practices meet regulatory requirements.	DC, CARES Group, RREA

Component	Risks	Impact	Mitigation	Monitoring	Responsibility
Demolition and Dismantling and Removing Buildings and Other Structures	During the demolition, dismantling, and removal of buildings and other structures the workforce may be exposed to health and safety risks caused by hazardous material exposure, dust and particulate matter, and noise.	Moderate 	Ensure all workers wear appropriate PPE, including respirators or dust masks, protective eyewear, gloves, hearing protection (earplugs / earmuffs), and coveralls when working in hazardous areas. Develop and enforce strict work procedures and training related to handling hazardous materials, controlling dust, and minimizing noise exposure.	Implement daily air quality and noise level monitoring to ensure that levels remain within safe limits and adjust controls as necessary. Records of PPE issuance and training delivery.	DC
Removing Excavated Material	If the removed excavated material is not managed appropriately, it could lead to the unnecessary disposal of materials that could otherwise be repurposed or recycled. Improper handling may also result in illegal dumping, contributing to environmental contamination and regulatory violations. Additionally, transporting and processing waste can create logistical challenges, emissions, and safety concerns. If the material is not managed properly, it might obstruct waterways, increasing flood risks and harming aquatic ecosystems, and degrade the visual landscape / effect community aesthetics.	Moderate 	The removal of excavated materials such as sand and boulder rock from the site must be carried out responsibly to comply with environmental regulations and minimize the impact on the surrounding area. Sand may be donated to communities undertaking public infrastructure projects such as schools, clinics, bridges, and other public buildings. Boulders and rocks should be repurposed for riprap (erosion control), retaining walls, or decorative landscaping on-site. Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance. Develop and implement a detailed waste management	Establish baseline prior to removal then implement daily monitoring of air quality, water quality, and soil conditions near the site. Conduct daily inspections / monitoring to verify that waste management practices are followed.	DC DC, CARES Group, RREA

Component	Risks	Impact	Mitigation	Monitoring	Responsibility
			plan that addresses the entire lifecycle - from on-site segregation to final disposal or repurposing. Include clear protocols for waste sorting, stockpiling, transportation, and processing. Segregate excavated materials (e.g., concrete, metals, soil, and other aggregates) allowing for prioritization of reuse or recycling. Collaborate with local authorities to manage materials that can be repurposed. Ensure all handling, transportation, and disposal activities comply with regulations. Maintain detailed records and audit trails for all waste streams. Use appropriate equipment to transport and process waste. Develop optimized logistics plans to reduce the number of trips. Proactively design and monitor waste storage areas.		
Site Clearance	If hazardous materials are mixed with inert construction debris, there is a risk that these contaminants are	Moderate 	Accurate records of disposal volumes, locations, and transporters should be maintained to ensure	Establish baseline before decommissioning, then institute a weekly monitoring programme to check water	DC

Component	Risks	Impact	Mitigation	Monitoring	Responsibility
	leached into the soil and nearby waterbodies. This leaching can degrade soil quality, harm aquatic ecosystems, and compromise downstream water quality.		accountability and regulatory compliance. Implement on-site waste segregation protocols by identifying and separating hazardous materials from inert construction debris. Train personnel to recognize hazardous substances so that they are correctly isolated and handled separately. Ensure all waste handling, storage, and disposal practices comply with relevant regulations.	quality near any storage and processing areas. Implement continuous monitoring of waste handling processes.	
			Conduct routine inspections and audits to verify that waste management practices are followed.	Conduct daily inspections / monitoring to verify that waste management practices are followed.	DC, CARES Group, RREA
Site Clearance	The site clearing process will generate large quantities of waste that, if not adequately sorted, reused and / or recycled will be disposed of in landfill or dumped. Not only does this contribute to the premature depletion of landfill capacity but represents lost opportunity for recycling and reusing valuable materials, whilst also having potential regulatory non-compliance impacts. If the material is dumped, this could cause physical obstruction which could	Moderate	Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance. Develop and implement an integrated waste management plan that outlines procedures for on-site waste segregation, storage, processing, and final disposal or reuse. Incorporate clear protocols that ensure hazardous, inert, perishable, and recyclable materials are managed	Conduct routine inspections to verify that waste management practices are followed. Waste Management Plan signed off by RREA, CARES Group, and DC.	DC

Component	Risks	Impact	Mitigation	Monitoring	Responsibility
	increase flood risks and / or harm aquatic ecosystems, as well as have an aesthetic impact. There are also potential impacts caused by the transporting and processing of the waste.		through separate waste streams. Establish dedicated waste separation zones with clearly labeled containers for construction debris, perishable items, hazardous materials, and other recyclables. Optimize logistics by consolidating waste transport to reduce the number of trips.		
			Conduct routine inspections and audits to verify that waste management practices are followed.	Conduct daily inspections / monitoring to verify that waste management practices are followed.	DC, CARES Group, RREA
			Collaborate with local authorities and communities to salvage and repurpose valuable construction materials.	Waste Management Plan signed off by RREA, CARES Group, and DC.	RREA
Site Clearance	The process of clearing debris, when it includes hazardous substances, presents serious health and safety risks to workers and nearby residents.	Moderate	Conduct site surveys and risk assessments before starting clearance to identify all hazardous substances. Implement strict on-site segregation procedures to ensure hazardous materials are separated from inert debris. Provide workers with appropriate PPE, including respirators, gloves, eye protection, and coveralls, tailored to identified hazards. Deliver comprehensive training on the proper handling, removal, and	Weekly progress reporting of decommissioning activities. Records of PPE issuance and training delivery.	DC

Component	Risks	Impact	Mitigation	Monitoring	Responsibility
			disposal of hazardous materials, including emergency response protocols.		
			Conduct routine inspections and audits to verify that waste management practices are followed.	Conduct daily inspections / monitoring to verify that waste management practices are followed.	DC, CARES Group, RREA
Rehabilitation	Whilst rehabilitation activities will aim to restore the site's ecological functions and appearance, there is a risk that if improperly managed, the site will not replicate the complexity or services of the original. This risk is increased through the temporary nature of the decommissioning activities.	Moderate	Preserve all trees and vegetation that were not previously cleared / disturbed as part of construction activities i.e., clearing only permitted to take place on vegetation recently established around partially completed structures. Define clear restoration targets that strive to replicate both the complexity and functional aspects of the original environment. Develop a tailored rehabilitation plan that integrates both active restoration (e.g., planting native species, regrading soils) and passive recovery measures (e.g., establishing protective buffers to allow natural recolonization). Utilize bioengineering techniques that promote soil stabilization and habitat complexity, such as the use of living retaining walls, bio-rolls, or erosion control mats seeded with indigenous vegetation.	Weekly progress reporting of decommissioning activities. Rehabilitation Plan signed off by RREA, CARES Group and DC.	DC

Component	Risks	Impact	Mitigation	Monitoring	Responsibility
			Combine structural rehabilitation with soft, nature-based solutions.		
			Set aside resources and responsibilities for ongoing monitoring, maintenance and protection.	Set aside resources and responsibilities for post-decommissioning monitoring, maintenance, and protection.	RREA
Handling Explosives & Blasting Magazine	When handling the explosives / dismantling the blasting magazine there is always a risk of accidental detonation caused by improper handling, mechanical impact, or exposure to extreme environmental conditions. Therefore, workers involved in the handling and decommissioning process face significant safety risks with physical injuries and exposure to toxic chemicals the primary concerns. Accidental detonation also presents community H&S risks and would release hazardous substances into the environment, create a wide dispersion of debris, and could lead to habitat destruction. Accidental detonations can also generate shock waves, release fine particulates and toxic gases, and trigger fires. These secondary effects can impact air quality and disturb local wildlife and communities.	Major	Utilize Material Safety Data Sheets (MSDS) and risk assessments to inform safe handling, storage, and decommissioning protocols. Only trained personnel with certified experience in explosives and blasting operations should be permitted to handle or remove the explosives and associated magazine. Conduct a detailed hazard analysis and risk assessment specific to explosives handling and dismantling activities. Identify all potential triggering factors (e.g., improper handling, mechanical impact, or extreme environmental conditions etc.) and develop control strategies accordingly. Develop and enforce robust Standard Operating Procedures (SOPs) for the handling of explosives and the dismantling of the blasting magazine. Ensure SOPs cover all stages, from preparatory	Risk Assessment, Standard Operating Procedures (SOPs) and Comprehensive Emergency Response Plan signed off by RREA, CARES Group, and DC.	DC

Component	Risks	Impact	Mitigation	Monitoring	Responsibility
			measures to post-operation cleanup. Establish stringent procedures for isolating and safely storing hazardous materials. Define and enforce exclusion zones. Develop a comprehensive emergency response plan that includes evacuation routes, spill containment, fire suppression, and medical response strategies.		
Handling Explosives & Blasting Magazine	Decommissioning the Explosives and Blasting Magazine may involve a controlled explosion which can generate significant noise and vibration disturbance to local communities and wildlife.	Moderate 	To maintain positive community relations, the public shall be kept informed about the decommissioning activities and any efforts to minimise disturbance, and procedures for prompt response and corrective action shall be documented within the GRM.	Records of community engagement and sensitisation campaigns about project activities conducted.	RREA
Handling Explosives & Blasting Magazine	Explosives typically contain reactive chemicals and additives that may be toxic if leaked. During handling, storage, or decommissioning, accidental spills or degradation of these compounds can contaminate soil and water. Such contamination might affect local ecosystems or alter water quality in nearby waterbodies.	Moderate 	Only trained personnel with certified experience in explosives and blasting operations should be permitted to handle or remove the explosives and associated magazine. Conduct detailed analyses of all explosive compounds, including reactive chemicals and additives, to determine their toxicity and potential environmental impacts. Utilize Material Safety Data Sheets (MSDS) and risk	Risk Assessment, Standard Operating Procedures (SOPs) and Comprehensive Emergency Response Plan signed off by RREA, CARES Group, and DC.	DC

Component	Risks	Impact	Mitigation	Monitoring	Responsibility
			assessments to inform safe handling, storage, and decommissioning protocols. Implement strict segregation practices to ensure that reactive explosives are not mixed with other incompatible substances, reducing the risk of chemical reactions during degradation. Establish comprehensive emergency response plans that include immediate spill containment, neutralization, and decontamination protocols.		
Handling Explosives & Blasting Magazine	Decommissioning a blasting magazine produces waste streams that require specialized handling. If not, then this can lead to regulatory non-compliance impacts.	Moderate	Rigorously adhere to all regulations regarding the handling, storage, and disposal of hazardous explosive materials. Maintain detailed records of all assessments, handling protocols, and disposal methods to ensure accountability. Provide comprehensive training for all personnel on handling degraded explosives, emergency response procedures, and emergency equipment usage.	Conduct routine inspections to verify that waste management practices are followed. Waste Management Plan signed off by RREA, CARES Group, and DC.	DC
				Audit of records of all assessments, handling protocols, and waste management processes.	CARES Group
Removing Fuel Depot & Contaminated Soils	There is some evidence of legacy spills, leaks and / or seepage of hydrocarbons surrounding the fuel depot which may have led to high concentrations in the	Moderate	Conduct assessment to delineate the extent and concentration of any hydrocarbon contamination. Segregate contaminated materials from clean soils	Establish baseline, then monitor soil, water, and air quality.	DC

Component	Risks	Impact	Mitigation	Monitoring	Responsibility
	surrounding soils. When these are disturbed during removal of the soil, there is a risk that contaminated material may migrate into nearby waterbodies potentially affecting human health and ecosystem integrity.		immediately upon excavation and store them in sealed, leak-proof containers. Ensure that all hazardous waste is processed and disposed of in accordance with regulatory guidelines. Ensure that response equipment, such as spill containment kits and neutralizing agents, is readily available and that team members are trained in their use.		
Removing Fuel Depot & Contaminated Soils	Workers involved in the excavation, transport, and treatment of contaminated soils from surrounding the fuel depot face health risks if proper safety procedures are not strictly followed.	Moderate 	Develop and enforce clear SOPs for each stage of work - from excavation through transport to treatment - to ensure consistent adherence to safety protocols. Equip workers with appropriate PPE including chemical-resistant coveralls, gloves, eye and face protection, and respirators suitable for the contaminants present. Implement measures such as water sprays to limit dust generation during excavation and transport. Limit the duration of exposure.	Establish baseline then monitor air quality to detect any change in dust or contaminant concentrations.	DC
Removing All Equipment	During the removal of a mix of heavy equipment (e.g., front roller, truck, brick-making machine, rock crusher and pickup vehicle) there is a risk	Moderate 	Clarify ownership and responsibilities. Prepare an inventory of all equipment to identify potential hazards, such as	Audit of records of all assessments.	DC / RREA

Component	Risks	Impact	Mitigation	Monitoring	Responsibility
	of the release of residual fluids, degraded materials, and potential contaminants to the environment. This risk is increased and further complicated as ownership is unclear, with some assets not maintained and not operational. When dismantling or transporting these assets, leakage or accidental spills can occur. These substances can seep into soil or nearby waterbodies, leading to localised pollution and environmental degradation. Outdated or damaged machinery may have corroded parts that release heavy metals (such as lead or cadmium) and other contaminants, which further contribute to soil and water pollution risks during removal.		residual fluids, corroded components, and degraded materials. Identify a suitable location for safe storage or consider constructing a shelter on-site to protect the equipment. Although all PACs have been informed about the potential relocation of the equipment, some of the machines are not in operational condition.		
			Prior to dismantling any equipment, drain any residual fluids safely using spill containment systems such as bunding or secondary containment trays. Use certified absorption materials and spill kits to manage any unavoidable leaks during removal or transport. Isolate components known to have corroded parts or heavy metal contamination, and secure them in sealed, leak-proof containers for proper disposal or safe storage. Document and comply with all environmental regulations regarding hazardous waste disposal. Monitor any leakage or changes in soil and water quality during and after equipment removal.	Establish baseline, then monitor soil, water, and air quality.	DC

Component	Risks	Impact	Mitigation	Monitoring	Responsibility
			Develop and implement robust spill response and decontamination protocols. Ensure workers are specifically trained on emergency actions, and that all necessary decontamination and cleanup equipment is readily available.		
Removing All Equipment	Decommissioning activities generate a variety of waste materials, including metals, plastics, rubber, and electronic components. If not managed properly, these materials may be wasted instead of repurposed, leading to unnecessary resource consumption. Poor disposal practices can also result in inappropriate or illegal dumping, contributing to environmental contamination and regulatory compliance issues. Additionally, transporting and processing waste can create emissions and logistical challenges, while accumulated debris may obstruct waterways, increasing flood risks and harming aquatic ecosystems. Beyond these environmental concerns, mismanaged waste can negatively impact the visual landscape, diminishing	Moderate	Accurate records of disposal volumes, locations, and transporters should be maintained to ensure accountability and regulatory compliance. Establish designated areas for segregating metals, plastics, rubber, electronic components, and other waste streams. Train personnel to correctly identify and classify materials, ensuring that reusable or recyclable items are not mixed with non-recyclables. Develop partnerships to recover valuable resources. Follow best practices and regulatory guidelines for the transport, processing, and disposal of hazardous and non-hazardous waste. Develop a rehabilitation plan that includes landscape restoration.	Establish baseline, then monitor local water quality during decommissioning.	DC

Component	Risks	Impact	Mitigation	Monitoring	Responsibility
	the overall aesthetics of the site and surrounding areas.		Audit of records of all assessments, handling protocols, and waste management processes. Collaborate with local authorities and communities to salvage and repurpose valuable construction materials.	Audit of records of all assessments, handling protocols, and waste management processes. Waste Management Plan signed off by RREA, CARES Group, and DC.	RREA

11. Appendices

Appendix A Evidence of Stakeholder Consultation

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