

ATHI WATER WORKS DEVELOPMENT AGENCY (AWWDA)

NCT LAST MILE WORKS (WP5)

CONSTRUCTION OF BULK WATER OFFTAKES ALONG THE EXISTING PIPELINE AND A CASCADE AERATOR AT KARIMENU WTP

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

Update to the ESMP of the Approved ESIA for the NCT Pipeline Works

Introduction

This Environmental and Social Management Plan (ESMP) has been prepared to cover the construction of bulk water offtakes along the existing transmission pipeline under the Last Mile Works (WP5).

This ESMP has also been extended to cover the construction of a cascade aerator at Karimenu Water Treatment Plant (WTP). Karimenu WTP is part of the same AWWDA bulk water supply system as the NCT pipeline and offtakes addressed above, and given the limited scale and localized nature of the cascade aerator works, and that both components share the same institutional, monitoring and reporting arrangements, they are addressed together in this updated ESMP rather than as separate documents. Unlike the offtakes, the cascade aerator works take place within the existing, Karimenu WTP site; no new land, wayleave or resettlement impacts arise from this component either.

This ESMP focuses specifically on the environmental, health, safety and social risks introduced by construction of the offtake structures and cascade aerator, while retaining and adapting the construction-phase good-practice measures relevant to working on an already-established pipeline corridor and WTP.

Purpose and Scope

2.1 Purpose

This ESMP sets out the environmental and social risks associated with construction, operation and (in principle) decommissioning of the bulk offtakes, the mitigation measures to be implemented, institutional responsibilities, a monitoring plan, and an itemized implementation budget.

2.2 Scope of the Proposed Works

- Construction of bulk offtake points at defined chainages along the existing pipeline, each comprising a valve/offtake chamber, metering arrangement, and short interconnecting pipework.
- Minor excavation for chambers and pipework, within the existing 9 m wayleave.
- Testing, flushing, chlorination and commissioning of each new offtake connection before handover to operations.
- **Construction of a cascade aerator at Karimenu WTP, located entirely within the existing WTP site. No new land or wayleave is required.**

Key Environmental and Social Risks and Mitigation Measures — Construction Phase

Table 1 sets out the environmental, health, safety and social risks specific to construction of the bulk offtakes and their tap-ins to the live pipeline (Rows 1-10), and to construction of the cascade aerator at Karimenu WTP (Rows 11-14), together with the corresponding mitigation measures, institutional responsibility, implementation timeframe, and indicative cost. Land acquisition, compensation and resettlement risks are not included, as no such impacts arise from this scope of work: the offtake works are confined to the existing 9 m wayleave, and the cascade aerator works are confined to the existing Karimenu WTP. Items newly added in response to AFD review comments are shown in green text (per the existing ESMP convention); items added to cover the Karimenu WTP cascade aerator component are shown in blue text.

Table 1: ESMP Matrix — Construction of Bulk Water Offtakes and Cascade Aerator (Karimenu WTP)

#	Activity	Potential E&S Impacts/Risks	Mitigation Measures	Responsibility	Timeframe
1	Site establishment & mobilization at each offtake location	- Minor, localized disturbance within the existing 9 m wayleave (no new land take) - Temporary obstruction of pedestrian/vehicle access at chamber sites - Nuisance to adjacent landowners/occupiers	- Confirm each offtake location falls entirely within the registered 9 m wayleave; no acquisition or compensation required - Notify adjacent landowners/occupiers and local administration at least 7 days before works start at each site - Restrict working area strictly to the wayleave footprint; fence/demarcate each active site - Appoint a Community Liaison Officer (CLO) to handle notifications and complaints across all offtake sites - Record and resolve complaints through the project-level Grievance Redress Mechanism (GRM) (see Grievance Redress Mechanism section) - Engage stakeholders per the Stakeholder Engagement Plan (SEP) (see Stakeholder Engagement Plan section), including prior notification of affected landowners/occupiers, local administration and county government	Contractor / AWWDA	Pre-construction / mobilization
2	Excavation for offtake/valve/meter chambers and interconnecting pipework	- Trench collapse and worker injury - Public falls into open excavations - Damage to adjacent utilities (power, telecom, sewer) - Soil erosion and uncontrolled spoil	- Trenches to be shored/battered per OSHA 2007 excavation requirements; no worker entry into unsupported trenches >1.2 m deep - Trace and mark existing utilities before excavation; hand-dig within 0.5 m of known crossings - All open excavations hoarded/fenced with warning tape, signage, and covered overnight or backfilled same day where feasible - Excavated material stockpiled on the wayleave (not on roadways or drainage lines), covered/bunded to prevent erosion during rain - Daily site inspection by Contractor's safety officer; incidents logged in the site H&S register	Contractor	Throughout construction

#	Activity	Potential E&S Impacts/Risks	Mitigation Measures	Responsibility	Timeframe
3	Occupational health & safety across all offtake sites	• Injuries, illness or fatality among the workforce • Non-compliance with DOSH/OSHA 2007 requirements • Gender-Based Violence (GBV) and Sexual Exploitation and Abuse (SEA) risk, given the mobile, multi-site workforce interacting with host communities.	• Contractor to register the workplace(s) with the Directorate of Occupational Safety and Health Services (DOSHS) and submit a project-specific H&S Policy for Resident Engineer approval before mobilization • PPE (helmets, boots, high-visibility vests, gloves, dust masks, hearing protection) provided to all site personnel • Maintain an incident/accident register per OSHA 2007 and report notifiable incidents to DOSHS • First aid kits and a trained first-aider present at every active work site; liaison arranged with nearest medical facility for emergencies • Toolbox talks / daily safety briefings before works commence at each offtake site • HIV/AIDS and GBV/SEA awareness sessions for the workforce, given the mobile, multi-site nature of the works • Provision of adequate clean drinking water and drinking vessels available on site. • Provision of adequate resting areas and gender-segregated changing stations, away from machinery, accessible to workers during breaks. • Contractor to adopt and enforce a Code of Conduct prohibiting GBV/SEA, signed by all workers and subcontractor personnel. • Confidential GBV/SEA survivor referral pathway established, linked to the GRM and to local health, psychosocial and legal support services. • Development of an Emergency Response Plan, approved by the Resident Engineer prior to mobilization (see Emergency Preparedness and Response section).	Contractor	Throughout construction
4	Public safety at chamber/trench sites, several of which are near roads, footpaths and homesteads	• Third-party falls into trenches/chambers • Traffic accidents where works encroach on road reserves or footpaths • Struck-by incidents involving plant and pedestrians	• All excavations and open chambers enclosed with hard barricades (rigid fencing panels, not tape alone), signed, and lit during hours of darkness. • Trained traffic marshals deployed at any offtake site adjacent to a busy footpath • Speed limit, 'men at work', and diversion signage installed where works affect road shoulders • Vehicles/plant restricted to designated access routes; reversing alarms and banksmen used where visibility is restricted	Contractor	Throughout construction

#	Activity	Potential E&S Impacts/Risks	Mitigation Measures	Responsibility	Timeframe
			- Community sensitization on the location and duration of works at each site - Development and implementation of a site-specific Traffic Management Plan for each offtake location adjacent to roads/footpaths, approved by the Resident Engineer and relevant county roads authority before works commence at that site.		
5	Spoil and excavated material management	- Excess spoil dumped informally, blocking drains or encroaching on adjoining land - Erosion and sedimentation of surface water from stockpiles - Visual/amenity nuisance if spoil is left uncleared - Loss of vegetation and ground cover within the wayleave from clearance for chamber excavation.	- Maximize re-use of excavated material as backfill; only genuine surplus is treated as spoil for off-site disposal - Surplus spoil transported to a site approved by the respective County Government/NEMA for disposal or beneficial re-use (e.g. road works, landscaping) - No spoil placed in drainage lines, wetlands, or riparian reserves - Stockpiles (where unavoidable overnight) covered/bunded and located away from surface water and drainage - Reinstate and re-vegetate (grass) all disturbed wayleave surface immediately after backfilling and compaction at each site - Minimize vegetation clearance to the footprint strictly required for each chamber/trench; retain existing trees and vegetation outside the immediate works area where feasible.	Contractor	Throughout construction / immediately after backfilling
6	Noise, dust and vibration from excavation, compaction and vehicle movements	- Nuisance and health risk to workers and nearby residents - Complaints from sensitive receptors (schools, health facilities, places of worship) if any are within the offtake corridor	- Limit works at any single site to normal daytime working hours where practicable; provide 24-hour notice for any unavoidable out-of-hours activity - Water spraying of exposed/dry work areas to suppress dust, particularly during compaction and backfilling - Plant and machinery maintained to manufacturer specification to minimize noise, vibration and exhaust emissions - Workers exposed to high noise levels issued hearing protection - Noise/dust spot-checks at sensitive receptors during works, with corrective action if standards under the Noise and Excessive Vibration Pollution Control Regulations are exceeded	Contractor	Throughout construction
7	Waste generation (packaging, pipe off-cuts, fittings, cement bags, minor hazardous waste)	Uncontrolled disposal of construction waste	Develop and implement a Waste Management Plan (WMP) prior to mobilization, covering waste segregation, storage, transport and disposal.	Contractor	Throughout construction

#	Activity	Potential E&S Impacts/Risks	Mitigation Measures	Responsibility	Timeframe
	e.g. solvent cement, lubricants)	Soil/water contamination from residual chemicals	- Segregated skips/bins provided at each active site and at the contractor's laydown yard for general, recyclable, and hazardous waste - Store hazardous waste (solvent cement tins, lubricant containers) in designated, covered and bunded areas pending collection by a NEMA-licensed hazardous waste contractor. - Maintain good housekeeping at all worksites through regular waste collection and removal. - Regular collection to prevent overfilling; no burning or burying of waste on site - Final disposal of general construction debris at a site approved by the County Government/NEMA - Organize regular waste management awareness sessions for the workers.		
8	Fuel, oil and chemical handling (small plant, generators, jointing/tapping equipment)	- Soil and water contamination from spills/leaks - Fire risk from stored fuels	- No refuelling or plant maintenance within 20 m of a watercourse or drain; refuelling only at designated bunded points - Spill kits kept at every active site; workers trained in their use - Fuel/lubricant storage bunded, roofed, and away from surface water drains - Any spill reported immediately to the Resident Engineer and cleaned up per the contractor's spill response procedure	Contractor	Throughout construction
9	Interaction with existing utilities and previously disturbed ground within the wayleave	- Damage to other buried services (power, telecom, sewer, other water mains) during excavation - Service interruption to third parties - Uncontrolled discharge or pipeline burst during tap-in/shutdown works on the live transmission main.	- Consult utility service providers and obtain as-built records before excavation at each offtake location - Trial pits/hand excavation used to confirm utility positions ahead of mechanical excavation - Any accidental damage reported immediately to the affected utility and the Resident Engineer, and repaired at the contractor's cost - Tapping/shutdown method statement reviewed and approved by the Resident Engineer before each tap-in; Emergency Response Plan (see Emergency Preparedness and Response section) implemented for isolation and incident response in the event of uncontrolled discharge.	Contractor / utility service providers	Pre-excavation & construction
10	Testing, flushing, chlorination and commissioning of new offtake connections	Discharge of chlorinated flushing water to the environment	- Flushing/discharge points selected to avoid direct release into watercourses; where unavoidable, dechlorinate before release and notify WRA - Notify nearby residents of testing/flushing schedule	Contractor	Testing & commissioning

#	Activity	Potential E&S Impacts/Risks	Mitigation Measures	Responsibility	Timeframe
		Localized ponding/erosion at discharge points	Direct discharge through a stilling arrangement to reduce velocity and prevent erosion		
11	Site establishment and mobilization for construction of the cascade aerator at Karimenu WTP	- Disruption to ongoing water treatment plant (WTP) operations and continuity of water supply to consumers if works interfere with active treatment units - Worker and public safety risk from an unfamiliar workforce operating within a live, fenced treatment plant containing chemical storage (e.g. chlorine), electrical installations and open treatment units - Restricted, confined working area within the existing WTP compound	- No new land required; all works confined to the existing Karimenu WTP already held by AWWDA; no land acquisition, compensation or resettlement impacts arise - Construction sequencing and daily work schedule agreed in advance with the WTP Plant operations team to avoid interruption to ongoing treatment and supply - Site-specific induction for all contractor personnel covering WTP-specific hazards (chlorine/chemical storage areas, electrical installations, restricted zones) before mobilization - Laydown/storage area confined to a designated non-operational zone within the compound, agreed with the Plant-Operator - Access to the WTP compound controlled; contractor personnel signed in/out and issued visitor/contractor passes	Contractor / AWWDA	Pre-construction / mobilization
12	Excavation and foundation works for the cascade aerator structure	- Trench/excavation collapse and worker injury - Damage to existing buried WTP pipework, electrical cabling or instrumentation - Dust, noise and vibration affecting WTP staff, control room operations and any nearby residents - Soil erosion and sediment run-off toward the Karimenu River/raw water intake given the WTP's proximity to a watercourse	- Trenches shored/battered per OSHA 2007 excavation requirements; no worker entry into unsupported excavations >1.2 m deep - Trace and mark existing WTP pipework, cabling and instrumentation before excavation; hand-dig within 0.5 m of known crossings; WTP operations staff consulted on as-built layout - Excavated material and stockpiles bunded/covered and kept away from the river and drainage lines to prevent sediment run-off - Silt fencing/sediment traps installed on the downslope side of excavation works where the site drains toward the Karimenu River - Daily site inspection by Contractor's safety officer; incidents logged in the site H&S register	Contractor	Throughout construction
13	Concrete works: construction of the cascade aerator structure and ancillary piping/collection sump	- Contamination of raw or treated water, or of the Karimenu River, from uncured concrete, cement wash-water or spillage - Occupational H&S risks from working at height and with formwork/wet concrete	- Concrete mixing and washout confined to a designated, bunded area at least 20 m from the river/raw water intake and any open treatment unit; no washing of mixers, tools or wheelbarrows directly into the river or drainage - Wash-water and surplus concrete captured and allowed to settle/cure in a temporary bunded pit before disposal of solids as construction waste - Fall protection and edge protection provided for any work at height on the cascade structure; PPE per Table 1, Row 3	Contractor	Throughout construction

#	Activity	Potential E&S Impacts/Risks	Mitigation Measures	Responsibility	Timeframe
		Construction waste (formwork off-cuts, cement bags, packaging)	Formwork off-cuts, cement bags and packaging segregated and disposed of per the Waste Management Plan (see Row 7)		
14	Testing, commissioning and tie-in of the cascade aerator to the treatment process	- Temporary interruption to WTP output/water supply to downstream consumers during tie-in - Risk to treated water quality if commissioning is not properly sequenced and tested	- Tie-in and commissioning sequenced and approved by the Plant operations to minimize interruption; downstream consumers notified in advance where a supply interruption is unavoidable - Water quality testing (turbidity, residual chlorine) carried out before the aerator is brought into service - Emergency Response Plan (see Emergency Preparedness and Response section) extended to cover the Karimenu WTP compound	Contractor / NCWSC-AWWDA Operations	Testing & commissioning

Emergency Preparedness and Response

Given that the offtake works involve tap-ins to a live, pressurized pipeline, and the cascade aerator works take place within an active water treatment plant containing chemical storage and treatment units, the Contractor shall prepare and have approved by the Resident Engineer, prior to mobilization, an Emergency Response Plan covering as a minimum:

- Pipeline burst or uncontrolled discharge during tapping or shutdown works, including immediate isolation procedure and contact protocol with AWWDA/NCWSC operations control.
- Trench collapse or entrapment.
- Fuel/chemical spill response, including location of spill kits and trained personnel.
- Medical emergency response, including designated first-aiders and the nearest medical facility per site.
- Fire, particularly at the contractor's laydown yard/campsite where fuels are stored.
- **Chemical storage area incidents at Karimenu WTP (e.g. chlorine leak), given the proximity of the cascade aerator construction works to existing chemical dosing and storage facilities, including coordination with the WTP Plant-in-Charge's existing emergency procedures.**

Emergency contact numbers for AWWDA, the Contractor, DOSH, WRA, and nearby medical facilities shall be displayed at every active work site. This Emergency Response Plan is cross-referenced as a mitigation measure in Table 1 (Rows 3 and 9).

Operation Phase E&S Risks and Mitigation Measures

Once commissioned, each offtake and the cascade aerator at Karimenu WTP are handed over to NCWSC/the respective county water utility for operation. Table 1a sets out the E&S risks anticipated during the operation phase and the corresponding mitigation measures.

Table 1a: Operation-Phase ESMP

Operation-Phase Risk	Mitigation Measures	Responsibility
• Illegal/unauthorized connections at or near offtake points	• Regular inspection and metering audits by NCWSC/AWWDA operations • Enforcement action per the Water Act, 2016 where illegal connections are identified	NCWSC / AWWDA Operations
• Vandalism or theft of offtake infrastructure (valves, meters, chamber covers)	• Secure, lockable chamber covers installed at handover • Community sensitization on reporting suspicious activity • Periodic security patrols of offtake points	NCWSC / AWWDA Operations
• Water quality degradation at the offtake (contamination, backflow)	• Routine water quality monitoring at offtake points • Functional non-return valves maintained • Scheduled flushing as part of the O&M programme	NCWSC / AWWDA Operations
• Leakage or pipe bursts at offtake connections during operation	• Routine leak detection and repair programme • Operation & Maintenance manual with defined maintenance schedule handed over by the Contractor	NCWSC / AWWDA Operations
• Continued community grievances relating to supply reliability after handover	• GRM remains active during the operation phase, managed by NCWSC/the respective county utility with escalation to AWWDA where relevant	NCWSC / County utility / AWWDA
• Biofilm/algae growth, debris accumulation, or mosquito breeding on the cascade aerator trays and collection sump • Gradual structural deterioration of the aerator structure	• Routine cleaning/desliming of aerator trays as part of the WTP O&M programme • Sump kept free of standing water and debris to discourage vector breeding • Periodic structural inspection of the aerator structure	NCWSC / AWWDA Operations

Decommissioning

The bulk offtake structures and the cascade aerator at Karimenu WTP constitute permanent water supply infrastructure intended to remain in service for the operational life of the NCT pipeline and Karimenu WTP respectively, and beyond, subject to routine asset management (periodic replacement of individual components such as valves and meters). No decommissioning is currently planned or anticipated as part of this project.

Should decommissioning of an individual offtake or of the cascade aerator become necessary in future (for example, due to network or treatment process reconfiguration), it shall be subject to a separate E&S review at that time, informed by the prevailing NEMA decommissioning procedures, and shall as a minimum address: safe isolation and capping of the connection or structure; removal and disposal of redundant materials in line with the Waste Management Plan principles set out in this ESMP; and reinstatement of the site.

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Monitoring Plan

Table 2 sets out the monitoring parameters, indicators, frequency and responsibility for verifying implementation of the mitigation measures set out above, including those newly added in response to AFD review comments.

Table 2: Environmental and Social Monitoring Plan

Parameter	Monitoring Indicator	Frequency	Responsibility
Trench safety & OSH compliance	Daily site inspection; PPE use; trench shoring	Daily	Contractor Safety Officer / Resident Engineer
Traffic and public safety at chamber sites	Presence of signage, marshals, hard barricades; compliance with the site-specific Traffic Management Plan	Daily during active works	Contractor / Resident Engineer
Spoil, waste and vegetation management	Volume of spoil re-used vs. disposed; waste segregation at site; implementation of the Waste Management Plan (incl. hazardous waste manifests)	Weekly	Resident Engineer / AWWDA E&S Safeguards officers
Water quality at tap-in points	Residual chlorine, turbidity before reconnection to supply	Before commissioning each offtake	Contractor / AWWDA
Noise levels at sensitive receptors	Spot dB(A) readings against EMCA Noise Regulations, 2009	As needed, or on complaint	Contractor
Dust levels at sensitive receptors	Visual dust nuisance checks and spot monitoring at sensitive receptors during dry conditions	As needed, or on complaint	Contractor
Incident/accident reporting	Incident register; DOSH notifications	Continuous; monthly summary	Contractor / Resident Engineer
Grievances received and resolved	GRM log; resolution turnaround time	Monthly	CLO / AWWDA E&S Safeguards
GBV/SEA safeguards	Code of Conduct signed by all workers; GBV/SEA cases reported and referred via the GRM referral pathway	Monthly	Contractor CLO / AWWDA E&S Safeguards
Welfare facilities	Availability of drinking water, resting areas and gender-segregated changing stations at active sites	Weekly	Resident Engineer
Emergency preparedness	Emergency Response Plan in place and approved; emergency contacts displayed at site; spill/incident drill records	Prior to mobilization; then quarterly	Resident Engineer / AWWDA E&S Safeguards
Reinstatement of wayleave surface	Visual inspection; re-vegetation establishment	At handover of each site	Resident Engineer / AWWDA E&S Safeguards
WTP operational continuity during cascade aerator construction	Records of coordination with the Plant-in-Charge; any unplanned interruption to treatment/supply logged and reported	Continuous during works	Resident Engineer / WTP Plant-in-Charge
Water quality at the Karimenu River/raw water intake during cascade aerator construction	Visual turbidity checks; integrity of silt fencing/sediment traps	Weekly during earthworks and concrete works	Contractor / AWWDA E&S Safeguards officers

Institutional Arrangements and Responsibilities

Table 3 summarizes institutional roles and responsibilities for implementation of this ESMP.

Table 3: Institutional Roles and Responsibilities

Institution / Role	Responsibility
AWWDA (Athi Water Works Development Agency)	Project proponent. Overall responsibility for ESMP implementation, supervision, budget allocation, and reporting to AFD.
Resident Engineer / Supervising Consultant	Day-to-day supervision of contractor compliance with this ESMP; reviews and approves tapping/shutdown method statements; verifies as-built reinstatement before site handover.
Contractor	Implements mitigation measures at each offtake site; maintains H&S and incident registers; employs E&S specialists and tapping crew; funds and executes all cost items in Table 4 unless otherwise stated in the contract.
NEMA	Regulates waste handling and disposal and overall ESMP compliance.
DOSH (Directorate of Occupational Safety and Health Services)	Workplace registration; inspection and enforcement of OSHA 2007 compliance.
Water Resources Authority (WRA)	Permits/oversight where flushing or testing discharge may affect a watercourse.
Nairobi City Water and Sewerage Company (NCWSC) / respective County Governments	Coordination on customer notifications for supply interruptions and on road/way-leave matters within their jurisdiction; operation-phase management of handed-over offtakes.
AFD (Agence Française de Développement)	Reviews and approves this ESMP; receives periodic E&S monitoring reports.
Karimenu WTP Plant-in-Charge / NCWSC WTP Operations	Coordinates construction scheduling and site access within the live WTP compound to avoid interruption to treatment operations; approves tie-in and commissioning of the cascade aerator.

Grievance Redress Mechanism (GRM)

A project-level GRM already established under the parent ESIA/ESMP shall continue to apply to this scope, including the cascade aerator component at Karimenu WTP. Given the absence of land/compensation impacts, grievances arising from offtake construction are expected to relate primarily to nuisance (noise, dust, access disruption), damage to property outside the wayleave, GBV/SEA concerns, or temporary water supply interruption; grievances relating to the cascade aerator are expected to relate primarily to any temporary interruption to WTP output during construction/tie-in. The Contractor shall:

- Maintain a grievance log recording date, complainant, nature of complaint, action taken, and closure date, for each of the offtake sites.
- Acknowledge grievances within 48 hours and aim to resolve routine complaints within 14 days.
- Escalate unresolved or serious grievances, including GBV/SEA cases, to the AWWDA E&S Safeguards Unit and, where relevant, to the Resident Engineer, following a confidential, survivor-centred referral pathway for GBV/SEA.
- Report GRM statistics as part of monthly E&S monitoring reports.

Stakeholder Engagement Plan (SEP)

This ESMP is implemented under the Stakeholder Engagement Plan prepared for the parent NCT Pipeline ESIA/ESMP, updated to reflect the specific locations, timing and stakeholders relevant to the bulk offtake works. Key elements applicable to this scope are:

- Stakeholder identification: adjacent landowners/occupiers, local administration (chiefs/village elders), county government departments (roads, environment), NCWSC/county water utilities, schools/health facilities/places of worship near offtake sites, and the general public along affected footpaths and roads; for the cascade aerator component, the Karimenu WTP Plant operations staff and downstream consumers served by the WTP.
- Disclosure: prior notification (minimum 7 days) to affected landowners/occupiers and local administration before works commence at each site, covering the nature, duration and hours of works.

- Consultation: community sensitization meetings at each offtake site prior to mobilization, covering safety, traffic management, GRM access, and expected disruption/duration.
- Engagement channels: the CLO as primary point of contact; the grievance log; community meetings recorded and reported in monthly E&S monitoring reports.
- Vulnerable groups: particular attention to persons with disabilities, elderly residents and school-going children near sites, including tailored safety messaging and site access arrangements.
- Reporting: stakeholder engagement activities and outcomes reported as part of monthly E&S monitoring reports to AWWDA and AFD.

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ESMP Implementation Budget

Table 4 provides an itemized, indicative budget for implementation of the mitigation and monitoring measures set out in this ESMP, covering both the bulk offtakes and the cascade aerator at Karimenu WTP. The reinstatement/re-vegetation line has been corrected from a calculation error in the previous version (see Table 5). New budget lines specific to the cascade aerator component are shown in blue text.

Table 4: Indicative ESMP Implementation Budget (approx. 20 offtake sites and cascade aerator at Karimenu WTP)

Item / Mitigation Cost Line	Unit	Qty	Rate (KES)	Total (KES)
PPE for workforce (helmets, boots, hi-vis vests, gloves, dust masks, hearing protection)	Per worker set	60	5,000	300,000
Site hoarding, warning signage, tape and hard barricades per offtake site	Per site	20	15,000	300,000
Trained traffic marshals (roadside/footpath sites, average 5 days per site)	Per site	20	15,000	300,000
Spill kits (oil/fuel) stationed at active sites	Per kit	20	8,000	160,000
First aid kits and station supplies	Per site	20	5,000	100,000
Portable drinking water and gender-segregated welfare/changing facilities at each site	Per site	20	8,000	160,000
Independent noise and dust spot-monitoring at sensitive receptors (covers both parameters)	Lump sum	1	200,000	200,000
Segregated waste skips and NEMA-licensed disposal	Per site	20	20,000	400,000
HIV/AIDS and GBV/SEA sensitization sessions, Code of Conduct dissemination and referral pathway set-up	Lump sum	1	200,000	200,000
Independent annual Health & Safety audit	Lump sum	1	250,000	250,000
Fire safety audit	Lump sum	1	150,000	150,000
Grievance Redress Mechanism and Stakeholder Engagement Plan operation (records, community meetings)	Lump sum	1	200,000	200,000
OSHA/site induction & chance-find procedure training	Per site	20	10,000	200,000
Environmental awareness and waste management training sessions for workers	Lump sum	1	150,000	150,000
Reinstatement and re-vegetation of disturbed wayleave surface	Lump sum	1	30,000	30,000
Silt fencing/sediment trap and turbidity control at the Karimenu River during aerator construction	Lump sum	1	80,000	80,000
Coordination allowance for WTP operational continuity (temporary flow/bypass arrangements during tie-in)	Lump sum	1	100,000	100,000
Bunded concrete mixing/washout area at Karimenu WTP	Lump sum	1	40,000	40,000
WTP-specific H&S induction (chlorine/chemical storage area orientation) for cascade aerator works	Lump sum	1	30,000	30,000
Vector/mosquito control provision for the aerator collection sump (operation-phase start-up)	Lump sum	1	20,000	20,000
Total				3,370,000

Response to AFD Comments

Table 5 summarizes each comment raised by AFD on the previous draft of this ESMP (which covered the bulk offtakes only), and how it has been addressed in this revision. It does not extend to the Karimenu WTP cascade aerator component, which has been added subsequently at AWWDA's request and is addressed throughout the sections above (notably Table 1, Rows 11-14) rather than in response to an AFD comment.

Table 5: Response to Comments

#	AFD ES Expert Comment (A-S. Triboulet, 30 July 2026)	How Addressed in This Revision
1	Are you also expecting E&S risks during operation? If yes, please add a table for operation phase ESMP. Same for decommissioning.	Added a new 'Operation Phase E&S Risks and Mitigation Measures' table (Section 4) covering illegal connections, vandalism, water quality, leakage and grievance handling post-handover. Added a Decommissioning statement (Section 5) explaining that no decommissioning is currently planned for this permanent infrastructure, and setting out the minimum requirements should it arise in future.
2	Any risk on loss of vegetation? Add on GBV risks. Add Grievance Redress Mechanism. Add Stakeholder Engagement Plan.	Vegetation loss added as a risk under Table 1, Row 5, with an added mitigation on minimizing clearance footprint. GBV/SEA added as a risk under Table 1, Row 3, with Code of Conduct and referral-pathway mitigations. GRM cross-referenced in Row 1 (existing GRM section retained). A new standalone Stakeholder Engagement Plan section has been added (Section 7).
3	Provision of adequate clean drinking water and drinking vessels, and adequate resting areas / gender-segregated changing stations, should be made available on site.	Added as new mitigation bullets under Table 1, Row 3, and as a new line item in the implementation budget (Table 4).
4	Could you add the development of an Emergency Response Plan?	Retained as a dedicated Emergency Preparedness and Response section, and explicitly cross-referenced as a mitigation measure in Table 1, Rows 3 and 9.
5	Using hard barricades.	Table 1, Row 4 mitigation now specifies 'hard barricades (rigid fencing panels, not tape alone)'; Table 2 and Table 4 updated to match.
6	Add development of a traffic management plan.	Added as a new mitigation measure under Table 1, Row 4, requiring a site-specific Traffic Management Plan approved by the Resident Engineer and county roads authority; also reflected in Table 2 monitoring indicators.
7	This row on waste management could be strengthened: develop a Waste Management Plan; store hazardous waste in designated, covered, bunded areas pending collection by a NEMA-licensed contractor; maintain good housekeeping; organize regular waste management awareness sessions.	All four elements added to Table 1, Row 7 mitigation measures, essentially as suggested.
8	Good, but I think it would be ideal to also include [the Emergency Response Plan] in the table above.	Cross-referenced in Table 1, Rows 3 and 9 (see response to Comment 4).
9	Please make sure you have monitoring indicators for each of the risks mentioned in the ESMP table (including the rows suggested to add).	Table 2 expanded with new rows/indicators for dust, GBV/SEA, welfare facilities, and emergency preparedness, and the waste/traffic rows broadened to reference the new Waste Management Plan and Traffic Management Plan.
10	Does it include provision of drinking water for workers, sanitation facilities, etc.?	New budget line added: 'Portable drinking water and gender-segregated welfare/changing facilities at each site' (Table 4).
11	Is it sufficient for both noise and dust management?	Budget line description clarified to state it covers both noise and dust, and the amount increased from KES 150,000 to KES 200,000 (Table 4).
12	There should also be some budget for environmental awareness/waste management training. The training budget seems limited (KES 10,000 per site).	The existing KES 10,000/site line is retained for OSHA/site induction and chance-find procedure training only. A separate new budget line of KES 150,000 (lump sum) has been added

#	AFD ES Expert Comment (A-S. Triboulet, 30 July 2026)	How Addressed in This Revision
		specifically for environmental awareness and waste management training (Table 4).
13	There is a typo here. 1*30,000 = 30,000 and not 300,000.	Corrected. The reinstatement/re-vegetation line now reads KES 30,000, and the budget total has been recalculated accordingly to KES 3,370,000 (reflecting this correction plus the new/revised lines above).

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