

KAZAKHSTAN

KARAGANDA WWTP MODERNISATION PROJECT

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN



February 2024

LIST OF ACRONYMS AND ABBREVIATIONS

CESMP	Contractor's Environmental and Social Management Plan
E&S	Environmental and Social
EBRD	European Bank for Reconstruction and Development
EHS	Environmental, Health and Safety
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESMS	Environmental and Social Management System
GBVH	Gender Based Violence and Harassment
GET	Green Economy Transition
GM	Grievance Mechanism
H&S	Health and Safety
ILO	International Labour Organisation
KPI	Key Performance Indicator
KS	Karaganda Su
OHS	Occupational Health & Safety
OHSMP	Occupational Health and Safety Management Plan
PIU	Project Implementation Unit
PPE	Personal Protective Equipment
SEP	Stakeholder Engagement Plan
WWTP	Wastewater Treatment Plant

TABLE OF CONTENTS		Page
1	INTRODUCTION	4
2	OVERALL MANAGEMENT RESPONSIBILITIES	5
2.1	Pre-construction and construction phase	6
2.2	Operation phase	7
3	ENVIRONMENTAL AND SOCIAL MANAGEMENT SYSTEM	8
3.1	ESMS framework	8
3.2	Project ESMP	9
3.3	Management of change	10
4	MITIGATION, MANAGEMENT AND ENHANCEMENT MEASURES	11
4.1	Pre-construction and construction phase	11
4.2	Operation phase	28
4.3	Closure and decommissioning	34
4.4	Specific mitigation or management plans to be developed by KS	34
4.5	Specific management plans to be developed by the Contractor	36
5	MONITORING PLAN	38
5.1	Monitoring ESMP Implementation	38
5.2	Operational Environmental Monitoring	38
5.3	GET performance indicators and reporting to EBRD	42
ANNEX 1: KEY CONTRACTOR ENVIRONMENTAL AND SOCIAL MANAGEMENT PLANS		43

1 INTRODUCTION

The European Bank for Reconstruction and Development (EBRD) is considering an investment in a new wastewater treatment plant (WWTP) for the city of Karaganda in Kazakhstan. The proposed WWTP will be operated by Karaganda Su (KS). The ESMP has been prepared by a consultancy team from Sweco (Denmark) and EcoSocio Analysis (Kazakhstan) for Karaganda Su's implementation during the Project.

The purpose of this Environmental and Social Management Plan (ESMP) is to provide a consolidated summary of all the Environmental and Social commitments needed to effectively mitigate the negative impacts of the Project during both construction and operation, and to enhance the positive impacts. The ESMP also provides a framework for the Environmental and Social Management System (ESMS) that is required to ensure systematic and effective execution of these commitments, including roles and responsibilities between KS, the Project Implementation Unit (PIU), and the Contractor.

Chapter 2 describes the overall management responsibilities of the PIU, KS, and the Contractor, respectively, while the ESMS framework is described in chapter 3. Mitigation, management, and enhancement measures identified in the Environmental and Social Impact Assessment (ESIA) are presented in chapter 4 along with means of verification and responsibilities for implementation for construction and operation phases. A monitoring plan has been prepared with an outline of key environmental monitoring actions, based on the ESIA outcome and is presented in chapter 5. Suggested tables of contents for each of the key contractor environmental and social management plans are found in Annex 1.

2 OVERALL MANAGEMENT RESPONSIBILITIES

This chapter presents measures recommended taken by Project organisations – the Project Implementation Unit (PIU) under KS as the proponent, the Contractor, and sub-contractors – to manage the environmental and social impacts of the Project during construction and operation.

The table below presents an overview of the environmental and social management responsibilities of the various Project entities, as explained further below.

Table 2.1: Overview of E&S responsibilities for Project

	Pre-construction	Construction	Operation
PIU under KS	Tendering of construction contract(s). Inputs to detailed design. Obtaining national approval. Development of ESMS for construction phase.	Ensuring compliance with all relevant national legislation, as well as with the environmental controls and mitigation measures provided in this ESMP. Monitoring performance of contractors and subcontractors providing workforce, supplies and services. Quarterly progress reports to EBRD during constructions. Implementation of ESMS for construction phase. Development of ESMS for operations phase. Capacity building at KS for implementation of operational ESMS.	Reporting Project performance to EBRD at agreed intervals. Overall responsibility for ESMS during operation.
KS	Inputs to detailed design. Inputs to ESMS for construction phase. Assisting with the approval process.	Construction monitoring. Stakeholder engagement. Inputs to ESMS for operation phase. Capacity building for implementation of operational ESMS. Receiving technical training in WWTP operations.	Daily implementation of ESMS for operations phase. Update of existing management plans to take into account new processes at the new WWTP.
Contractor	Selected via tender process. Responsible for detailed design and construction.	Development and implementation of CESMP and sub-plans. Conduct monitoring and on-site audits of sub-contractors to verify implementation of the CESMP and report on findings to the Supervising Engineer. Communicate any E&S issues and incidents to the Supervising Engineer immediately. When construction is complete, the contractor and its technology providers will train	-

	Pre-construction	Construction	Operation
		KS staff in plant operations and maintenance.	

2.1 Pre-construction and construction phase

2.1.1 PIU under KS

KS will establish a PIU to assist in Project preparation, monitor contractor performance and build management capacities. This includes the development of management and monitoring systems, and supervision of the works. The PIU shall verify with the relevant authorities what additional environmental studies, biodiversity studies and approvals may be needed in conjunction with the finalisation of the detailed design and ensure that these are implemented. If required, capacity building should be provided to the PIU on, e.g., environmental and social performance, contractor management and monitoring.

During construction, regular visits shall be paid by a competent person from the PIU to inspect the construction site and verify that the contractor is complying with contractual obligations, and that the works are compliant with national legislation and the EBRD requirements. This is part of the contractor management system that the PIU shall develop as per Performance Requirement 1. The PIU is to cooperate closely with KS during monitoring activities.

The PIU shall develop a reporting framework in line with EBRD requirements, and report with an agreed frequency on the implementation of the E&S monitoring and the Project performance. This shall include key parameters such as the number of worker accidents, and what was done to follow-up on the accidents and prevent a similar accident from happening again.

The PIU will, in cooperation with KS, develop the operation phase ESMS during the construction phase. The PIU will undertake capacity building at KS to ensure that personnel tasked with implementing the operational ESMP and ESMS have the necessary awareness and skills to execute these functions effectively.

2.1.2 KS

During the pre-construction phase, KS (and the City Akimat) shall have the opportunity to comment on the final design and can assist in the approval process.

During the construction phase, the PIU shall coordinate contractor monitoring with KS (and the City Akimat). The PIU will build capacity at KS for implementation of the ESMP for the operation phase (see further below). At the end of the construction, KS personnel will receive technical training in operations of the new WWTP.

2.1.3 Contractor

Environmental and social principles shall be integrated throughout the process of identifying and entering a contract with the contractor. In particular, attention shall be paid to the following.

Tender documents to include among others:

- Health and safety (H&S) criteria to enable the PIU to check the credentials of contractors, e.g., ISO 45001 certification, national registration to perform civil works, H&S policy, skills qualifications of key employees, e.g., welders and crane operators, and health and safety qualification of person(s) responsible for H&S management.
- Tender documents to include environmental criteria to enable the PIU to check the credentials of contractors, e.g., ISO 14001 certification, environmental policy, environmental qualifications of employees, for example the person(s) responsible for environmental management.

- Tender documents to specify that national legislation and EBRD requirements on employment conditions are to be followed, e.g., in relation to working time, overtime, access to a grievance mechanism for contractor's employees.

Contract documents to require among others:

- Preparation and implementation of Contractor Environmental and Social Management Plan and sub-plans.
- Works are performed strictly during daytime hours unless with special application and approval.
- Provision of PPE for construction staff.
- Only qualified contractor and sub-contractor workers will be allowed to perform jobs where qualifications are required.
- Including accident statistics (fatalities, severe injuries, injuries and near-miss incidents) in periodic progress reporting.
- The contractor and/or suppliers to provide instruction manuals for the correct operation of key infrastructure and provide training of KS staff during the commissioning phase.
- Having in place or developing a gender-based violence and harassment policy, code of conduct and a grievance mechanism for the contractors' employees where grievances can be submitted confidentially, if this is the preference.

Based on the provisions of this ESMP, the Contractor shall prepare a Contractor ESMP (CESMP) detailing the construction process, the organisational and site-specific arrangement for environmental and social management. Further information on this is included in section 4.5 below.

To ensure full compliance of construction activities with the provisions of the CESMP, the Contractor shall employ a qualified Environmental and Social (E&S) Manager at the construction site. The E&S Manager will oversee the construction on a day-to-day basis, monitor ESMP implementation, prepare site-specific management plans for potentially critical areas as specified in the CESMP and advise on corrective action in case of unforeseen situations. In addition, the E&S Manager will be responsible to prepare regular reports on the progress of CESMP implementation for the Supervising Engineer.

The E&S Manager will also be responsible for ensuring OHS compliance at all times, including regular training of workers according to the provisions in the Occupational Health and Safety Management Plan (OHSMP).

2.2 Operation phase

2.2.1 PIU under KS

It is recommended that the PIU conducts an internal environmental and health and safety (EHS) audit during commissioning of the WWTP to verify the EHS risks related to the operation of the new infrastructure and to check the contractor's maintenance plans.

2.2.2 KS

KS' ESMS shall include provisions in the ESMP for the management and monitoring of those environmental and social impacts identified during the operations phase. Given that KS is the wastewater operator, it is expected that daily implementation of the ESMP for the operations phase is assigned to KS.

KS shall review and update relevant Management Plans to include the new infrastructure, e.g., the emergency plan.

3 ENVIRONMENTAL AND SOCIAL MANAGEMENT SYSTEM

3.1 ESMS framework

KS needs to have in place an Environmental and Social Management System (ESMS), which has the overall purpose to ensure appropriate management of E&S matters at the corporate level, and for the Project throughout the whole project lifecycle, including successful implementation of the ESMP and mitigation measures identified through the ESIA process.

KS already has in place some elements of E&S management at the corporate level, although this first and foremost focuses on compliance with permits and licences. At KS a dedicated environmental policy has not been developed and management of environmental matters is not very systemised. Environmental protection procedures, instructions and personnel training do not go beyond legal compliance. A high level OHS policy is in place which also highlights the company's commitment to quality.

Hence, an ESMS needs to be developed following international good practice standards. The scope of the ESMS should cover the WWTP as a minimum but can be expanded to cover all KS operations.

An ESMS is a systemic approach for organisations to identify, manage, and mitigate the environmental and social risks and impacts associated with their activities, products, and services. It is designed to promote sustainable practices, ensure compliance with applicable regulations and standards, and engage with stakeholders in a responsible and transparent manner. An ESMS typically comprises a range of policies, procedures, and practices that enable an organization to effectively address its environmental and social responsibilities. It provides a framework for integrating environmental and social considerations into the organization's decision-making processes and day-to-day operations.

The following provides a framework for the key components of an integrated ESMS based on ISO14001 (Environmental Management) and ISO45001 (Occupational Health and Safety management), that should be tailored to KS' specific needs and context and existing management practices. In essence, an ESMS should emphasize a culture of continual improvement in E&S performance. It includes setting improvement targets, implementing corrective and preventive actions, and fostering innovation to achieve sustainable E&S outcomes.

1. **Policy and Commitment:** The E&S management system begins with a clear and documented policy statement that outlines the organization's commitment to environmental protection, occupational health, and safety. This policy should be endorsed at the highest level of management and communicated throughout the organization. KS has in place a corporate level E&S (EHS) policy, that needs to be fully operationalised across its operations.
2. **Planning:** This component involves identifying environmental aspects, health and safety hazards, and associated risks and opportunities related to the company's activities, including WWTP operations. It also includes setting objectives and targets for improvement in E&S performance and developing action plans to achieve them.
3. **Implementation and Operation:** This component involves establishing the necessary processes, resources, and controls to implement the E&S management system effectively. It includes defining roles, responsibilities, and authorities, as well as providing appropriate training and communication channels. In the context of the proposed WWTP project, KS will need to assign as a minimum a dedicated E&S manager at the corporate level that oversees the project, and dedicated E&S personnel on site that is responsible for daily E&S management during construction and operations.
4. **Legal and Other Requirements:** The system ensures compliance with applicable environmental, health and safety laws, regulations, and other requirements. It involves keeping up-to-date with changes in legislation and establishing procedures to assess compliance and address any non-

conformities. KS already has in place procedures to ensure compliance with applicable laws, which should be formalised within the context of an ESMS.

5. **Hazard Identification and Risk Assessment:** This component focuses on identifying and assessing environmental aspects, health hazards, and safety risks associated with the organization's activities, including the WWTP. It includes evaluating the severity and likelihood of incidents and implementing controls to mitigate or eliminate hazards and risks.
6. **Objectives and Targets:** The E&S management system sets measurable objectives and targets aligned with the organization's policy. These objectives can include reducing environmental impacts, preventing accidents and incidents, and promoting employee health and well-being. E.g., in the context of the proposed WWTP, it is recommended that KS develops a resource management and conservation plan setting out objectives and activities that facilitate maximum reuse of effluents and sludge from the WWTP.
7. **Operational Controls:** This component involves establishing procedures and controls to manage and minimize E&S risks. It includes implementing measures to prevent pollution, conserve resources, ensure safe work practices, and respond to emergencies effectively.
8. **Training, Awareness, and Competence:** The system ensures that employees receive appropriate E&S training and are aware of their roles and responsibilities. It includes assessing and maintaining the competence of personnel involved in E&S activities. KS will need to build their capacity in ESMS in general, and specifically in relation to E&S related to WWTP operations in the context of the proposed project.
9. **Communication and Consultation:** This component emphasizes effective internal and external communication on E&S matters. It involves establishing channels for sharing information, engaging employees and stakeholders, and addressing concerns or feedback.
10. **Performance Evaluation:** The E&S management system includes monitoring and measuring E&S performance to assess the effectiveness of controls and identify opportunities for improvement. It involves conducting inspections, audits, incident investigations, and collecting relevant data for analysis. In the context of the proposed project, an important aspect is to establish performance evaluation procedures for assessing effectiveness of contractors and subcontractors' E&S management performance.
11. **Management Review:** This component requires regular reviews by top management to evaluate the performance of the E&S management system, identify areas for improvement, and allocate necessary resources.

3.2 Project ESMP

The ESMS, as described above, and an Environmental and Social Management Plan (ESMP) are related but distinct concepts. An ESMS is a comprehensive framework or system to manage and address an organisation's environmental and social responsibilities and should be integrated into KS' overall management system.

An ESMP however, is a project-specific plan developed as part of the overall ESMS. An ESMP is typically prepared before the project commences or during the early stages and outlines the specific actions, mitigation measures, and management procedures that will be implemented to address the environmental and social impacts associated with the project, e.g., based on an ESIA process. The ESMP provides guidance on how the project will comply with environmental and social requirements, including legal and regulatory obligations, industry best practices, and stakeholder expectations.

An ESMP has been outlined below for the proposed project reflecting the mitigation measures identified in the ESIA process. This needs to be adopted by KS for the Project and operationalised within the context of overall E&S management. The aspects of the ESMP that relate to the construction phase also need to be adopted and further developed by the contractors who are assigned responsibility for Project construction.

3.3 Management of change

The Project specific plans (both the ESMP and CESMPs) are living documents and are subject to adjustment and revision as necessary. Changes are to be made if replacements, modification, exclusion of any document statements or parts of the document are required or addition of new statements is needed. Changes in the Project status, necessity to reflect new procedures/actions (as a result of internal audits/inspections), and also changes in laws and regulations could lead to revision of Plans.

To ensure an adaptive management of the ESMP and CESMPs the following activities will be carried out:

- Reviewing and updating Plans in accordance with the Project status as it progresses. The key information about any changes in the Project will be regularly reviewed, and KS E&S and contractor management staff will pay regular visits to the construction site to monitor the actual impacts of the Project.
- As the construction stages progress, regular assessments of the ESMP and CESMP activities and measures will be carried out in an ongoing engagement with the contractors and stakeholders. In addition, care will be taken to review the results of the audits and monitoring data to update the ESMP and CESMPs. These Plans will be updated/amended as appropriate to ensure reliable and efficient environmental and social management consistent with the scale of the Project at different stages of its life cycle.

4 MITIGATION, MANAGEMENT AND ENHANCEMENT MEASURES

The following sections outline the mitigation, management, and enhancement measures of the ESMP for the proposed Project, identified through the ESIA process, for pre-construction, construction, and operational phases, respectively. The tables below correspond to the mitigation tables in the ESIA report.

4.1 Pre-construction and construction phase

Environmental and social impacts and the mitigation, management and enhancement measures identified in the ESIA report for the pre-construction and construction phase are presented in the table below. These mitigation measures will need to be fully reflected in the Contractor ESMP to be prepared prior to construction.

The table also includes means of verification, the entity responsible for implementation of the measures, and the timeframe for their implementation. The costs for implementing the mitigation measures are to be included in the construction costs.

Table 4.1: E&S Mitigation, management, and enhancement measures

Potential Impact / Risk or Issue	Mitigation, Management and Enhancement Measures	Verification Means	Responsibility	Time Frame
Landscape and Topography				
<ul style="list-style-type: none"> Increased visual impacts experienced at the Railway Junction 737 residential area 	<ul style="list-style-type: none"> Detailed design of the WWTP to propose and design mitigation measures to reduce the visual impact of the WWTP as experienced by the Railway Junction 737 residents. The type of mitigation should be designed in consultation with the residents and may include the planting of a green belt along the border of the WWTP to shield the residents from a view of the WWTP infrastructure. 	Measures to reduce visual impacts of the WWTP integrated in overall detailed design	KS Detailed design agency	Prior to construction
<ul style="list-style-type: none"> Change in topography. Change of site appearance from greenfield to industrial use. Removal of topsoil and vegetation. 	<ul style="list-style-type: none"> Detail design and site layout and grading plan in a way that minimises earthwork and limits change to topography (pre-construction). Separate excavated topsoil from other excavated material and store in a designated area for use in site rehabilitation of e.g., sludge pond area. 	<p>A completed site layout and grading plan</p> <p>An assigned area for storing top-soil during construction</p>	KS Detailed design agency	Prior to construction
<ul style="list-style-type: none"> Change of site appearance from greenfield to industrial. 	<ul style="list-style-type: none"> Create a buffer zone of native vegetation, trees, and shrubs around the WWTP. Integrate landscaping and green spaces within the WWTP site, using native vegetation. Implement thoughtful lighting design to reduce the visibility of the WWTP during night-time hours. 	<p>A plan for landscaping, including buffer zone and lighting strategy</p>		
<ul style="list-style-type: none"> Rehabilitation of parts of existing WWTP area and sludge ponds 	<ul style="list-style-type: none"> Demolish and remove unsafe structures and dispose of demolition waste in a responsible manner. Clean the site of loose debris and solid waste / litter. In collaboration with relevant authorities, develop a plan for deconstructing or demolishing existing WWTP structures and for closing and rehabilitating the part of the existing sludge pond area that is not required for emergency purposes. Plan activities in terms of cleaning, landscaping, and replanting native vegetation, and potential restoring of natural drainage patterns 	<p>A demolition plan for existing WWTP site, including measures to dispose of demolition waste</p> <p>A plan for closing the sludge ponds</p>	<p>Contractor</p> <p>KS</p>	Prior to construction

Potential Impact / Risk or Issue	Mitigation, Management and Enhancement Measures	Verification Means	Responsibility	Time Frame
	<p>within the area. This plan should also reflect (but not be limited to):</p> <ul style="list-style-type: none"> Community safety arrangements. Monitoring of surface water quality, geological and ground water conditions in the area affected by the sludge facilities. A system for drainage water disposal to treatment as long as needed, up to the time of the facilities conservation or remediation. Develop conservation and remediation measures. Provide regular progress reporting on the plan implementation to lenders and other key stakeholders. 			
Geology and Soil				
<ul style="list-style-type: none"> Ground and soil disturbance. Vegetation removal and associated risk of soil erosion 	<ul style="list-style-type: none"> Implement controlled excavation practices to minimise soil disturbance. Separate excavated topsoil from other excavated material and store in a designated area for reuse. Careful management of excavated materials to reduce wash out. Develop and implement an erosion and sediment control plan with measures to prevent soil erosion and sediment runoff during construction and operation. This can involve techniques such as installing silt fences, sediment basins, or sediment traps, as well as implementing proper stormwater management practices. 	A completed site drainage, erosion, and sediment control plan	KS Contractor	Prior to construction
<ul style="list-style-type: none"> Risk of spillages of contaminants from vehicles, oils, etc. affecting soil quality. 	<ul style="list-style-type: none"> Implement spill prevention and control measures. Include spillage reaction and clean-up procedures in emergency plans and train relevant staff in their use. 	Spill prevention and control measures, and training plan for workers in place, as part of overall ESMS and/or CESMP	KS Contractor	Prior to construction
<ul style="list-style-type: none"> Risk of spillages of contaminants from chemical handling and storage on site. 	<ul style="list-style-type: none"> Minimise the on-site storage of fuel on site. Above ground storage tanks (AST) to be located on impermeable and bunded surface with appropriate oil traps installed. Only store chemicals in dedicated storage areas with adequate bunding to prevent release to external environment. 	<p>Construction site plan with dedicated areas for AST and chemical storage</p> <p>Construction emergency plan developed.</p>	KS Contractor	Prior to construction

Potential Impact / Risk or Issue	Mitigation, Management and Enhancement Measures	Verification Means	Responsibility	Time Frame
	<ul style="list-style-type: none"> Staff handling chemicals should receive appropriate training to avoid and react to potential spillages. Include spillage reaction and clean-up procedures in emergency plans and train relevant staff in their use. 	Spill prevention and control measures, and training plan for workers in place, as part of overall ESMS and/or CESMP		
<ul style="list-style-type: none"> Risk of spillages of contaminants from construction vehicles and other machinery. 	<ul style="list-style-type: none"> Endeavour to service equipment off-site at dedicated service points. When servicing needs to take place on site, only do this on impermeable and bunded surface with appropriate oil traps installed. 	Construction site plan with dedicated impermeable areas for equipment and vehicle service	KS Contractor	Prior to construction
<ul style="list-style-type: none"> Potential release of solid and hazardous waste streams into the environment, negatively affecting soils and ecosystems. 	<ul style="list-style-type: none"> Solid and hazardous waste generated shall be collected at dedicated collection points within the construction site and stored in closed containers. Waste sorting to prioritise reuse and recycling in line with what options are available locally. Provide staff training (including to contractors) focusing on eliminating littering and to follow waste sorting and collection procedures. Conduct regular cleaning of litter within the site in line with good housekeeping. 	<p>Construction site plan with dedicated impermeable areas for solid and hazardous waste.</p> <p>Spill prevention and control measures implemented.</p> <p>Emergency plans prepared, and training to relevant staff provided.</p>	KS Contractor	Prior to construction
<ul style="list-style-type: none"> Potential release of contaminants from demolition activities and/or from rehabilitation of sludge ponds 	<ul style="list-style-type: none"> Conduct pre-demolition audits prior to commencing any demolition activities to identify any potential contaminants such as asbestos, PCBs, lead based paints, fuels, solvents, cleaning agents, heavy metals, etc. Remove these contaminants prior to further demolition. Construction debris which cannot be safely reused or recycled on-site is to be removed immediately from the site and disposed of in an appropriate manner according to local regulations. Temporary storage only on impermeable areas without to avoid the risk of leaching into nearby soils. KS to develop a plan for decommissioning and rehabilitation of the sludge pond area, including amongst other: Sludge ponds to be emptied of 	<p>Pre-demolition audit conducted for WWTP site and sludge ponds (if relevant)</p> <p>A demolition plan for existing WWTP site, including measures to dispose of demolition waste.</p> <p>A plan for closing the sludge ponds.</p>	<p>Contractor</p> <p>KS</p> <p>KS</p>	Prior to construction

Potential Impact / Risk or Issue	Mitigation, Management and Enhancement Measures	Verification Means	Responsibility	Time Frame
	sludge and cleaned prior to being filled and covered with top-soil and revegetated. <ul style="list-style-type: none"> Any potential plastic lining in the sludge ponds to be removed prior to rehabilitation of the land. 			
Climate and Climate Change Aspects - GHG emissions				
<ul style="list-style-type: none"> Enable reuse of existing components to reduce overall carbon footprint (scope 3) 	<ul style="list-style-type: none"> Conduct an early pre-demolition audit (to feed into the detailed design and procurement process) with the aim to identify and create an inventory of existing WWTP components which could be incorporated into the detailed design of the new WWTP and then reused. This could include more recently acquired elements such as newer primary and/or secondary sedimentation tank scrapers. 	A completed pre-demolition audit and inventory of existing WWTP components that are suitable for reuse. Findings accounted for in detailed design.	KS Detailed design agency	Prior to detailed <u>design</u> and procurement planning
<ul style="list-style-type: none"> Energy consumption and associated GHG emissions 	<ul style="list-style-type: none"> Incorporate energy-efficient design principles into the treatment plant layout and infrastructure. Optimize the plant's footprint to reduce energy requirements for pumping, aeration, and other processes. Conduct a comprehensive carbon footprint assessment of the treatment plant's detailed design and operation, including emission embodied in building materials. The outcome can be used to inform design initiatives to further bring down the GHG footprint of the overall project. 	Energy-efficiency principles reflected and discussed in detailed design. A carbon footprint assessment completed based on detailed design	KS Detailed design agency	Prior to construction
<ul style="list-style-type: none"> Leakage of methane biogas from AD system, pipes and storage tanks. 	<ul style="list-style-type: none"> Install an advanced gas monitoring and detection system to continuously monitor methane levels and potential leakages. Install a flare or combustion system to burn off excess or unused biogas, ensuring complete combustion and preventing uncontrolled methane emissions. 	An advanced methane gas monitoring and detection system included in detailed design.	KS Detail design agency	Prior to construction
Climate and Climate Change Aspects - Climate resilience				
<ul style="list-style-type: none"> Flooding risk due to rapid snowmelt or extreme rain events at the site with potential impact on WWTP infrastructure 	<ul style="list-style-type: none"> Regular site drainage and storm water management infrastructure shall be designed at the site to protect infrastructure from flooding, to be effective during both construction and operation phases. There is a risk of increased seasonal groundwater recharge in the area. There is a need for effective site drainage, and during detailed design the need for in ground drains should be investigated, to keep the groundwater at a level that does not pose a risk to the concrete 	Site drainage and storm water management plan completed for the site, taking into account events triggered by climate change	KS Detail design agency Contractor	Prior to construction

Potential Impact / Risk or Issue	Mitigation, Management and Enhancement Measures	Verification Means	Responsibility	Time Frame
	<p>structures. However, this can be seen as standard practice during detailed design, and a specific uplift in required measures due to climate change, as compared to regular good practice considering local conditions and historic trends, is not found necessary.</p> <ul style="list-style-type: none"> • A specific uplift in required measures due to climate change, as compared to regular good practice considering local conditions and historic trends, is not found necessary. • Construction phase emergency planning to consider response measures in case of unforeseen climate related events (e.g., storms and heavy precipitation). 			
<ul style="list-style-type: none"> • Increased groundwater recharge and rise in groundwater table 	<ul style="list-style-type: none"> • Regular site drainage to manage surface water. • Analysis of groundwater table – including seasonal changes – to be included in design of concrete structures and potential necessary in ground drainage to maintain a certain groundwater level. • Specific uplift in required measures due to climate change, as compared to regular good practice considering local conditions and historic trends, is not found necessary. 	Detailed groundwater table analysis integrated into site drainage and storm water management plan.	KS Detailed design agency Contractor	Prior to construction
Surface and Groundwater Resources				
<ul style="list-style-type: none"> • Snow melt and groundwater in landscape depressions impacting ground stability. • Risk of contaminants coming in contact with water on site during excavation and site levelling works. 	<ul style="list-style-type: none"> • Design and plan for appropriate site drainage for the construction site (pre-construction / final design and construction planning). 	Site drainage and storm water management plan completed for the site, taking into account events triggered by climate change	KS Detailed design agency Contractor	Prior to construction
<ul style="list-style-type: none"> • Water consumption • Potential contamination of soil and groundwater from wastewater / cleaning water. 	<ul style="list-style-type: none"> • If a concrete batching plant will be located on site, make sure that all spill prevention and control measures also apply to the batching plant and are reflected in contractors' management plans. • Implement proper water management practices to reduce water consumption and prevent contamination. • Locate the plant on a hard surface to eliminate the risk of spillages to the environment. 	<p>Spill prevention and control measures in ESMS and CESMP</p> <p>A resource management plan for construction phase</p>	KS Contractor	Prior to construction

Potential Impact / Risk or Issue	Mitigation, Management and Enhancement Measures	Verification Means	Responsibility	Time Frame
Ambient Air Quality incl. Odour				
<ul style="list-style-type: none"> Dust generation leading to H&S impacts for workers on site 	<ul style="list-style-type: none"> Maintain proper road surfaces to minimize dust from vehicle movement. Use dust collectors or filters on construction equipment to capture airborne particles. Cover lorries transporting construction and demolition waste. Cover stockpiles of materials to prevent wind erosion and reduce dust emissions. Apply water to suppress dust generation. 	<p>Contractor ESMP</p> <p>Regular E&S monitoring by contractor to KS</p>	Contractor KS	Prior to construction and during construction
<ul style="list-style-type: none"> Emissions from vehicles resulting in air pollution at the WWTP construction site 	<ul style="list-style-type: none"> Use low-emission or electric-powered construction equipment when possible. Conduct regular maintenance and tuning of equipment to optimize performance and minimize emissions. Retrofit older equipment with emission control devices, such as diesel particulate filters. Encourage eco-driving practices among operators to reduce fuel consumption. 	<p>A resource management plan for construction phase</p> <p>Contractor ESMP</p> <p>Regular E&S monitoring by contractor to KS</p>	Contractor KS	Prior to construction and during construction
<ul style="list-style-type: none"> Odour problems affecting the WWTP site workers and village / residential areas closest to the site. 	<ul style="list-style-type: none"> Plan sludge pond cleaning activities during periods of favourable weather conditions, such as low wind speeds and atmospheric stability, to minimize odour dispersion. Consider using vacuum trucks or equipment with enclosed systems to minimize the escape of odorous gases during sludge removal and transport. 	<p>A plan for closing the sludge ponds completed.</p> <p>Contractor ESMP</p>	Contractor KS	Prior to construction and during construction
Noise				
<ul style="list-style-type: none"> Risk of insufficient noise insulation around noisy equipment (pumps, air blowers, etc). 	<p>Detailed design of the WWTP to:</p> <ul style="list-style-type: none"> Choose equipment and machinery with low noise emission levels. Look for manufacturers' specifications regarding noise output during the selection process. Place noisy equipment away from worker areas or implement soundproof enclosures around equipment. Install vibration isolation mounts or pads for equipment that can cause structural vibrations and noise propagation. 	<p>Noise protection measures included and described in the detailed design of the WWTP</p>	KS Detailed design agency	Prior to construction

Potential Impact / Risk or Issue	Mitigation, Management and Enhancement Measures	Verification Means	Responsibility	Time Frame
	<ul style="list-style-type: none"> Install physical barriers, such as walls or fencing, to create a sound barrier between noise sources and worker areas. Include soundproof enclosures or rooms around noisy equipment to contain noise emissions. Use materials with sound-absorbing properties for barriers and enclosures to reduce noise reflection and transmission in rooms with noisy equipment. Utilize noise monitoring systems to track noise levels in noisy areas and ensure compliance with applicable regulations and standards. 			
<ul style="list-style-type: none"> Noise from machinery impacting H&S of construction workers 	<ul style="list-style-type: none"> Set traffic speed limits and verify drivers' behaviour with regards to driving speed. Limit construction work to daylight hours. Raise awareness and educate workers about the potential risks of noise exposure and the importance of using hearing protection. Provide workers with appropriate personal protective equipment, such as earmuffs or earplugs, to minimize their exposure to high noise levels. 	<p>Construction traffic management plan</p> <p>Construction OHS plan, including training schedule for workers.</p>	KS Contractor	Prior to and during construction
Flora				
<ul style="list-style-type: none"> The characteristics of the land plot for the new proposed WWTP indicate that it could be suitable as a habitat for rare and protected species such as: <i>Tulipa patens</i>, <i>Adonis vernalis</i> L. and <i>Pulsatilla patens</i> (L.) Mill. These species are ephemerals and ephemeroids whose life cycle runs rapidly immediately after snowmelt. As the site survey was carried out in June, no representatives were identified, and a spring survey is required in 2024. 	<ul style="list-style-type: none"> Conduct an additional spring vegetation survey in spring 2024 within the WWTP site area directly affected by the new WWTP infrastructure, and the area directly disturbed by overhead line relocation and underground cable trenches, to rule out the presence of potentially threatened ephemerals and ephemeroids whose life cycle runs rapidly immediately after snowmelt. The survey must be conducted by a qualified botanist. Should any threatened species be identified, a mitigation plan should be developed and implemented, based on the identified species characteristics. This may include relocating plants to suitable locations within the adjacent areas, when feasible, under the surveillance of a qualified botanist, establishing offsetting measures, to ensure 'no net loss' of rare species. 	<p>A flora survey implemented by a qualified botanist in spring 2024 with focus on potentially threatened ephemerals and ephemeroids</p> <p>Appropriate mitigation measures determined if protected species are identified.</p>	KS Contracted Qualified botanist	Spring 2024 when potentially threatened ephemerals and ephemeroids would be visible

Potential Impact / Risk or Issue	Mitigation, Management and Enhancement Measures	Verification Means	Responsibility	Time Frame
<ul style="list-style-type: none"> Opportunity to identify areas within the proposed WWTP site where existing vegetation can be maintained. 	<ul style="list-style-type: none"> Plan construction activities to minimize disturbance to flora habitats. Phase construction activities to allow for the completion of work in one area before moving on to the next, reducing the overall footprint of disturbance. Develop a restoration plan to rehabilitate disturbed areas post-construction, including a plan to rehabilitate the sludge pond area to support biodiversity. 	<p>Include biodiversity (flora and fauna) protection measures in construction EHS management plans.</p> <p>Site landscaping and restoration plan completed.</p> <p>A plan for closing the sludge ponds completed.</p>	KS Detailed design agency / environmental consultants Contractor	Prior to and during construction
<ul style="list-style-type: none"> Removal and/or damage to vegetation 	<ul style="list-style-type: none"> Implement measures to minimize soil compaction and disturbance in areas with significant vegetation. Separate excavated topsoil from other excavated material and store in a designated area for reuse. Utilize appropriate construction techniques, such as temporary access roads or mats, to distribute the weight of construction vehicles and equipment. Apply mulch or organic materials to exposed soil surfaces to control erosion and promote vegetation growth. Implement erosion control measures, such as erosion control blankets or sediment barriers, to prevent sediment runoff that could impact nearby flora. Select native plant species appropriate for the site conditions and recreate habitats that support local flora biodiversity. 	<p>Include biodiversity (flora and fauna) protection measures in construction EHS management plans.</p> <p>Site landscaping and restoration plan completed.</p> <p>A completed site drainage, erosion and sediment control plan</p> <p>A plan for closing the sludge ponds completed.</p>	KS Detailed design agency / environmental consultants Contractor	Prior to and during construction
Fauna				
<ul style="list-style-type: none"> Opportunity to identify areas within the proposed WWTP site where existing habitats can be maintained. 	<ul style="list-style-type: none"> Plan construction activities to minimize disturbance to fauna habitats, particularly during sensitive breeding or migration seasons. If needed, implement buffer zones and sediment control measures around wetlands and watercourses to prevent sediment runoff and pollution. Phase construction activities to allow for the completion of work in one area before moving on 	<p>Include biodiversity (flora and fauna) protection measures in construction EHS management plans.</p> <p>Site landscaping and restoration plan completed.</p>	KS Detailed design agency / environmental consultants Contractor	Prior to and during construction

Potential Impact / Risk or Issue	Mitigation, Management and Enhancement Measures	Verification Means	Responsibility	Time Frame
	<p>to the next, reducing the overall footprint of disturbance.</p> <ul style="list-style-type: none"> Develop a restoration plan to rehabilitate disturbed areas post-construction, including a plan to rehabilitate the sludge pond area to support biodiversity. When rehabilitating the sludge pond area, avoid any direct disturbance during the bird breeding season, and conduct visual inspection for bird nests prior to any works. Postpone earth works where nests have been identified. 	<p>A completed site drainage, erosion and sediment control plan</p> <p>A plan for closing the sludge ponds completed.</p>		
<ul style="list-style-type: none"> Removal and/or damage to vegetation and habitats of e.g. nesting birds 	<ul style="list-style-type: none"> Schedule noisy activities during periods when the least impact on fauna is expected, such as avoiding nocturnal species during their active periods. Create or enhance alternative habitats nearby to compensate for any lost or impacted habitats. Establish new vegetation areas, nesting sites, or artificial shelters suitable for the affected fauna species, e.g., within the sludge pond area. Take extra construction precautions to avoid indirect disturbance of the biopond and sludge pond bird habitats during the breeding season, due to the likely presence of vulnerable or near threatened species. This may involve: <ul style="list-style-type: none"> Establish a buffer zone between the WWTP construction site and the biopond habitats. Avoid traffic in the biopond area during the breeding season. Implement noise control and limit works to active day period. Limit artificial lighting at night. Avoid dust pollution. Consult with bird experts to refine the necessary mitigation measures. Provide education and training to construction workers on the importance of fauna protection measures and ensure that workers understand mitigation requirements and their role in minimizing impacts on fauna. Provide training to the personnel responsible for construction site management in identifying the vulnerable and 	<p>Include biodiversity (flora and fauna) protection measures in construction EHS management plans.</p> <p>Establish a buffer zone between the WWTP construction site and the biopond area</p> <p>Site landscaping and restoration plan completed.</p> <p>A completed site drainage, erosion, and sediment control plan</p> <p>A plan for closing and rehabilitating the sludge ponds completed.</p>	<p>KS Detailed design agency / environmental consultants Contractor</p>	<p>Prior to and during construction</p>

Potential Impact / Risk or Issue	Mitigation, Management and Enhancement Measures	Verification Means	Responsibility	Time Frame
	threatened bird species, to help avoid impacts should the species enter the construction site.			
Access Roads and Communal Infrastructure				
<ul style="list-style-type: none"> Increased wear and tear due to increased heavy traffic during construction phase of the WWTP 	<ul style="list-style-type: none"> KS in collaboration with relevant authorities, ensure that the access road is maintained in adequate condition for heavy transport, prior to, during and following the construction phase. This should include as a minimum: <ul style="list-style-type: none"> - Conduct a pre-construction survey of the access road to be used for transport to and from the WWTP site with the aim to establish the condition of the road prior to construction start. - Document the condition of the road with technical documents and visual materials (photos and videos), as relevant. - Consult and obtain written confirmation and feedback (approval) on the pre-construction road survey from key stakeholders, incl. KS director, city council, local resident representatives (chairman) in the Kir-zavod residential area. - Agree on a road inspection protocol outlining how to record potential road deterioration during the construction phase. - A document agreement made between KS and the city council on the division of responsibilities for road maintenance and potential improvements prior to and/or following the construction starts. The agreement should be signed by KS and the municipality prior to start of construction, and include provisions for funding of required road maintenance and other improvements. 	<p>Road pre-construction survey completed prior to construction, including a protocol for inspecting damages to the road during the construction phase, agreed between all stakeholders.</p> <p>Share of responsibilities and costs associated with the access road agreed between KS and the city council.</p> <p>Road maintenance completed as needed prior to construction, based on condition analysis.</p>	KS	Prior to construction
<ul style="list-style-type: none"> Risk of inappropriate handling of CDW by waste contractors and/or contractors' sub-contractors. Encourage sorting, reuse and recycling of existing 	<ul style="list-style-type: none"> KS to adopt and implement auditing of waste contractors to ensure appropriate handling and disposal of waste, and compliance with legal requirements. Encourage sorting of waste, reuse, and recycling, in dialogue with relevant service providers. 	<p>Contractor auditing procedures completed (as part of ESMS).</p> <p>Construction waste management plan completed.</p>	<p>KS</p> <p>Contractor</p>	During construction

Potential Impact / Risk or Issue	Mitigation, Management and Enhancement Measures	Verification Means	Responsibility	Time Frame
WWTP assets and demolition waste in line with circular economy principles	<ul style="list-style-type: none"> To reduce the load on municipal landfills and to encourage resource efficiency and productivity in line with circular economy principles, KS should conduct an early pre-demolition audit to support selective deconstruction of the existing WWTP structures, with the aim to identify potential components that can be directly reused in the new WWTP and to sort remaining fractions on site to enable recycling. KS should engage with specialised construction waste service providers that offer recycling services. For the demolition and construction waste management, it is recommended that KS and its contractors follow, to the extent possible in the local context, the EU Construction and Demolition Waste Protocol and guidelines to guide the process. Requirements in this regard should be included in tendering documents. 	Early pre-demolition audit completed to support selective deconstruction, guided by the EU C&D Waste protocol and guidelines and requirements in this regard included in tendering documents.		
Supply Chain				
<ul style="list-style-type: none"> Risk of ESG impacts or violations in the supply chain 	<ul style="list-style-type: none"> Provide training to procurement teams to raise awareness about supply chain ESG impacts and build capacity to conduct ESG due diligence to identify and mitigate supply chain risks. KS to integrate supply chain requirements into tendering and contractual documents and processes and reserve the right to monitor supply chain risks in contractors and subcontractors' activities through relevant clauses in contracts. 	Training on supply chain ESG risks and management completed.	KS Contractor	Prior to tendering / procurement
<ul style="list-style-type: none"> Risk that material comes from quarries without the necessary permits 	<ul style="list-style-type: none"> Conduct appropriate due diligence to ensure that aggregates and other locally sourced construction materials come from legitimate sources and hold the necessary permits, including with regards to environmental, health and safety performance. 	Supply chain risk assessment procedures developed within overall ESMS	KS Contractor	Prior to tendering / procurement
<ul style="list-style-type: none"> Risk that wood and wood products have been sourced from illegal or unsustainable forest operations 	<ul style="list-style-type: none"> Endeavour to source wood and wood products with internationally recognised sustainable forestry certifications, such as the FSC label. Conduct appropriate due diligence to verify this. 	Included in supply chain risk assessment procedures developed within overall ESMS	KS Contractor	Prior to tendering / procurement
Employment				
<ul style="list-style-type: none"> Risk of influx of workers 	<ul style="list-style-type: none"> KS to contract local contractor to ensure local employment. 	Recruitment policy in place. Employment records.	Contractor	Mobilization and Construction phase

Potential Impact / Risk or Issue	Mitigation, Management and Enhancement Measures	Verification Means	Responsibility	Time Frame
	<ul style="list-style-type: none"> Contractor will develop a local recruitment policy, including advertising jobs locally, aiming at employing local workers from Karaganda City and neighbouring villages, where appropriate. 			
Labour and Working Conditions				
<ul style="list-style-type: none"> Working conditions and terms of employment 	<ul style="list-style-type: none"> KS to integrate labour requirements in tender documents and in contracts with all contractors involved in the construction. KS to develop and implement auditing and performance monitoring procedures to check contractors' compliance with labour requirements. The Contractor is required to adopt and implement a Labour Management Plan including human resources policy and procedures, which will set out the approach to labour management consistent with the EBRD requirements and the laws of Kazakhstan. The policy and procedures will cover and ensure compliance with the relevant requirements for the following: <ol style="list-style-type: none"> non-discrimination, equal opportunity, and equal pay. prevention of child labour and forced labour. freedom of association and right of collective bargaining. contractor management. terms of employment including recruitment, hours of work, overtime arrangement and overtime remuneration, and the right to refuse overtime request. commitment to apply zero tolerance for gender-based violence, workplace harassment, sexual exploitation, and abuse. formal grievance mechanism. The human resources policy and procedures including the grievance mechanism will be provided to all workers. These documents will contain information that is clear and understandable regarding workers' rights under national labour and employment law and any applicable collective agreements. 	Labour management plan in place. Workers' induction training. Grievance register.	KS Contractor	Construction phase

Potential Impact / Risk or Issue	Mitigation, Management and Enhancement Measures	Verification Means	Responsibility	Time Frame
<ul style="list-style-type: none"> Worker's grievance mechanism 	<ul style="list-style-type: none"> The Contractor will provide construction workers with an effective grievance mechanism (GM) and make the GM available for the workforce of sub-contractors and suppliers. The GM shall include provision for GVBH grievances ensuring confidentiality. This mechanism shall involve appropriate level of management and address concerns promptly, using an understandable and transparent process that provides timely feedback to those concerned without retribution. The mechanism should also allow for anonymous complaints to be raised and addressed. The mechanism should not impede access to other judicial or administrative remedies that might be available under the law or through existing arbitration procedures, or substitute for grievance mechanisms provided through collective agreements. 	Worker's grievance mechanism is in place. Workers have been informed about the GM procedures. Grievances register documented.	Contractor	Mobilization and Construction phase
<ul style="list-style-type: none"> Workers' accommodation 	<ul style="list-style-type: none"> In case workers accommodation will be provided during the construction phase, ensure that facilities are compliant with EBRD/IFC Guidance "Workers' Accommodation: Processes and Standards". 	Labour management plan in place.	Contractor	Construction phase
Occupational Health and Safety				
Occupational Health and Safety	<ul style="list-style-type: none"> KS shall develop and adapt an Occupational Health and Safety Policy and procedures for the construction Project, within their overall OHS management system. KS to integrate OHS requirements in tender documents and in contracts with all contractors involved in the construction. OHS requirements to favour companies with OHS management systems in line with international standards (ISO 45001 or similar). KS to develop and implement auditing and performance monitoring procedures to check contractors' compliance with OHS requirements. OHS Policy and procedures will be developed and adopted by the Contractor and sub-contractors. KS will check the adoption and monitor implementation of the Policy provisions. Prior to commencement of construction works the Contractor shall develop specific health and safety procedures, including procedures for 	<p>OHS management system framework developed for the project (KS) and requirements reflected in procurement documents.</p> <p>Construction OHS management plans developed and implemented by contractors based on requirements in tender documents.</p> <p>Necessary resources and staff assigned on behalf of KS and Contractor</p>	<p>KS to integrate in ESMS and in tendering and procurement documents.</p> <p>Contractor to implement during construction</p>	<p>Prior to construction</p> <p>During construction</p>

Potential Impact / Risk or Issue	Mitigation, Management and Enhancement Measures	Verification Means	Responsibility	Time Frame
	<p>transportation of workers to and from the construction site. OHS procedures shall be prepared in line with EBRD requirements, drawing on the guidance note on health, safety and security as well as briefing notes on safety related to specific works, available for contractors: How to implement EBRD performance requirements (ebrd.com).</p> <p>Safe working in confined spaces: English Russian Briefing note BN01: Underground and overhead services English Russian Briefing note BN02: Safe excavations English Russian Briefing note BN03: Working safely around asbestos pipes English Russian Briefing note BN04: Safe working with mobile plant English Russian Briefing note BN05: Setting up a safe site English Russian</p> <ul style="list-style-type: none"> • Contractor to provide capacity building to its workers on OHS matters. • Contractor to ensure provision of sanitary facilities in compliance with sanitary norms. • KS to assign at least one full time employee to the coordination and monitoring of OHS management during the construction phase, including supervision of contractor OHS management. • Each contractor to assign at least one manager to oversee OHS management of their respective work responsibilities. • Contractor to provide medical emergency response plan. • Contractor to ensure presence of a well-equipped on-site first aid facility and train staff to act as first aid responders. • Construction contractor to report to KS on all incidents and accidents and continuous improvement measures on at least a monthly basis. Serious incidents to be reported immediately. 			

Potential Impact / Risk or Issue	Mitigation, Management and Enhancement Measures	Verification Means	Responsibility	Time Frame
<ul style="list-style-type: none"> Specific H&S risks related to electrical safety 	<ul style="list-style-type: none"> OHS provisions related to electrical works and safety associated with the OHS relocation process to be included in the plan for the relocation of the overhead power lines, to apply for the relevant contractors as contractual obligations. Provisions should be made in this plan related to the access road to the WWTP site where the lines are passing, in terms of H&S measures, and if any temporary or permanent access needs to be prepared during the relocation work to allow for safe movement of vehicles and heavy equipment to the WWTP site. Alignment should be made with relevant sections of the construction traffic management plan. 	A plan for the relocation of the overhead power lines and installation of underground cables including provisions for specific OHS management and traffic via the access road. Aligned with the traffic management plan as needed.	<p>KS to integrate in ESMS and in tendering and procurement documents.</p> <p>Contractor to implement during construction.</p>	<p>Prior to construction</p> <p>During construction</p>
Community Health and Safety				
<ul style="list-style-type: none"> Risk of non-communicable diseases 	<ul style="list-style-type: none"> Described in section 8.1.5 and 8.1.6 of the ESIA Report 	-	-	-
<ul style="list-style-type: none"> Communicable diseases 	<ul style="list-style-type: none"> As part of the safety induction training and regular safety trainings, inform about the risk of STDs and methods for prevention. Introduce a Code of Conduct to be followed by contractors and subcontractors. Inform the local communities on functioning of the grievance mechanism. Dissemination of Project related information among local communities as indicated in the Stakeholder Engagement Plan 	<p>Safety induction training conducted.</p> <p>Code of Conduct established.</p> <p>Non-compliance reports</p> <p>Grievance register.</p> <p>Minutes of meetings.</p>	Contractor	Construction phase
<ul style="list-style-type: none"> Risk of accidents 	<ul style="list-style-type: none"> Conduct pre-construction assessment of the local roads to be used during construction. Oblige Contractor to have damage claims and complaints procedure in place for local communities. Manage the Project transportation activities in a manner ensuring use of roads at low traffic hours to the extent possible. Ensure observance of traffic safety rules, including speed limits. Regular inspections of vehicle fleet to avoid breakdowns during trips and prevent consequential traffic congestion or increased risk of accidents. 	<p>Traffic and transport plan established.</p> <p>Induction training conducted.</p> <p>Non-compliance reports.</p> <p>Accidents register.</p>	Contractor	Construction phase

Potential Impact / Risk or Issue	Mitigation, Management and Enhancement Measures	Verification Means	Responsibility	Time Frame
Gender Based Violence and Harassment				
<ul style="list-style-type: none"> Risk of GBVH 	<ul style="list-style-type: none"> Contractor puts in place a workers Code of Conduct including zero tolerance for GBVH, and provide inductions and trainings for Contractor's and sub-contractors' staff to include awareness on GBVH definitions, prevention, encouragement to report/submit concerns and grievances related to GBVH etc. 	Code of Conduct prepared. Workers' sensitisation conducted. Grievance register.	Contractor	Construction phase
Land Acquisition and Land Use				
<ul style="list-style-type: none"> Land acquisition process 	<ul style="list-style-type: none"> KS to ensure that the land acquisition be implemented in accordance with the resolution dated April 5, 2023, and that a resolution for the plot #09-142-176-058 is obtained prior to construction. Contractor to ensure works within allocated footprint and in case of any additional land take or accidental damage to properties record and resolve grievances and compensate the damage caused. 	Resolution	KS Karaganda Land Management Department	Pre-construction
Cultural Heritage				
<ul style="list-style-type: none"> Chance Find 	<ul style="list-style-type: none"> The Contractor will develop and adopt a Chance Find Procedure for the construction work. Covering, at a minimum: the legal framework for cultural heritage; the process to follow in the event of chance finds; roles and responsibilities for implementing the procedure and an induction for all workers, including project staff, contractors, and government agencies. 	Chance Finds procedure in place.	Contractor	Construction phase
Stakeholder Engagement and Grievance Mechanism				
<ul style="list-style-type: none"> Community engagement and operational grievance mechanism 	<ul style="list-style-type: none"> KS to appoint an experienced staff member to act as the dedicated focal point responsible for implementation of the Stakeholder Engagement Plan and grievance management during all phases of the Project, with special emphasis on the construction phase. 	Experienced staff member appointed as focal point for stakeholder engagement during the Project.	KS	Pre-construction

4.2 Operation phase

Environmental and social impacts and the mitigation, management and enhancement measures identified in the ESIA report for the operation phase are presented in the table below. The table also includes means of verification, the entity responsible for implementation of the measures, and the timeframe for their implementation.

Table 4.2: E&S Mitigation, management, and enhancement measures

Potential Impact / Risk or Issue	Mitigation, Management and Enhancement Measures	Verification Means	Responsibility	Time Frame
Landscape and Topography				
Visual appearance of the WWTP site	<ul style="list-style-type: none"> Maintain a buffer zone of native vegetation, trees, and shrubs around the WWTP as well as landscaping and green spaces within the WWTP site, using native vegetation. 	Buffer zone established	KS	Operation phase
Geology and Soil				
<ul style="list-style-type: none"> Risk of spillages of contaminants from vehicles, oils, etc. affecting soil quality 	<ul style="list-style-type: none"> Implement spill prevention and control measures. Include spillage reaction and clean-up procedures in emergency plans and train relevant staff in their use. Minimise vehicle maintenance and refuelling on site. 	<p>Spill prevention and control measures implemented.</p> <p>Emergency plans prepared and training to relevant staff provided.</p>	KS	Operation phase
<ul style="list-style-type: none"> Ground and soil disturbance 	<ul style="list-style-type: none"> Implement controlled excavation practices to minimise soil disturbance. Separate excavated topsoil from other excavated material and store in a designated area for reuse. 	<p>Controlled excavation practices implemented.</p> <p>Excavated topsoil reused</p>	KS	Prior to operation phase and operation phase
<ul style="list-style-type: none"> Risk of accidental spills into soils 	<ul style="list-style-type: none"> Minimise the on-site storage of fuel on site. Above ground storage tanks to be located on impermeable and bunded surface with appropriate oil traps installed. Only store chemicals in dedicated storage areas with adequate bunding to prevent release to external environment. Staff handling chemicals should receive appropriate training to avoid and react to potential spillages. Include spillage reaction and clean-up procedures in emergency plans and train relevant staff in their use. 	<p>Emergency plans prepared and training to relevant staff provided.</p> <p>Storage specifications for different substances in place</p>	KS	Operation phase
<ul style="list-style-type: none"> Inappropriate stormwater management can result in contaminants from the WWTP site entering nearby soil. 	<ul style="list-style-type: none"> Develop and implement an erosion and sediment control plan with measures to prevent soil erosion and sediment runoff during construction and operation. This can involve techniques such as installing silt fences, sediment basins, or sediment traps, as well as implementing proper stormwater management practices. 	Erosion and sediment control plan established	KS	Operation phase

Potential Impact / Risk or Issue	Mitigation, Management and Enhancement Measures	Verification Means	Responsibility	Time Frame
<ul style="list-style-type: none"> Effluents of poor quality can negatively affect soil quality if applied on fields etc. 	<ul style="list-style-type: none"> Monitor effluent quality to ensure that strict standards are met applicable for effluent reuse (see section below on surface and groundwater impacts) 		KS	Operation phase
<ul style="list-style-type: none"> Sludge containing contaminants can negatively affect soil quality where it is stored, and/or where it is applied on land as fertilizer. 	<ul style="list-style-type: none"> Monitor sludge quality to ensure that strict standards (incl. EU standards) are met with regards to potential reuse of AD digested and dried sludge for agricultural purposes (see further discussion in section below on surface and groundwater impacts) 		KS	Operation phase
Climate and Climate Change Aspects - GHG Emissions				
<ul style="list-style-type: none"> Energy consumption and associated GHG emissions. 	<ul style="list-style-type: none"> Adopt and implement energy management systems to monitor and optimize energy usage throughout the plant. Provide training and awareness programs for plant staff on energy conservation, GHG reduction, and sustainable operational practices. 	<p>Energy management systems adopted.</p> <p>Training and awareness programs provided.</p>	KS	Operation phase
<ul style="list-style-type: none"> Leakage of methane biogas from AD facilities, pipes and storage tanks. 	<ul style="list-style-type: none"> Conduct regular inspections and audits of the biogas infrastructure and systems, incl. covers, pipelines, valves, and other equipment to identify potential leaks and implement corrective measures. Provide training to plant staff on proper biogas handling procedures, including leak detection, emergency response, and maintenance protocols. 	<p>Regular audits and inspections conducted.</p> <p>Training and awareness programs provided</p>	KS	Operation phase
Climate and Climate Change Aspects - Climate resilience				
<ul style="list-style-type: none"> Risk of rapid snowmelt or extreme rain events in Karaganda City, resulting in potential overload and flooding of the WWTP. 	<ul style="list-style-type: none"> Maintain regular site drainage and storm water management infrastructure at the site. Detailed design and emergency planning to include appropriate measures in case of flood events. Conduct training of staff in emergency measures including how to deal with flood events. 	<p>Effective site drainage and storm water management maintained.</p> <p>Emergency plan established.</p> <p>Training of staff conducted.</p>	KS	Operation phase
Surface and Groundwater Resources				
<ul style="list-style-type: none"> Not reusing the effluents for irrigation is 	<ul style="list-style-type: none"> KS to develop a resource management and conservation plan, that amongst other includes: 	Resource management and conservation plan established.	KS	Operation phase

Potential Impact / Risk or Issue	Mitigation, Management and Enhancement Measures	Verification Means	Responsibility	Time Frame
<p>a poor use of the resource given that Kazakhstan is a water scarce country.</p> <ul style="list-style-type: none"> • Opportunity to reuse treated sludge for irrigation on nearby fields. 	<ul style="list-style-type: none"> • A plan for reusing effluents and sludge from the WWTP, including measures to consult relevant farmers and other stakeholders with regards to utilisation of these resources. • Explore possibilities to reuse treated effluent from the WWTP for irrigation on nearby fields or forestry areas. • Explore possibilities to reuse digested sludge as fertilizer on nearby fields, to reuse nutrients. • Include procedures for monitoring of effluents and sludge in line with relevant EU directives. 			
<ul style="list-style-type: none"> • Not reusing the digested sludge as fertilizer is a poor use of valuable nutrients. • Opportunity to reuse nutrients as fertiliser on nearby fields. 		Resource management and conservation plan established	KS	Operation phase
<ul style="list-style-type: none"> • The plan is to reuse digested sludge for agriculture. However, there is a risk of insufficient offtake capacity as contracts with offtakers are not in place. Also, plans regarding alternative or temporary storage solutions including locations for digested and dried sludge appear not to have been finalised. 		Resource management and conservation plan established	KS	Operation phase
<ul style="list-style-type: none"> • Use of pesticides 	<ul style="list-style-type: none"> • Avoid the use of pesticides and herbicides within the site. 		KS	Operation phase
Noise and Vibration Impacts				
<ul style="list-style-type: none"> • Noise from pumps, air blowers and other equipment with impacts on workers 	<ul style="list-style-type: none"> • Implement regular maintenance schedules to keep equipment in optimal condition, minimizing the risk of increased noise levels due to wear or malfunction. • Train operators on proper equipment operation techniques to reduce unnecessary noise emissions. 	Regular maintenance schedules prepared and specific training as well as protective equipment provided	KS	Operation phase

Potential Impact / Risk or Issue	Mitigation, Management and Enhancement Measures	Verification Means	Responsibility	Time Frame
	<ul style="list-style-type: none"> Raise awareness and educate workers about the potential risks of noise exposure and the importance of using hearing protection. Provide workers with appropriate personal protective equipment, such as earmuffs or earplugs, to minimize their exposure to high noise levels. 			
Flora				
<ul style="list-style-type: none"> Opportunity to revegetate the site and create new biodiversity habitats. 	<ul style="list-style-type: none"> Select native plant species appropriate for the site conditions and recreate habitats that support local flora biodiversity. Consider using treated effluents and treated sludge to support vegetation within and around the site. 	Native plants selected, and opportunities for using treated effluents and treated sludge explored.	KS	Operation phase
Fauna				
<ul style="list-style-type: none"> Opportunity to revegetate the site and create new biodiversity habitats. 	<ul style="list-style-type: none"> In line with the habitat restoration plan, continue creating or enhance alternative habitats nearby to compensate for any lost or impacted habitats. Establish new vegetation areas, nesting sites, or artificial shelters suitable for the affected fauna species, e.g. within the sludge pond area. 	New vegetation areas established and following of restoration plan	KS	Operation phase
Access Roads and Communal Infrastructure				
<ul style="list-style-type: none"> Risk of inappropriate handling of waste by waste contractors and/or contractors' sub-contractors 	<ul style="list-style-type: none"> Adopt and implement auditing of waste contractors to ensure appropriate handling and disposal of waste, and compliance with legal requirements. Encourage sorting of waste, reuse, and recycling to the extent possible, in dialogue with relevant service providers. 	<p>Auditing of potential contractors conducted.</p> <p>Dialogue with relevant service providers.</p>	KS	Operation phase
<ul style="list-style-type: none"> Risk of higher than necessary resource consumption, driving excessive demand from the distribution network with higher than necessary environmental and climate impacts. 	<ul style="list-style-type: none"> Develop and implement a resource management and conservation plan for the Project, outlining procedures and actions to continuously identify opportunities and alternatives for resource efficiency in its operations, including related to: <ul style="list-style-type: none"> Energy efficiency Water use efficiency Material use efficiency Waste minimisation and strategies for reduction, reuse, and recycling. 	Resource management and conservation plan established	KS	Operation phase

Potential Impact / Risk or Issue	Mitigation, Management and Enhancement Measures	Verification Means	Responsibility	Time Frame
Supply Chain				
<ul style="list-style-type: none"> Risk of ESG impacts or violations in the supply chain 	<ul style="list-style-type: none"> Provide training to procurement teams to raise awareness about supply chain ESG impacts and build capacity to conduct ESG due diligence to identify and mitigate supply chain risks. 	Training provided and capacity built	KS	Operation phase
Employment				
<ul style="list-style-type: none"> Risk of retrenchment 	<ul style="list-style-type: none"> KS shall promptly, but no later than 60 days before any decision is taken in respect of any planned redundancy, inform EBRD if such redundancy affects at least 10% of its total employees over a 30-day period and prepare a Retrenchment Plan in line with PR2 requirements. In the case of any planned redundancy affecting at least 25% of its total employees over a 30-day period of time, KS will provide the Retrenchment Plan to EBRD prior to undertaking any of the planned redundancies. KS to cooperate with the City Akimat to identify employment opportunities for redundant employees outside of KS. 	Retrenchment policy and plan prepared. Cooperation established.	KS	Operation phase
Occupational Health and Safety				
<ul style="list-style-type: none"> Occupational Health and Safety 	<ul style="list-style-type: none"> KS to adopt and implement an OHS management system based on ISO 45001 or similar for its WWTP operations. 	OHS management system in place for KS's WWTP operations.	KS	Operation phase
Community Health and Safety				
<ul style="list-style-type: none"> Risk of accidents 	<ul style="list-style-type: none"> KS to include the new WWTP traffic and transportation into its management plan. 	Traffic management plan updated. Accident register.	KS	Operation phase
Cultural Heritage				
<ul style="list-style-type: none"> Chance Find 	<ul style="list-style-type: none"> KS will develop and adopt a Chance Find Procedure for the operation and maintenance work 	Chance Find Procedure established.	KS	Operation phase
Vulnerable Groups				
<ul style="list-style-type: none"> Risk of non-affordable services 	<ul style="list-style-type: none"> KS to closely monitor the affordability for low-income households after potential tariff increases due to the Project. 	Written conclusions from regular monitoring available.	KS	Operation phase

4.3 Closure and decommissioning

The environmental, health and safety impacts during decommissioning are similar to those identified for the construction activities and similar mitigation and monitoring measures should be implemented. Closure of storage tanks, reservoirs, and manholes should be carried out appropriately to prevent the closed site of constituting a risk for humans and animals to accidentally fall into the tank or manhole or to crawl in and be trapped inside. At the time of decommissioning, a separate decommissioning EHS plan, including a demolition plan, shall be developed prior to start of activities.

4.4 Specific mitigation or management plans to be developed by KS

The above ESMP tables refer to several specific plans which need to be prepared by KS to support the overall E&S management of the project and should be integrated within the company's overall ESMS for the Project. The below sections provide a short description of selected key plans that need to be prepared.

4.4.1 A plan for closing and rehabilitating the existing sludge pond area

With the proposed Project, most of the 21 existing sludge ponds will become redundant, as sludge will be mechanically dried and treated through anaerobic digestion. As noted in the ESIA, it is planned that three (3) ponds should be retained for emergency purposes for the proposed WWTP.

Currently, no detailed plan for closure of the remaining sludge ponds has been developed / presented.

It is therefore required that KS, in collaboration with relevant authorities, develop a **plan for closing and rehabilitating the part of the existing sludge pond area** that is not needed for emergency purposes.

This plan should include:

- Phasing of the sludge pond decommissioning, including timeline, budget, and rationale for which ponds to retain at each point in time and which to decommission.
- Activities for cleaning the ponds, landscaping, and replanting native vegetation.
- Outline how cleaning the sludge ponds will be conducted (it is recommended to plan sludge pond cleaning during periods of favourable weather conditions, such as low wind speeds and atmospheric stability, to minimize odour dispersion and consider using vacuum trucks or equipment with enclosed systems to minimize the escape of odorous gases during sludge removal and transport).
- Explore potential activities for restoring of natural drainage patterns within the sludge pond area.
- Proposed timing of activities. This could for example be in parallel with landscaping of the proposed WWTP area.
- Proposed budget and responsibilities for executing the plan.

Rehabilitating the existing sludge ponds is an opportunity to create more natural biodiversity habitats. This can be seen to offset some of negative vegetation impacts associated with the greenfield WWTP construction.

4.4.2 A plan for reusing treated effluent and stabilized (digested) sludge

The proposed WWTP will treat sludge through anaerobic digestion (AD) which has multiple benefits compared to the current situation. These include energy generation, odour control, sludge volume reduction, nutrient recovery, and greenhouse gas emissions reduction. The proposed process for stabilizing the sludge meets the requirements as specified in the EU Sewage Sludge Directive (86/278/EEC).

The proposal by Aquarem is to utilise the digested sludge from the WWTP as fertiliser in agriculture. An area has been proposed for short term storage of sludge within the WWTP site, prior to collection for land

application. However, an actual plan to ensure sufficient offtake of the treated sludge has not been presented.

Treated effluent will meet the EU standards for effluent re-use as specified in the Regulation (EU) 2020/741, hence may be suitable for agricultural re-use or provide a positive impact for the aquatic environment in the receiving waters.

Hence, the ESAP includes an action to develop a **plan for reusing treated effluent and digested sludge from the new WWTP**. This plan should have overall purpose to operationalise the intention to reuse the sludge for agricultural purposes, and to explore alternative options in case not all treated sludge can be utilised in such a way. The plan could fall within a broader corporate level 'resource management and conservation plan' within KS's overall ESMS.

In terms of potential sludge reuse, the Karaganda green belt initiative and existing coal mining activities around the city could be explored in terms of need for material and nutrients to support rehabilitation efforts. Furthermore, as part of the ESIA process, a contact was made to the Karaganda forest and wildlife protection farms which is directed to Karaganda Region Natural Resources and Nature Management Department of Karaganda Region. They expressed interest to use sludge as fertiliser. They have much land which is not forestry land, and where they could apply treated sludge. They were interested in further dialogue regarding the process, e.g., on who would deliver the treated sludge to the sites.

Hence, the plan for reusing treated effluent and stabilized sludge should outline as a minimum:

- Identification of potential candidates for utilising the sludge on a regular basis, including farms and other users within an area to which transport of the sludge is feasible. Similar analysis related to treated effluent re-use.
- An action plan for liaising with identified candidates to promote the use of stabilized sludge and treated effluent.
- Estimation of the total quantity of treated sludge for which there are agricultural offtake options, and how much needs to be handled or stored in another way.
- Identification and exploration of alternatives for storing or disposing of treated sludge in case there is not sufficient offtake capacity amongst farmers or other users in the area. Exploration of potential locations, their advantages and disadvantages with regards to potential negative impacts, cost of transport and storage, etc. (options could include parts of the current sludge pond area, given permits can be obtained).
- Potential transport routes and assessment of potential negative impacts related to transport of sludge to farms, and propose mitigation measures (e.g., related to traffic safety and odour).
- A business model with regards to the sludge reuse (potential revenue streams, cost of transport, explore potential for further processing with value add, etc.).
- Approach with regards to agreements with farmers or other users for using the sludge, ensuring compliance with monitoring requirements, etc.
- Requirement related to monitoring of sludge and effluents prior to reuse (see also monitoring plan herein).
- Similar exploration regarding treated effluent reuse options, as relevant.

4.4.3 An emergency plan for WWTP operations

An emergency plan needs to be developed for the operation of the proposed WWTP. The objective of the plan should be to effectively respond to emergencies and mitigate risks, and to ensure continuity of operations with the least disruptions.

The emergency plan should be designed to respond to different emergencies, including but not limited to:

- Power cuts
- Fires and risks of explosions
- Natural disasters, including potential flooding events within the site, or due to overflow from the city stormwater system through the sewers (also taking into account potential events triggered by climate change)
- Specific risks related to the biogas facility and storage of gas, including risk of explosions.

The outline and content of the emergency plan may include, but is not limited to:

- **Introduction and purpose**, brief overview and identification of key personnel involved in emergency response.
- **Emergency contacts**, contact numbers to internal and external stakeholders and emergency services, agencies, and local authorities. Define protocols for internal and external communication during emergencies.
- Emergency response **organisation**; outlining roles and responsibilities and communication channels.
- **Assessment of potential emergency scenarios** specific to the WWTP, including risk assessment and outlining response measures. E.g., the flooding of the WWTP should include a bypass option. Evaluate the potential impacts and risks associated with each scenario.
- **Resources and equipment**: Identify the necessary resources and equipment required for emergency response with details on fire suppression systems, spill containment kits, personal protective equipment, and emergency power sources. Make provisions to ensure regular maintenance and testing of emergency equipment.
- **Training of personnel and planning of drills**. Outline training programs for employees on emergency response procedures. Schedule regular drills and exercises to test the effectiveness of the emergency plan. Develop evacuation procedures, including assembly points and routes.

4.5 Specific management plans to be developed by the Contractor

As mentioned in chapter 2, the Contractor shall prepare a CESMP detailing the construction process, the organisational and site-specific arrangement for environmental and social management. The CESMP and its sub-management plans will be based on the provisions of this ESMP.

Construction will not commence until the CESMP has been approved by the Supervising Engineer.

The CESMP shall contain the following sub-plans:

- Emergency preparedness and response plan
- Labour management plan including grievance mechanism for workers.
- Occupational health and safety management plan (OHSMP)
- Site establishment plan, including a plan for site drainage and stormwater management.
- Pollution prevention and control plan (management of ambient air quality, noise and vibration, waste)
- Air quality management plan
- Water and energy resources management plan
- Community health, safety, and security plan
- Traffic management plan
- Stakeholder engagement plan

An outline of these plans is presented in Annex 1 on Key Contractor Environmental and Social Management Plans.

The CESMP and its sub-management plans will be living documents, i.e., they will be updated and amended as construction proceeds and as and when specific unforeseen issues arise (see section 3.3 on management of change).

5 MONITORING PLAN

5.1 Monitoring ESMP Implementation

The KS ESMS should include procedures to internally control the effectiveness of the ESMS components and the implementation and completion of the Project ESMP and its mitigation measures. Activities should be reflected as internal audit and control procedures within the overall ESMS, with the aim to check that the ESMS and the ESMP are being implemented.

In terms of the responsibilities of contractors to implement the ESMP, KS shall have in place procedures within its overall ESMS to verify construction contractors' ESMS procedures and ESMP compliance. This verification can be through control audits of contractors' E&S management systems and performance, and through regular (recommended monthly) reporting by contractors to KS on E&S incidents and other key performance indicators related to the ESMP.

As an example, the monitoring of contractors' performance shall include (but not be limited to) contractors and subcontractors' compliance with OHS performance as per requirements in contracts, and compliance with the labour requirements as a special clause in the service and supply contracts. KS will also monitor contractors and subcontractors for compliance with requirements through regular labour and OHS inspections establishing compliance on the above.

5.2 Operational Environmental Monitoring

The operational Environmental Monitoring plan summarises the environmental monitoring measures stemming from the ESIA. It reflects recommended monitoring activities which are required to monitor the effectiveness of the mitigation measures, and to verify the expected positive impacts of the WWTP Project on key receptors during operation. This monitoring is the responsibility of KS, but can be outsourced to specialised service providers, as relevant.

Geology and soil

The main soil related risks related to operational activities of the WWTP include sludge handling and storage, which can lead to impacts on soil through leaching and/or accidental spills.

Karaganda Su is currently not required to conduct soil analysis at its WWTP site or around it. It was released from this obligation by the State Environmental Expertise conclusion on the previous local environmental impact assessment. Unless required in future permits, specific soil monitoring within the WWTP site on an ongoing basis is not seen as necessary.

An exception is if treated sludge will continue to be permanently stored on the site, in which case it is advisable to conduct soil monitoring in areas adjacent to the sludge storage area, to monitor potential contamination to surrounding soils (leaching). The monitoring plan and frequency should be reflected in the "plan for reusing treated effluent and stabilized (digested) sludge" (see above).

The proposed Project envisions reuse of treated sludge as fertilizers. However, a plan has not been developed that details this activity but should be developed (see "**A plan for reusing effluents and sludge**" in the ESMP tables above). This plan may outline locations for temporary or long-term storage of sludge if there is insufficient offtake capacity by farmers in the area. Consequently, the plan should also outline annual **soil monitoring requirements** in the vicinity of these storage areas, to ensure that no soil contamination is associated with the sludge storage. It would make sense to conduct this soil monitoring in parallel with sludge quality monitoring (see further below).

The soil monitoring should include parameters set forth in the EU sludge reuse directive, Annex 1A – Limit values for concentrations for heavy metals in soil.

Also, sludge can contain contaminants (such as heavy metals), which affect the potential to reuse the sludge as fertilizer. Required monitoring related to reuse of effluents and sludge is reflected in a separate section below.

Climate and climate change aspects - GHG emissions

Within its overall ESMS, KS shall develop and maintain a consistent monitoring and reporting scheme for GHG emissions stemming from its operations, including the WWTP, following international good practice and standards (e.g., Greenhouse gas protocol).

In the context of this Project, this should include:

- Estimation of **scope 1** emissions related to the WWTP process, AD and biogas generation and use based on actual throughput data:
- As part of the scope 1 estimation, include and reflect data on methane gas leakages from the AD / biogas / CHP plant, based on results from the installed “advanced gas monitoring and detection system” installed to continuously monitor methane levels and potential leakages.
- Estimation of **scope 2** emissions related to the WWTP process based on real data on energy consumption (electricity and heat).

Based on its GHG monitoring, KS should regularly report GHG emissions and use the results to identify areas for improvement and track progress towards emissions reduction targets. This must include monitoring of the biogas system and registration of the level of potential leakages.

Surface and groundwater resources

As part of the operations ESMP, KS should develop a programme for monitoring wastewater quality at the new WWTP, clearly establishing regulatory requirements to parameters and thresholds, and identifying appropriate corrective measures in case of non-compliance. The monitoring shall include quantitative parameters for influent and effluent and qualitative parameters for influent, stages, and effluent. Impact on the receiving water body to be monitored for qualitative parameters. This shall be reported at agreed intervals.

KS already monitors effluent quality from the WWTP, as well as water quality in the receiving Sokyr river (see ESIA baseline). This monitoring should continue for the proposed WWTP, for benchmarking against both the national effluent and water quality standards and the EU effluent quality standards, as set forth in the EU Urban Wastewater Treatment Directive (UWWTD). Continuous monitoring of effluent quality against national and EU effluent standards is required, to ensure that effluent standards are met and that the WWTP is operating optimally.

See also required monitoring in relation to reuse of effluents and sludge below.

Ambient air quality – Odour monitoring

To verify the positive impacts of the Project towards eliminating odour impacts at currently affected receptors, it is required that KS in collaboration with qualified consultants, **develop and implement a structured odour monitoring and management regime based on recognised methods**, with the aim to identify, assess and register odour levels at source, and in the currently affected settlements. The monitoring should also take account of potential other sources of odour in the broader area, such as from the pig farm which is operating to the West from the WWTP, to identify more accurately the sources of potential odour problems. The monitoring regime should be conducted by an independent body or persons, and should outline at least:

- The **objectives and scope** of the monitoring including, identification of potential odour sources related to the WWTP activities and receptor areas to be assessed, frequency of monitoring, and duration of monitoring campaigns.
- **Odour sampling and analysis methods**, describing the methods used for assessing odour levels, which may include quantitative methods such as dynamic olfactometry, where trained persons (panellists or sniffers) evaluate the intensity of odours in a controlled laboratory environment. Simpler qualitative methods may also be applicable, such as using field inspections and odour intensity scales, as long as these are systematic and consistent in terms of methods applied. In parallel, odour logbooks and complaints registers should be maintained.
- **Stakeholder involvement**, outlining engagement with stakeholders to provide inputs for designing the odour monitoring regime / plan, appropriate locations, timing etc. including representatives from those communities most affected by the existing WWTP.
- **Data interpretation and reporting**: Outline how the monitoring results shall be documented, interpreted, and used, and which benchmark levels shall trigger the need for potential mitigation measures to be put in place in case odour levels exceed acceptable levels in nearby communities.
- **Outline of potential mitigation measures**: The plan should outline a list of potential mitigation measures that can be explored and implemented in case monitoring indicates ongoing odour issues beyond acceptable odour levels in the affected residential areas. The list of mitigation measures shall include potentially feasible odour control technologies for the WWTP and anaerobic digestion facility.

Noise and vibration in indoor working environments (OHS)

KS should use automatic noise detectors to continuously monitor noise in noisy environments within the WWTP, e.g., buildings with air blowers, pumps etc, to ensure that applicable regulations and standards are met with regards to workers health and safety.

Fauna

The ESIA included baseline studies in the Sokyr river to assess the nature and level of benthic fauna (hydrobiology study) in the area around the discharge point from the WWTP and bioponds. Regular monitoring should continue to verify the expected positive impact of the proposed WWTP on the benthic fauna due to improved effluent quality.

The baseline hydrobiology study recommended the following monitoring:

Monitoring recommendations

To monitor the recovery of bottom communities after the discharge of treated wastewater it is recommended to take samples from stations with identical coarse sand and gravel bottom sediments. In continuing the monitoring regime based on the initial baseline survey, the following should be considered:

Monitoring point 1 – This reflects the background conditions (upstream from WWTP discharge). Location needs to be moved downstream further from the vehicles river crossing area.

Monitoring point 3 – is the point with the greatest influence of sewage water

Monitoring point 8 – is located in the recovery zone.

The initial baseline survey monitoring was not conclusive, and future monitoring should be implemented with the aim to create clarity of the benthic fauna characteristics above and below the WWTP effluent discharge point and determine level of expected improvement in water quality and biodiversity conditions, based on indicator species.

Sweco recommends the following monitoring frequency:

- Annually until the start of operations (to verify the baseline).
- Annually for the first 3 years of operation of the new WWTP.

- At the end of 3 years, the results of monitoring should be reviewed to see if there is a clear understanding of the dynamics in the river benthic fauna and suggesting a clear improvement in water quality and biodiversity conditions, based on indicator species. If this is not the case after the first 3 years, the monitoring should be continued, and the appropriate monitoring frequency determined accordingly.

Reuse of effluents and digested sludge

As reflected in the ESAP, it is recommended that KS develop “**A plan for reusing effluents and sludge**” with the aim to facilitate and operationalise the reuse of these valuable resources. This plan must include procedures for monitoring of effluent and sludge quality, in line with the below:

Use of effluents for irrigation

As outlined in chapter 8.1.4 of the ESIA, the effluent from the new WWTP will, based on the design parameters, also comply with the EU minimum requirements for water reuse as specified in the EU’s water re-use guideline, with regards to BOD and TSS corresponding to crop category A, which is the highest water quality level. However, re-use of the water for agriculture must be subject to evidenced compliance with the remaining pathogen (E.Coli, Legionella, etc.) requirement of the EU regulation and strict monitoring requirements as outlined in the EU’s water re-use guideline.

Monitoring of effluents prior to irrigation use should be designed to establish compliance with the EU water reuse directive, including Annex I – Uses and minimum requirements.

Use of treated sludge for land application

Any sludge reuse involving land application, must be subject to prior monitoring of contaminants and with account taken of the nutrient requirements of plants, and that the quality of the receiving soil and of the surface and groundwater is not impaired, in line with the EU sludge directive.

Hence, KS should develop a regime for regular sludge monitoring, and monitoring of the receiving soil receptor, to ensure compliance with sludge reuse and soil quality standards outlined in Annex I and II of the EU sludge directive, relating to e.g.;

- Limit values for concentrations of heavy metals in soil
- Limit values for heavy-metal concentrations in sludge for use in agriculture
- Limit values for amounts of heavy metals which may be added annually to agricultural land, based on a 10-year average.
- Rules in Annex II regarding sludge analysis, soil analysis and sampling and analysis methods

Additionally, KS should maintain a detailed registry of effluent and sludge reuse, including:

- The amounts of effluents and sludge, respectively, produced and supplied for use in agriculture.
- Composition of sludge in accordance with the parameters set out in the EU sludge directive, incl. nutrients and pollutants.
- Type of sludge treatment performed prior to reuse.
- Names and addresses of users of sludge and location where the sludge is used.
- Names and addresses of users of irrigation from the WWTP and/or biopond effluents, and quantities used.

Vulnerable groups

KS should closely monitor the affordability for low-income household after potential tariff increases due to the Project. Continuous stakeholder engagement will be important in ensuring timely information on affordability issues concerning vulnerable households. Furthermore, the monitoring should include

indicators such as i) outstanding payments among low-income households, and ii) customer grievances related to payment of tariffs, drawing on data from the KS customer department.

5.3 GET performance indicators and reporting to EBRD

KS shall agree with EBRD the level, form, and frequency of regular E&S performance reporting to the Bank during the construction and operation phases, which should include key performance indicators (KPIs) relating to the implementation of the agreed action plans and this ESMP, as well as key environmental performance indicators based on the proposed monitoring plan.

The reporting to EBRD shall also include the following Green Economic Transition (GET) KPIs related to the operations of the WWTP, see below table.

Table 5.1: Overview of GET KPIs for reporting to EBRD

KPI	Unit	Frequency
Volume of wastewater treated	m ³	Quarterly and annually
Total energy consumption at WWTP (heat and electricity)	kWh	Quarterly and annually
On-site energy generation from CPH (biogas) plant (heat and electricity). Indicate also the energy used within the WWTP to off-site sourcing vs. lost or exported energy.	kWh	Quarterly and annually
Quantity of sludge from the WWTP reused in agriculture and landscaping	TPA	Quarterly and annually
Volume of effluent from the WWTP reused for irrigation	m ³	Quarterly and annually

ANNEX 1: KEY CONTRACTOR ENVIRONMENTAL AND SOCIAL MANAGEMENT PLANS

The Contractor will prepare several construction management plans as mentioned above. Proposed overall tables of contents for key Contractor Environmental and Social Management Plans are presented in the following sections.

Emergency Preparedness and Response Plan (EPRP)

List of definitions and abbreviations

Section 1. Introduction

- 1.1 Overview
- 1.2 Scope and objectives
- 1.3 Legal and other requirements
 - 1.3.1 Applicable Kazakh laws and standards
 - 1.3.2 Applicable international standards and guidelines
- 1.4 Stakeholder consultation

Section 2. Goals of the EPRP

- 2.1 Emergency Preparedness and Response Goals
- 2.2 Roles and Responsibilities
 - 2.2.1 Key Roles and Responsibilities for Management Plan Implementation
 - 2.2.2 Key Interfaces (i.e., OHS management)

Section 3. Existing Environment and Operational Impact

- 3.1 Emergency Preparedness and Response Goals
- 3.2 Description of Works
- 3.3 Predicted Risks and Hazard

Section 4. Mitigation Measures and Management Controls

- 4.1 Overview of Management Controls

Section 5. Monitoring and Reporting

- 5.1 Overview of Monitoring Requirements
- 5.2 Key Performance Indicators
- 5.3 Key Monitoring Activities
- 5.4 Monitoring Program
- 5.5 Performance Reporting and Review
- 5.6 Corrective Actions
- 5.7 Publishing of Monitoring Data

Section 6. Training

- 6.1 Induction Training
- 6.2 Job Specific Training

References

Labour Management Plan

List of definitions and abbreviations

Section 1. Introduction

1.1 Overview

1.2 Scope and Objectives

1.3 Legal and other Requirements

1.3.1 Applicable Kazakh Laws and Standards

1.3.2 Applicable International Standards and Guidelines

Section 2. Goals of the LMP

2.1 Key Roles and Responsibilities for Management Plan Implementation

2.2 Key Interfaces (i.e., OHS management)

3.3 Labour Management Plan Goals

Section 3. Mitigation Measures and Management Control

3.1 Overview of Management Controls

3.2 Workers Code of Conduct

Workers' Code of Conduct that requires respect for local communities, appropriate behaviour during and outside working hours, prohibitions on the consumption of alcohol and drugs, and prohibition of sexual harassment and gender-based violence.

3.3 Procedures on Worker's Salary

3.4 Policy against Sexual Harassment

3.5 Gender-Based Violence and Sexual Harassment Incident Reporting and Referral Procedure

3.6 Workers' Grievance Mechanism (GM) and Monitoring Process

The GM shall be developed with a principle of transparency, impartiality, confidentiality, and accessibility in mind.

3.7 Labour Force Management

Section 4. Monitoring and Reporting

4.1 Overview of Monitoring Requirements

4.2 Key Performance Indicators

4.3 Key Monitoring Activities

4.4 Performance Reporting and Review

4.5 Revision of the Plan

Section 5. Training

5.5 Induction Training

5.6 Job Specific Training

References

Occupational Health and Safety Plan

List of definitions and abbreviations

Section 1. Introduction

- 1.1 Overview
- 1.2 Scope and Objectives
- 1.3 Legal and other Requirements
 - 1.3.1 Applicable Kazakh Laws and Standards
 - 1.3.2 Applicable International Standards and Guidelines

Section 2. Goals of the OHSMP

- 2.1 Project Context
- 2.2 Occupational Health and Safety Management Goals
- 2.3 Roles and Responsibilities
- 2.4 Key Roles and Responsibilities for Management Plan Implementation
- 2.5 Key Interfaces (i.e., labour management)

Section 3. Existing Environment and Operational Impact

- 3.1 Existing Environment
- 3.2 Description of Works and Activities
- 3.4 Identified Project Risks

Section 4. Mitigation Measures and Management Control

- 4.1 Overview of Management Controls
- 4.2 Identification and Management of Risk
- 4.3 Project Risk Assessment
- 4.4 Risk Control Measures
- 4.5 PPE
- 4.6 Change management and Job Hazard Analysis
- 4.7 Incident and Emergency Response
- 4.8 Fatigue Management Plan
- 4.9 Working in Confined Space
- 4.10 Fire Prevention Plan

Section 5. Critical Risk Management Procedures

- 5.1 Swinging Objects
- 5.2 Welding Jobs
- 5.3 Working at Height
- 5.4 Lifting Operations
- 5.5 Reporting on Accidents and Incidents Procedure
- 5.6 Permit to Work Procedure for Especially Dangerous Works
- 5.7 COVID-19 Risk Mitigation Plan

Section 6. Monitoring and Reporting

- 6.1 Overview of Monitoring Requirements
- 6.2 Key Performance Indicators
- 6.3 Key Monitoring Activities
- 6.4 Monitoring Program
- 6.5 Performance Reporting and Review
- 6.6 Non-compliance and Corrective Actions

Section 7. Training

- 7.1 Training Plan
- 7.2 Induction Training

- 7.3 Job Specific Training
- 7.4 Specific Competencies
- 7.5 Awareness

References

Site Establishment Plan

List of definitions and abbreviations

Section 1. Introduction

- 1.1 Overview
- 1.2 Scope and Objectives
- 1.3 Legal and other Requirements
 - 1.3.1 Applicable Kazakh Laws and Standards
 - 1.3.2 Applicable International Standards and Guidelines

Section 2. Goals of the SEMP

- 2.1 Roles and Responsibilities
 - 2.1.1 Key Roles and Responsibilities for Management Plan Implementation
 - 2.1.2 Key Interfaces (i.e., Occupational Health and Safety)

Section 3. Environmental Risk Identification and Management

- 3.1 Environmental Risk Assessment and Identification
- 3.2 Environmental Risk Management

Section 4. Construction Monitoring Programs

- 4.1 Noise Monitoring Construction Program
- 4.2 Air Quality Monitoring Construction Program
- 4.3 Water Usage Monitoring Construction Program

References

Pollution Prevention and Control Management Plan

List of definitions and abbreviations

Section 1. Introduction

- 1.1 Overview
- 1.2 Scope and Objectives
- 1.3 Legal and other Requirements
 - 1.3.1 Applicable Kazakh Laws and Standards
 - 1.3.2 Applicable International Standards and Guidelines

Section 2. Goals of the PPCMP

- 2.1 Roles and Responsibilities
 - 2.1.1 Key Roles and Responsibilities for Management Plan Implementation
 - 2.1.2 Key Interfaces
- 2.2 Pollution Prevention and Control Measures Management Goals

Section 3. Existing Environment and Operational Impact

- 3.1 Existing Environment
- 3.2 Description of Effluent Discharge Points
- 3.3 Equipment Type and Location
- 3.4 Prediction of Potential Impacts
- 3.5 Effluent Discharge
- 3.6 Spill Management
- 3.7 Surface Water Run-off
- 3.8 Solid Waste
- 3.9 Hazardous Materials

Section 4. Mitigation Measures and Management Controls

- 4.1 Overview of Management Controls
- 4.2 Key Management Controls
- 4.3 Design Controls

Section 5. Monitoring and Reporting

- 5.1 Overview of Monitoring Requirements
- 5.2 Key Performance Indicators
- 5.3 Key Monitoring Activities
- 5.4 Monitoring Program
- 5.6 Performance Reporting and Review
- 5.7 Corrective Actions

Section 6. Training

- 6.1 Induction Training
- 6.2 Job Specific Training

References

Air Quality Management Plan

List of definitions and abbreviations

Section 1. Introduction

- 1.1 Overview
- 1.2 Scope and Objectives
- 1.3 Legal and other Requirements
 - 1.3.1 Applicable Kazakh Laws and Standards
 - 1.3.2 Applicable International Standards and Guidelines

Section 2. Goals of the PPCMP

- 2.1 Roles and Responsibilities
 - 2.1.1 Key Roles and Responsibilities for Management Plan Implementation
 - 2.1.2 Key Interfaces
- 2.2 Dust Goals
- 2.3 Emission Goals

Section 3. Existing Environment and Operational Impact

- 3.1 Existing Environment
- 3.2 Description of Works
- 3.3 Predicted Dust Impacts
- 3.4 Prediction of Emission Impacts

Section 4. Mitigation Measures and Management Controls

- 4.1 Overview of Management Controls
- 4.2 Dust Controls Measures
- 4.3 Emission Controls Measures

Section 5. Monitoring and Reporting

- 5.1 Overview of Monitoring Requirements
- 5.2 Key Performance Indicators
- 5.3 Key Monitoring Activities
- 5.4 Monitoring Program
- 5.5 Performance Reporting and Review
- 5.6 Exceedances and Corrective Actions
- 5.7 Publishing of Monitoring Data

Section 6. Training

- 6.1 Induction Training
- 6.2 Job Specific Training

Section 7. Complaints Response

- 7.1 Procedure and Recording of Complaints
- 7.2 Community Notification

References

Water and Energy Resource Management Plan

List of definitions and abbreviations

Section 1. Introduction

1.1 Overview

1.2 Scope and Objectives

1.3 Legal and other Requirements

1.3.1 Applicable Kazakh Laws and Standards

1.3.2 Applicable International Standards and Guidelines

Section 2. Goals of the PPCMP

2.1 Roles and Responsibilities

2.1.1 Key Roles and Responsibilities for Management Plan Implementation

2.1.2 Key Interfaces

2.2 Water and Energy Resource and Quality Management Goals

Section 3. Existing Environment and Operational Impact

3.1 Existing Environment

3.2 Project Water and Energy Use

3.3 Predicted Impacts on Water Resource and Quality and Energy consumption

Section 4. Mitigation Measures and Management Controls

4.1 Overview of Management Controls

4.2 Key Management Controls

4.3 Design Controls

Section 5. Monitoring and Reporting

5.1 Overview of Monitoring Requirements

5.2 Key Performance Indicators

5.3 Key Monitoring Activities

5.4 Monitoring Program

5.5 Performance Reporting and Review

5.6 Corrective Actions

References

Community Health, Safety and Security Management Plan

List of definitions and abbreviations

Section 1. Introduction

1.1 Overview

1.2 Scope and Objectives

1.3 Legal and other Requirements

1.3.1 Applicable Kazakh Laws and Standards

1.3.2 Applicable International Standards and Guidelines

Section 2. Goals of the CHSMP

2.1 Project Context

2.2 Community Health and Safety Management Goals

2.3 Roles and Responsibilities

2.3.1 Key Roles and Responsibilities for Management Plan Implementation

2.3.2 Key Interfaces (i.e., worker management)

Section 3. Existing Environment and Operational Impact

3.1 Existing Environment

3.2 Description of Works

3.3 Identified Project Risks

Section 4. Mitigation Measures and Management Controls

4.1 Overview of Management Controls

4.2 Identification and Management of Risks

4.3 Risk Control Measures

Section 5. Monitoring and Reporting

5.1 Overview of Monitoring Requirements

5.2 Key Performance Indicators

5.3 Key Monitoring Activities

5.4 Monitoring Program

5.5 Performance Reporting and Review

5.6 Non-compliance and Corrective Actions

Section 6. Training

6.1 Induction Training

6.2 Job Specific Training

Section 7. Complaints Response

7.1 Procedure and Recording of Complaints

7.2 Community Notification

References

Appendices

A procedure for informing community members about the Workers' Code of Conduct, and the public grievance mechanism

Traffic Management Plan (TMP)

List of definitions and abbreviations

Section 1. Introduction

- 1.1 Overview
- 1.2 Scope and Objectives
- 1.3 Legal and other Requirements
 - 1.3.1 Applicable Kazakh Laws and Standards
 - 1.3.2 Applicable International Standards and Guidelines

Section 2. Goals of the TMP

- 2.1 Project Context
- 2.2 Traffic Management Goals
- 2.3 Roles and Responsibilities
 - 2.3.1 Key Roles and Responsibilities for Management Plan Implementation
 - 2.3.2 Key Interfaces (i.e., worker management)

Section 3. Existing Environment and Operational Impact

- 3.1 Existing Environment and avoidance of sensitive locations along the transport routes
- 3.2 Description of Works
- 3.3 Predicted Traffic Impacts

Section 4. Mitigation Measures and Management Controls

- 4.1 Overview of Management Controls
- 4.2 Traffic Control Measures

Section 5. Monitoring and Reporting

- 5.1 Overview of Monitoring Requirements
- 5.2 Key Performance Indicators
- 5.3 Key Monitoring Activities
- 5.4 Monitoring Program
- 5.5 Performance Reporting and Review
- 5.6 Non-compliance and Corrective Actions
- 5.7 Publishing of Monitoring Data

Section 6. Training

- 6.1 Induction Training
- 6.2 Job Specific Training

Section 7. Complaints Response

- 7.1 Procedure and Recording of Complaints
- 7.2 Community Notification

References

Appendices

Traffic Incidents/Accidents Record Sheet

Stakeholder Engagement and Grievance Procedure

The Contractor is to prepare a Stakeholder Engagement Plan and a Grievance Procedure, based on the Project Stakeholder Engagement Plan, prepared as a separate document as part of the ESIA package.