MUGLA WATER PROJECT

Annex D8 Non-Technical Summary (NTS)

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Acronyms / Abbreviations

Acronym / Abbreviation	Full Name
C-ESMP	Contractor Environmental and Social Management Plan
CİMER	Presidency's Communication Center (Cumhurbaşkanlığı İletişim Merkezi)
EBRD	Environmental and Social
EIA	European Bank for Reconstruction and Development
ESAP	Environmental and Social Action Plan
ESMP	Environmental and Social Management Plan
ESMS	Environmental and Social Management System
ESR	Environmental and Social Requirement (EBRD)
MUSKİ	Muğla Water and Sewerage Administration (Muğla Su ve Kanalizasyon İdaresi)
NRW	Non-Revenue Water
OHS	Occupational Health and Safety
PM	Particulate Matter
SCADA	Supervisory Control and Data Acquisition
SEPA	Special Environmental Protection Area
SEP	Stakeholder Engagement Plan

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1. Project Description

The Muğla Water Project is being implemented by Muğla Water and Sewerage Administration (MUSKİ) with financing from the European Bank for Reconstruction and Development (EBRD). The Project represents a strategic investment to modernise drinking water transmission and distribution infrastructure across selected districts of Muğla Province, where ageing networks, hydraulic limitations and high non-revenue water (NRW) levels have created long-term operational and resource efficiency challenges.

The Project is located within the Western Mediterranean Basin, a hydrologically and ecologically sensitive region characterised by karstic aquifers, major surface water bodies such as Köyceğiz Lake and the Dalaman River, and highly variable seasonal water availability. The priority investment districts include Köyceğiz, Ortaca and Dalaman, with specific sub-components such as the Topgözü Water Supply Transmission Line, Dalyan and Sarıgerme networks and city center distribution rehabilitation works.

The scope of works includes replacement of undersized and leak-prone pipelines, construction of new water storage facilities, construction of a new water pipeline and renewal of the SCADA system to enable real-time monitoring, pressure management and performance optimization. Particular attention is given to the replacement of asbestos cement pipes, which represent both environmental and occupational health and safety risk if not properly managed.

A defining technical feature of the Project is the upgrade of the Topgözü transmission system to enable gravity-fed operation. By reducing reliance on pumping, the Project will lower electricity consumption and associate greenhouse gas emissions during operation. This gravity-based configuration strengthens system reliability and reduces long-term operational vulnerability to energy price fluctuations and supply interruptions.

The Project is fundamentally rehabilitation-based and implemented within existing public corridors. No major greenfield development is planned. However, the works are spatially dispersed and located within dense urban, tourism-oriented and agricultural settings. Narrow streets, limited sidewalks, close proximity to buildings and the presence of bicycle lanes and tourism facilities require careful planning to ensure safety, accessibility and timely reinstatement.

The overall objective is not only to reduce NRW but to enhance long-term system resilience, improve hydraulic stability, increase climate adaptability and secure drinking water services in a province subject to intense seasonal demand fluctuations.

The location of the Project intervention areas and the main infrastructure components are presented in Figure 1.

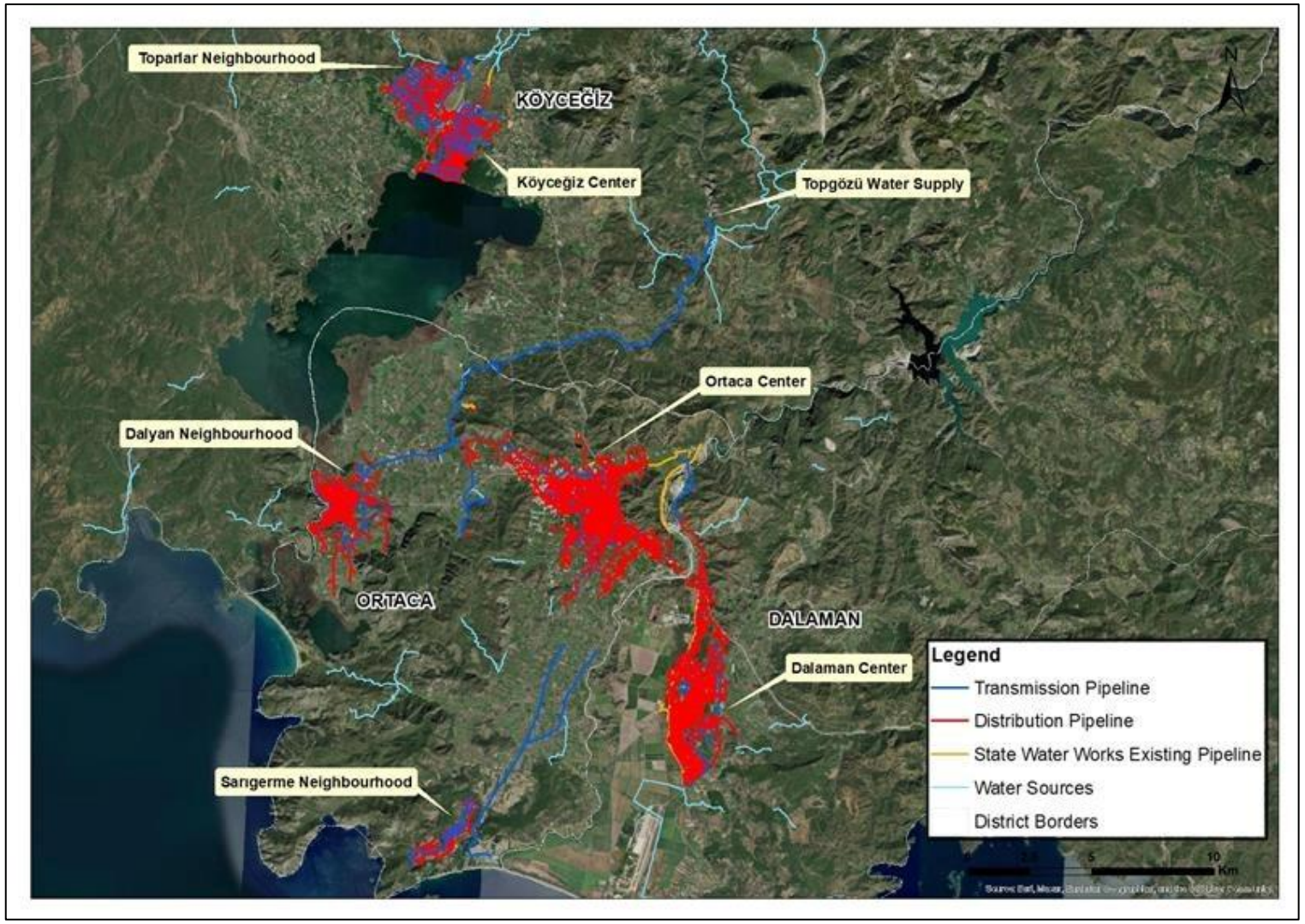

Figure 1. Project Intervention Areas and Main Infrastructure Components

2. Background

Muğla Province has a permanent population of approximately 1.1 million, which increases significantly during summer months, exceeding several million due to tourism and secondary housing. This seasonal fluctuation places considerable pressure on drinking water infrastructure, particularly in Dalyan, Sarıgerme and central districts where tourism-dependent economic activity is concentrated.

Baseline analysis undertaken as part of the Environmental and Social Audit confirms that NRW levels are approximately 50 percent. This represents not only financial inefficiency but also an environmental burden, as unnecessary abstraction increases pressure on groundwater and surface water systems within the Western Mediterranean Basin.

The basin itself is highly sensitive to drought conditions. Under very severe drought scenarios, total basin water potential may decrease by approximately 27 percent compared to normal hydrological conditions. This reduction directly affects both surface water flows and groundwater recharge rates, particularly within karst aquifers feeding springs such as Topgözü.

The hydrogeological context is characterized by Mesozoic carbonate formations with high karstification, combined with Quaternary alluvial plains in Dalaman and Ortaca that are susceptible to seismic amplification and potential liquefaction risks. The region is also situated within an active seismic zone influenced by the Gökova and Fethiye-Burdur fault systems. This structural context introduces long-term infrastructure resilience considerations into the Project design.

The Project area also includes agricultural land, citrus orchards, greenhouse farming, small livestock activities and tourism infrastructure. Informal roadside uses and seasonal economic activities were identified during site visits. Vulnerable groups include elderly residents, low-income households, seasonal workers, women-headed households and persons with disabilities. These socio-economic dynamics were considered during baseline screening.

Although the Project does not require a formal national EIA under Turkish legislation due to its brownfield nature, it has been assessed in line with the EBRD Environmental and Social Policy (2024) and applicable Environmental and Social Requirements

During project preparation, different technical options were discussed, including continuing with a pumped transmission system and limiting the intervention to partial network rehabilitation. The gravity-based configuration of the Topgözü transmission line was selected after considering long-term operational performance, energy use and resilience. Compared to a pumped alternative, the gravity-fed solution reduces electricity consumption, lowers operating costs and decreases dependency on external energy supply. It also provides greater reliability during peak seasonal demand and drought periods. For these reasons, the selected configuration was considered the most appropriate and sustainable option under the local hydrogeological and climatic conditions.

3. Process

Environmental and Social Assessment combines a structured audit of existing facilities with an evaluation of proposed investments. The approach is proportionate to a Category B brownfield project and integrates environmental, social, labour, occupational health and safety and climate considerations.

Site visits were conducted in December 2025 using a sample-based methodology across representative districts and infrastructure components. Observations included pumping stations, storage facilities, pipeline alignments, flood-prone areas and corridors near sensitive receptors such as schools, healthcare centres and tourism facilities.

The assessment examined ambient air quality, baseline noise conditions, geological and hydrogeological characteristics, seismic risk, biodiversity screening, land use compatibility and socio-economic context. Particular emphasis was placed on the Köyceğiz–Dalyan Special Environmental Protection Area and the presence of sensitive species such as Caretta caretta in the wider ecological context.

Labour and OHS baseline conditions were reviewed, including contractor management structures, workforce composition, grievance mechanisms and compliance with national labour legislation. Occupational risks such as excavation safety, confined space entry, traffic interaction, asbestos handling and heat stress were assessed in detail.

Climate considerations were integrated across all sections of the assessment. Both mitigation and adaptation aspects were evaluated, including reduced operational energy demand through gravity-fed design, drought resilience through NRW reduction, and the need to consider extreme heat and seismic events in construction-phase risk management. The Climate Risk and Vulnerability Assessment confirms that the Project is exposed to high and systemic climate risks, primarily driven by drought and increasing water scarcity. In this context, adaptation measures form an integral part of the Project design to ensure long-term service reliability.

Stakeholder engagement activities were conducted in accordance with ESR10. Consultations with local authorities and community representatives informed identification of sensitive locations and practical mitigation measures.

4. Summary of Environmental Benefits, Adverse Impacts and Mitigation Measures

The Project's most significant environmental benefit is the reduction of water abstraction pressure through NRW reduction. By lowering physical leakages, the Project directly contributes to basin-level water conservation under drought-sensitive conditions. This aligns with resource efficiency objectives under ESR3 and climate resilience goals under EBRD's Green Economy Transition framework.

By reducing dependence on pumping, the Project will lower operational energy demand and associated emissions.

Construction-phase impacts include dust generation, temporary increases in PM concentrations, noise and vibration, soil disturbance and traffic congestion. These impacts are temporary but potentially significant in narrow urban corridors. Mitigation measures include water spraying, covering of transported materials, equipment maintenance, scheduling restrictions, vibration control and rapid reinstatement of surfaces to prevent mud formation and secondary safety hazards observed in previous works.

Due to the project route largely being located within the existing urban area, limited amounts of topsoil are expected in the areas where excavation work will be carried out. If topsoil is found, particularly in areas where new water pipelines and pipelines will be constructed, it will be removed before excavation and stored separately from other excavated materials. The topsoil will not be used as backfill material and will be stored under appropriate conditions. After the completion of pipe laying and backfilling work, it will be re-laid as part of rehabilitation and landscaping applications to restore the damaged surfaces. According to current assessments, it is planned that all of the removed topsoil will be reused in rehabilitation work within the project area.

Since excavation and pipe laying work will be carried out in stages, the amount of excavation area that will remain open at the same time and the amount of excavated material that will be temporarily stored will be limited. It is planned that suitable portions of the excavated material will be reused in backfilling work, while unsuitable portions will be transported to appropriate dumping areas determined by the municipality in accordance with the provisions of the Regulation on the Control of Excavated Soil, Construction and Demolition Waste. In the event of unexpected soil contamination or the presence of asbestos fibers, these materials will be managed separately from other excavation materials and sent to licensed facilities through experts in accordance with the provisions of the Waste Management Regulation and relevant legislation. Necessary environmental management measures will be implemented to minimize environmental impacts throughout the excavation works.

Excavated materials will be segregated and reused where suitable or disposed of at authorised facilities in accordance with the Waste Management Regulation.

Construction materials will be sourced from licensed and commercially operating suppliers. The Project does not foresee the opening of new borrow pits or extraction sites. Where aggregates or other materials are required, procurement will be undertaken from facilities holding the necessary environmental permits. Transport planning will take into account urban traffic conditions to minimize disturbance and safety risks.

Asbestos cement pipe removal represents a key environmental and occupational risk. Controlled wet removal techniques, sealed packaging, licensed transport and disposal procedures will be applied. Workers will receive specialized training and appropriate personal protective equipment.

Although biodiversity impacts are expected to be limited due to the brownfield nature of the works, precautionary measures will be implemented near the Köyceğiz–Dalyan SEPA to prevent sediment discharge, accidental spills or disturbance to sensitive habitats. No irreversible ecological impacts are anticipated.

Given the high seismicity of the region, infrastructure resilience considerations form part of the environmental risk context. Pipeline materials and jointing techniques will be selected to withstand ground movement where relevant.

In addition to site-specific construction effects, the assessment considered the broader regional context. Muğla is part of the Western Mediterranean Basin, where water resources are already under pressure due to seasonal tourism, agricultural use and increasing drought frequency. By reducing physical water losses, the Project is expected to have a positive cumulative effect at basin level. It does not introduce new abstraction points or increase water demand. Indirect impacts are also expected to remain limited, as the Project improves efficiency within existing service areas rather than enabling new large-scale development. Any secondary effects are therefore considered manageable and, in most cases, beneficial.

Residual environmental impacts, following mitigation, are expected to remain low and reversible.

5. Summary of Social Benefits, Adverse Impacts and Mitigation Measures

Improved reliability of drinking water supply provides clear social and economic benefits. Stable pressure levels and reduced service interruptions support households, tourism facilities, agricultural users and local businesses. In a tourism-driven economy, predictable water services are directly linked to economic resilience.

Temporary construction-related impacts may include restricted access, traffic congestion, noise and short-term service interruptions. These impacts are expected to be localised and time-bound but require careful management due to narrow streets and high pedestrian interaction.

Community health and safety risks are primarily associated with excavation sites, vehicle movements and pedestrian interaction in streets without sidewalks. Traffic and Pedestrian Management Plans will be implemented, including signage, barriers, safe crossings and coordination with emergency services.

Works are planned primarily within existing municipal rights-of-way. Screening undertaken during the assessment indicates that permanent land acquisition is not anticipated. In locations where temporary access restrictions or interactions with informal land users may occur, advance communication and proportionate mitigation measures will be applied. Construction-phase monitoring will verify that no unforeseen livelihood impacts arise.

No permanent physical displacement is anticipated. Temporary impacts on informal roadside users may occur and will be managed in line with ESR5 principles, with advance notification and appropriate mitigation where required

Public facilities including schools, healthcare centres and tourism establishments were mapped as sensitive receptors during baseline assessment. Construction scheduling will take these into account.

Cultural heritage risk is low but present given Muğla's archaeological history. A Chance Find Procedure will be applied.

Labour management will comply with national legislation and ESR2. Worker grievance mechanisms will be available, and child labour and forced labour are strictly prohibited.

The social assessment has considered local demographic characteristics, including gender-related differences in employment and vulnerability patterns. Temporary construction impacts such as access restrictions or service interruptions will be managed in a way that avoids disproportionate effects on women-headed households, elderly residents or individuals with reduced mobility. Equal opportunity principles will apply to contractor recruitment practices. Codes of conduct and supervisory arrangements will also address the prevention of gender-based violence and harassment in line with applicable EBRD requirements.

At present, construction is expected to rely largely on locally or regionally available labour. No dedicated worker camps are planned. Should temporary worker accommodation become necessary at a later stage, its location and management would be designed to meet national requirements and good international practice, ensuring appropriate living conditions and avoiding undue pressure on nearby communities.

6. Monitoring of Impacts

Monitoring will be implemented as an integral part of the Project's Environmental and Social Management System, serving both compliance verification and adaptive management purposes in line with EBRD requirements.

During the construction phase, monitoring will be carried out through a combination of routine site inspections, contractor reporting and supervisory oversight by MUSKİ and the supervising engineer. Inspections will focus on dust suppression effectiveness, noise management practices, traffic and pedestrian safety arrangements, waste segregation and disposal records, excavation management and reinstatement quality. Attention will be given to asbestos removal activities, including verification of method statements, training records, transport documentation and disposal confirmations at licensed facilities. Monitoring findings will be documented, and non-conformities will trigger corrective actions within defined timeframes.

Environmental monitoring will also include visual inspections of sediment flow near sensitive receivers, verification of the implementation of measures taken against spill risks from fuel, oil and other chemicals, and review of potential environmental incidents. Vehicle engine oil changes must be performed at businesses holding an Engine Oil Change Point Permit in accordance with the "Regulation on the Management of Waste Oils. Fuel and chemicals will be stored in areas providing secondary containment, refueling will only be carried out in designated areas, and an adequate number of spill response kits will be available at work sites. Spills will be rapidly contained, contaminated materials will be collected appropriately using suitable equipment, and transported by licensed vehicles for recovery/disposal at licensed facilities. These incidents will be recorded and necessary corrective actions will be implemented. Where relevant, additional measures such as instantaneous noise measurements near residential or tourism-sensitive receivers may be taken to ensure compliance with applicable limits and good international practices.

OHS monitoring will include verification of task-based risk assessments, excavation stability controls, trench shoring systems, confined space entry permits, lock-out/tag-out procedures, traffic segregation and safe equipment operation. Seasonal risks such as heat stress will be managed through monitoring of working hours, provision of shaded rest areas, hydration measures and worker awareness training. Emergency preparedness arrangements, including first aid capacity and emergency response procedures, will be periodically reviewed and tested. Lost-time incidents, near-miss events and safety observations will be recorded and analyzed to identify trends and preventive actions.

Labour-related monitoring will verify compliance with working hours, wage payments, grievance access for workers and contractor adherence to labour standards. Worker grievances will be tracked separately from community grievances to ensure appropriate handling and confidentiality.

During the operational phase, monitoring will shift toward performance-based indicators. NRW reduction rates will be tracked as a key efficiency and climate adaptation indicator. Pressure stability, network performance and unplanned outage frequency will be reviewed to assess system reliability improvements. Electricity consumption trends will be monitored to quantify energy savings achieved through gravity-fed transmission and network optimization, demonstrating climate mitigation benefits.

Climate resilience considerations will also form part of operational monitoring. This includes periodic review of drought conditions, abstraction levels, seasonal demand fluctuations and system performance under peak tourism loads. Where climate-related stressors such as prolonged dry periods or extreme

weather events occur, operational adjustments and contingency measures will be evaluated and documented.

Grievance monitoring and stakeholder feedback analysis will form part of the adaptive management cycle. All grievances will be recorded in a central registry, categorised by type and location, and periodically reviewed to identify recurring issues or emerging risks. Lessons learned from grievance trends, inspection findings and incident reports will inform updates to construction practices, communication strategies and management procedures.

Monitoring results will be consolidated into periodic internal and lender reporting. Where monitoring identifies deviations from planned performance, corrective and preventive actions will be defined, assigned and tracked to closure. Through this structured approach, monitoring functions not only as a compliance tool but as a mechanism to ensure transparency, accountability and continuous strengthening of environmental and social performance throughout the Project lifecycle.

Monitoring will include practical performance indicators to track implementation and outcomes. These will include progress in reducing non-revenue water, trends in electricity consumption in gravity-fed sections, the number and resolution time of community grievances, lost-time incidents and compliance with reinstatement timelines. The purpose of these indicators is to provide a transparent basis for evaluating performance and identifying areas requiring corrective action.

7. Summary of the Environmental and Social Action Plan

ESAP has been prepared to ensure that the Muğla Water Project is implemented in full alignment with the EBRD Environmental and Social Policy (2024) and the applicable Environmental and Social Requirements. ESAP translates the findings of the Environmental and Social Audit and Assessment into clearly defined, time-bound and measurable actions, with assigned responsibilities and implementation schedules.

ESAP does not introduce new project components; rather, it strengthens management arrangements to ensure that identified risks are systematically controlled throughout pre-construction, construction and operation phases.

A central component of the ESAP is the formalization and continuous strengthening of MUSKİ's Environmental and Social Management System (ESMS) for the Project. This includes clarification of institutional roles and responsibilities, designation of environmental and social focal points, integration of E&S requirements into procurement and contractor contracts, and establishment of structured internal reporting lines. The ESAP requires that environmental and social performance be periodically reviewed and documented, ensuring that commitments are not only defined but also actively monitored.

During the construction phase, the ESAP places particular emphasis on contractor management. Contractors will be required to prepare and implement Contractor Environmental and Social Management Plans (C-ESMPs) consistent with the Project-level ESMP. These plans will include detailed procedures for dust and noise control, excavation and reinstatement management, traffic and pedestrian safety, waste segregation and disposal, hazardous material handling and emergency preparedness. ESAP also strengthens supervision mechanisms to ensure that mitigation measures are applied consistently across multiple, geographically dispersed work fronts.

Asbestos cement pipe replacement is identified as a priority risk area. The ESAP therefore includes specific actions related to asbestos management, including development of task-specific method statements, worker training, air monitoring where required, sealed transport procedures and confirmation of disposal at licensed facilities. These measures aim to ensure compliance with national legislation and good international practice, while protecting both workers and nearby communities.

In line with ESR4, ESAP reinforces community health and safety management. This includes preparation and implementation of Traffic and Pedestrian Management Plans, advance notification of works, coordination with emergency services, and enhanced safety arrangements in areas with schools, healthcare centers, tourism facilities and high pedestrian activity. Lessons learned from previous reinstatement challenges observed during site visits, particularly mud formation and access difficulties during rainy periods, are explicitly reflected in the requirement for timely and quality-controlled reinstatement of excavated surfaces.

Labour and working conditions are addressed under ESR2. The ESAP includes measures to strengthen contractor oversight related to working hours, wage compliance, worker accommodation (if applicable), prohibition of child and forced labour, and grievance access for contractor personnel. The establishment and monitoring of worker grievance mechanisms, separate from community grievance channels, is included to ensure transparency and accessibility.

Climate change considerations are integrated into the ESAP as both mitigation and adaptation actions. On the mitigation side, operational energy performance will be tracked through monitoring of electricity consumption and performance indicators linked to gravity-fed system optimization. On the adaptation side, ESAP includes actions to integrate drought resilience considerations into operational planning, strengthen monitoring of NRW performance as a climate resilience indicator, and ensure that construction-phase risk assessments account for extreme heat events and potential flood-prone sections of the alignment. The seismic context of Muğla Province is also recognized, and infrastructure integrity and emergency preparedness arrangements are required to reflect regional seismic hazard conditions.

Specifically for studies near the Köyceğiz-Dalyan Special Environmental Protection Area, biodiversity surveys and conservation measures have been included. While no significant impact is anticipated, the Environmental Protection Plan requires precautionary sediment control in environmentally sensitive areas, implementation of spill prevention measures, regular field inspections, availability of spill response equipment, and recording and reporting of potential spills.

Stakeholder engagement commitments are formalized through implementation of the Stakeholder Engagement Plan (SEP). ESAP includes actions to maintain disclosure of Project documentation, document consultations, track grievances and report on grievance resolution performance. Grievance data will be periodically reviewed to identify recurring issues and inform adaptive management.

Monitoring and reporting are core elements of the ESAP framework. The Plan defines indicators, reporting frequencies and responsible units. Performance will be reviewed regularly, and corrective actions will be implemented where monitoring results indicate deviations from planned performance. This adaptive management approach ensures that environmental and social performance evolves in response to site-specific experience.

Overall, ESAP provides a structured implementation roadmap. It strengthens governance, clarifies accountability, integrates environmental and social risk management into procurement and construction practices, and embeds climate resilience and resource efficiency objectives into long-term operational management. Through this structured framework, environmental and social commitments are translated into practical and verifiable actions throughout the Project lifecycle.

8. Communications

Stakeholder engagement will continue throughout the Project lifecycle. This Non-Technical Summary, together with the Environmental and Social Assessment Report and the Stakeholder Engagement Plan (SEP), will be publicly disclosed and made available through MUSKİ's official communication channels in accessible formats.

A Project-specific Grievance Mechanism will remain in place and free of charge. Stakeholders may submit questions, comments or complaints by telephone, email, online forms or in person at district service offices. All submissions will be recorded, reviewed and addressed within defined timeframes. The mechanism provides a transparent and accessible channel for concerns and does not restrict the right of individuals to seek judicial or administrative remedies, including through CİMER.

The SEP sets out in detail the engagement approach, stakeholder identification process, disclosure commitments and grievance procedures. Project documentation and engagement practices will be updated as necessary during implementation.

Stakeholders may contact MUSKİ at the following address:

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