



REPUBLIC OF TÜRKİYE
MINISTRY OF TRANSPORT
AND INFRASTRUCTURE



TÜRKİYE EMERGENCY ROAD REHABILITATION AND RECONSTRUCTION PROJECT



ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT REPORT

CNR-KGM-TERRRP-ESIA-001

Final

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT		CNR-KGM-TERRRP-ESIA-001
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ABBREVIATIONS AND ACRONYMS

AF	Associated Facility
AiIB	Asian Infrastructure Investment Bank
AoI	Area of Influence
AZE	Areas of Zero Extinction
BSA	Biodiversity Survey Area
C-ESMP	Contractor's Environmental and Social Management Plan
CFP	Chance Find Procedure
CH	Critical Habitat
CHPRBD	Cultural Heritage Preservation Regional Board Directorate
CHS	Community Health and Safety
ÇINAR	Çınar Engineering Consultancy Inc.
CLO	Community Liaison Officer
DSF	Dead Sea Fault
DSI	State Hydraulic Works
DSM	Deep Soil Mixing
E&S	Environmental and Social
EAFZ	East Anatolian Fault Zone
EHS	Environmental, Health, and Safety
EIA	Environmental Impact Assessment
ENCR	Environmental Noise Control Regulation
EPRP	Emergency Preparedness Response and Plan
ESAP	Environmental and Social Action Plan
ESDD	Environmental and Social Due Diligence
ESEL	Environmental and Social Exclusion List
ESF	Environmental and Social Framework
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESMS	Environmental and Social Management System
ESP	Environmental and Social Policy
ESS	Environmental and Social Standard
EU	European Union
GAP	Gender Action Plan
GBVH	Gender Based Violence and Harassment
GHG	Greenhouse Gas
GIS	Geographical Information System
GRM	Grievance Redress Mechanism
IAS	Invasive Alien Species
IBA	Important Bird Areas
IEA	International Energy Agency
IFC	International Finance Corporation



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IHME	International Hydrogeological Map of Europe
ILM	Incremental Launch Method
ILO	International Labor Organization
INA	Important Nature Area
IPA	Important Plant Area
IUCN	International Union for Conservation of Nature
KBA	Key Biodiversity Area
KGM	General Directorate of Highways
KVKBKM	Regional Council for the Conservation of Cultural Property
LAP	Land Acquisition Plan
LARP	Land Acquisition and Resettlement Plan
LRP	Livelihood Restoration Plan
LTV	Long Term Limit Value
MoCT	Ministry of Culture and Tourism
MoEUCC	Ministry of Environment, Urbanization and Climate Change
MoNE	Ministry of National Education
MoTAT	Mobile Waste Tracking System
MoTI	Ministry of Transport and Infrastructure
MTA	General Directorate of Mineral Research and Exploration
N/A	Not Applicable
NatP	Nature Park
NR	Nature Reserve
OHS	Occupational Health and Safety
OIZ	Organized Industrial Zone
PAPs	Project Affected Persons
PIF	Project Introduction File
PIU	Project Implementation Unit
PPE	Personal Protective Equipment
PPM	Project-Affected People's Mechanism
RA	Ramsar Area
RIU	Regional Implementation Unit
RP	Resettlement Plan
RWIHC	Regulation on Water Intended for Human Consumption (
SDS	Safety Data Sheet
SEA/SH	Sexual Exploitation and Abuse/Sexual Harassment
SEP	Stakeholder Engagement Plan
STV	Short Term Limit Value
SWQR	Surface Water Quality Regulation
TAG	Tarsus Adana Gaziantep
TEPAV	The Economic Policy Research Foundation of Türkiye
The Project	Türkiye Emergency Road Rehabilitation and Reconstruction Project
TurkStat	Turkish Statistical Institute



UNESCO	United Nations Educational, Scientific, and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
VEC	Valued Environmental and Social Component
WBG	World Bank Group
WDA	Wildlife Development Area
WHO	World Health Organization
WLI	Wetland of Local Importance
WNI	Wetland of National Importance
WPCR	Water Pollution Control Regulation
WWTP	Wastewater Treatment Plant



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EXECUTIVE SUMMARY

The Türkiye Emergency Road Rehabilitation and Reconstruction Project (the Project) has been planned to be prepared and implemented by General Directorate of Highways (KGM) under the Ministry of Transport and Infrastructure (MoTI) to ensure efficient execution and compliance with national regulations and Asian Infrastructure Investment Bank (AIIB) Environmental and Social Framework (ESF). Environmental and Social Risk Category of the Project is identified as Category B (Medium risk) according to AIIB's ESF.

The Project will rehabilitate and reconstruct roads, tunnels, and bridges damaged by the February 2023 earthquakes that occurred in the southeast of Türkiye. The Project activities will be implemented through five (5) sub-projects which will entail rehabilitation and enhancement of transportation infrastructure to meet required safety and capacity standards, as well as integration of climate-resilient measures to mitigate and withstand the impacts of seismic events in the future. The sub-projects are located within the jurisdictions of the 5th Regional Directorate of Highways (Mersin) and 8th Regional Directorate of Highways (Elazığ), and are as follows.

- Tarsus-Adana-Gaziantep (TAG) Highway Rehabilitation (P1)
- Hatay Province Roads Rehabilitation and Reconstruction (P2)
- Antakya-Samandağ Road Reconstruction (P3)
- Malatya-Akçadağ-Gölbaşı Road and Erkenek Tunnel Rehabilitation (P4)
- Tohma, Ağın and Beylerderesi Bridges Rehabilitation (P5)

The phased approach on environmental and social (E&S) assessment will be utilized for the proposed Project given the urgent need of assistance because of the earthquakes. In this context, a contract was signed between 5th Regional Directorate of Highways and Çınar Engineering Consultancy Inc. (ÇINAR) on 14.02.2024 for the preparation of Environmental and Social Documentation in accordance with the AIIB ESF and national legislation. These documents include the followings:

- Environmental and Social Due Diligence (ESDD) including Environmental and Social Action Plans (ESAPs) for each sub-project under construction,
- Environmental and Social Impact Assessment (ESIA) Report including Environmental and Social Management Plans (which also cover Management of Change Procedure, Chance Find Procedure and project level Emergency Preparedness and Response Plan) prepared separately for each sub-project, identifying mitigation measures and monitoring requirements for each E&S issues in the subjects of land use and soil; noise and vibration; air quality and greenhouse gas; water resources, water quality and wastewater; resource and waste; cultural heritage; biodiversity; social issues; labor and working conditions; resettlement, land acquisition and livelihood restoration; occupational health and safety; community health, safety and security.
- Project level Stakeholder Engagement Plan (SEP) including sub-project level Grievance Redress Mechanisms (GRMs) and AIIB's Project-affected People's Mechanism (PPM),
- Project level Gender Action Plan (GAP),
- Project level Resettlement Plan (RP) .

At the current stage of the project, construction work at sub-projects P1, P2, P3, and P5 has already commenced due to the urgent need for reconstruction and repair.

Within the scope of the project during the land preparation and construction phase, in addition to road and bridge rehabilitation and reconstruction works, construction activities will be carried out for the use of construction and accommodation sites, quarries/material borrow sites, concrete plants, asphalt plants, crusher/crushing and screening facilities/mechanical facilities, and material storage sites as associated and auxiliary facilities.



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The Area of Influence (Aol) for each sub-project has been determined as a 250-meter corridor extending each side of the roads undergoing rehabilitation and reconstruction. Furthermore, a 250-meter radius area around boundaries of each associated and auxiliary facility has also been specified as the Aol, covering the construction and accommodation sites, quarries/borrow sites, concrete plants, asphalt plants, crusher/crushing and screening facilities, and mechanical facilities.

The anticipated E&S impacts within the scope of these activities for the land preparation and construction phase are summarized below:

Land Use and Soil Management

- Change in land use due to the establishment of associated and auxiliary facilities,
- Fragmentation of agricultural and pasture lands due to the subproject activities regarding associated and auxiliary facilities to be established along with corresponding potential impacts on restrictions to access to the lands,
- Loss of vegetative soil (in terms of quantity and/or vegetative quality),
- Soil disturbance and erosion, due to earthworks: excavation and filling operations,
- Soil erosion risk in the absence of proper erosion control measures and sedimentation,
- Soil contamination risk originated from accidental spill/leakage and improper management of hazardous materials and waste,
- Landslide and seismicity related risks.

Noise and Vibration Management

- Increase in noise levels and vibration due to the subproject activities regarding both reconstruction and rehabilitation of the highways and operation of the quarry/material borrow site and other associated and auxiliary facilities.

Air Quality and GHG Management

- Decrease in air quality due to the emissions originated from the subproject activities regarding both reconstruction and rehabilitation of the highways, movement of the construction vehicles and operation of the quarry/material borrow site and other associated and auxiliary facilities,
- Greenhouse gas emissions due to construction traffic and operation of the quarry/material borrow site and other associated and auxiliary facilities.

Water Resources, Water Quality and Wastewater Management

- Impacts on the water resources (surface waters and/or groundwater, depending on the resources to be used) due to water use for construction activities including associated and auxiliary facilities and due to operation of the quarries/borrow sites depending on the location of these sites and the groundwater level,
- Degradation impacts on surface water quality due to improper management of the wastewater, waste and chemicals/hazardous substances along with surface runoff resulting in sediment accumulation on the waterbody,
- Impacts on surface water flow and flood risk due to poor management of surface runoff,
- Impacts on groundwater resources due to accidental spill/leakage and improper management of hazardous materials and waste (including wastewater).

Resource and Waste Management

- Raw material and energy usage due to the construction and rehabilitation activities together with operation of the quarry/material borrow site and other associated and auxiliary facilities.
- Possible impacts from storage of excavation surplus materials in case excavated materials are not reused/recycled, resulting in additional land occupation,



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- Potential impacts of hazardous and non-hazardous solid wastes due to poor waste management, resulting in environmental pollution and occupational and community related health and safety risks.
- Additional load on the waste management facilities around the subproject area in the absence of best management practices and effective waste management.

Cultural Heritage Management

- Physical disturbance of tangible cultural heritage (chance finds that might be encountered)

Biodiversity Management

- Disturbance/Destruction of flora and fauna habitat (ecosystem) and displacement/destruction of fauna due to site clearing and storage as well as improper management of waste, wastewater, air quality and noise/vibration management
- Vegetation, soil and biodiversity losses,
- Pollution of aquatic habitats in areas adjacent to rivers, the impact on these habitats, and interruption of water flow (blocking of rivers flow)
- Introduction of Alien Invasive Species

Socio-economic Environment

- Potential impacts on population change, local employment and vulnerable groups
- Potential impacts due to resettlement and land acquisition
- Potential risks on loss of livelihood
- Potential risks on capacity of infrastructure and services

Labor and Working Condition Management

- Potential risks due to insufficient accommodation conditions
- Potential risks due to improper working conditions
- Potential risks due to child labor, forced labor and unregistered employment
- Potential impacts due to deficiencies on operating an effective workers grievance redress mechanism

Occupational Health and Safety

- Risk of falling due to open trenches and pits.
- Accidents and injuries (e.g., overturning, crushing).
- Repetitive movements and heavy lifting.
- Risk of collision and crushing due to vehicle traffic near the work area.
- Risk of landslides and collapses.
- Working difficulties and health risks due to extreme hot, cold, or rainy weather conditions.
- Accidents that may occur during the use of heavy machinery such as excavators, trucks, and crushers.
- Poisoning, skin irritations, and respiratory problems.
- Animal bites and insect stings.
- Accidents due to workers not receiving adequate training.
- Risks arising from the lack or improper use of personal protective equipment.
- Health problems caused by vibration from machinery.
- Risk of dehydration, heatstroke, or hypothermia.
- Risk of respiratory problems due to dust exposure.
- Risk of slipping and falling due to slippery surfaces or uneven ground.
- Risk of explosions and flying debris during blasting operations.
- Hearing loss due to loud machinery and blasting operations.
- Risk of falling from height throughout the construction works.



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- Risks and impacts originated from poor management of hazardous and chemical materials.
- Risk of electric shock when working with electricity.
- Risk of electric shock caused by construction machinery coming into contact with power lines.

Community Health, Safety and Security

- Increase of traffic accident risk due to the subproject related activities, resulting in adverse impacts on daily life flow,
- Raising GBVH and SEA/SH due to the increase in regional workforce influx,
- Increased frequency of emergencies due to the subproject related activities,
- Increased risk of exposure to disease due to the increase in regional workforce influx,
- Risks arising from the security personnel attitudes,
- Risk related to explosive use and blasting in the quarries/material borrow sites.

On the other hand, within the scope of the project during the operation phase, repair, maintenance, and housekeeping activities for the roads, along with auxiliary components, will be carried out, as well as landscaping activities within the expropriation corridors of the highways.

The anticipated E&S impacts within the scope of these activities for the operation phase are summarized below:

Land Use and Soil Management

- Landslide, seismicity and geotechnic related risks,
- Soil contamination risk due to spill/leakage resulting from traffic accidents and during the repair/maintenance works and housekeeping of the road pavement and other highway components,
- Soil disturbance and erosion risk due to extreme weather conditions and improperly functioning erosion and sediment control structures.

Noise and Vibration Management

- Increase in noise levels and vibration due to highway traffic and especially in case of insufficient maintenance and repair works of the highways.

Air Quality and GHG Management

- Decrease in air quality due to the emission of gaseous pollutants (NO_x, SO_x, CO, unburned hydrocarbons etc.) resulting from highway traffic,
- Greenhouse gas emissions due to highway traffic.

Water Resources, Water Quality and Wastewater Management

- Increased surface runoff due to impermeable road,
- Contamination of surface waters due to the repair/maintenance/housekeeping operations; accidental spillage of chemicals resulting from traffic/transportation; surface runoff containing routine deposits and spills from the highways.

Resource and Waste Management

- Potential impacts of hazardous and non-hazardous solid wastes generated from maintenance, repair and housekeeping of the highways due to poor waste management, resulting in environmental pollution and occupational and community related health and safety risks.
- Additional load on the waste management facilities around the subproject area in the absence of best management practices and effective waste management.



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Biodiversity Management

- Potential risks on vegetation and biodiversity losses
- Potential risks on introduction of alien invasive species

Socio-economic Environment

- Communication issues with the stakeholders
- Potential impacts due to poor management of Grievance Redress Mechanism

Labor and Working Conditions

- Potential impacts due to poor management of Grievance Redress Mechanism

Occupational Health and Safety

- Risks during maintenance and repair.
- Accidents due to workers not receiving adequate training.
- Risks arising from the lack or improper use of personal protective equipment.
- Health problems caused by vibration from machinery.
- Working difficulties and health risks due to extreme hot, cold, or rainy weather conditions.
- Poisoning, skin irritations, and respiratory problems.
- Animal bites and insect stings.
- Chemical and biological risks that may occur during road cleaning after accidents.
- Risk of slipping and falling due to slippery surfaces or uneven ground.
- Risk of collision and crushing due to vehicle traffic near the work area.

Community Health, Safety and Security

- Communication issues with the stakeholders in case of poor management of stakeholder engagement,
- Risk on traffic, operation safety and pedestrian safety due to highway traffic,
- Increased frequency of emergencies due to highway traffic related issues.

To be able to address E&S issues identified during the ESIA process of the Project (outlined above), and ensure effective management of them together with, ESMPs have been prepared for each sub-project in line with both national legislation, the AIIB ESF and relevant World Bank Group (WBG) Environmental, Health and Safety (EHS) Guidelines. Accordingly, for each environmental and social issues, mitigation measures, monitoring parameters, monitoring locations, monitoring methods, monitoring frequencies, legal requirements, key performance indicators, responsible parties and action specific costs have been specified in Environmental and Social Mitigation and Monitoring Plans for construction and operation phases of the project.

As the project owner, it is the responsibility of KGM to manage the environmental and social issues of the project and to ensure that the necessary mechanisms are developed and implemented by the Contractors. The project will have one Project Implementation Unit (PIU) in Ankara and two Regional Implementation Units (RIUs) within Regional Directorates 5 and 8. The PIU will primarily coordinate project preparation and implementation, while the RIUs will manage day-to-day activities, procurement, supervision, and monitoring specific to their respective subprojects. The PIU established within KGM consists of the Project Director, PIU Head, Environmental and Social Specialist(s), a Procurement Specialist, a Financial Management (FM) Specialist, a Technical Specialist and a Monitoring and Evaluation (M&E) Specialist along with two RIUs.

The KGM RIUs and the Contractors are obliged to carry out the relevant reporting by conducting the monitoring/audit activities required by the Project. Regular internal audits and environmental and social monitoring will be carried out by the Contractors. The Contractors



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will prepare and submit monthly E&S Progress Reports covering the status of the construction activities and relevant E&S issues to the Supervision Consultant, consisting of Environmental and Social Specialists within the body of KGM RIUs. Afterwards, Supervision Consultant will prepare and submit monthly Environmental and Social Monitoring Report including monthly E&S Progress Report prepared by the Contractors to the KGM RIUs. The AIIB team will be informed by the RIUs semi-annually on the progress and updates via Environmental and Social Monitoring Reports during the lifecycle of the Project.



1 INTRODUCTION

The Türkiye Emergency Road Rehabilitation and Reconstruction Project (the Project) has been planned to be prepared and implemented by the General Directorate of Highways (KGM) under the Ministry of Transport and Infrastructure (MoTI) to ensure efficient execution and compliance with national regulations and Asian Infrastructure Investment Bank (AIIB) environmental and social framework.

The Project will rehabilitate and reconstruct roads, tunnels, and bridges damaged by the February 2023 earthquakes that occurred in the southeast of Türkiye. The Project activities will be implemented through five (5) sub-projects which will entail rehabilitation and enhancement of transportation infrastructure to meet required safety and capacity standards, as well as integration of climate-resilient measures to mitigate and withstand the impacts of seismic events in the future. The sub-projects are located within the jurisdictions of the 5th Regional Directorate of Highways (Mersin) and 8th Regional Directorate of Highways (Elazığ).

The Project summary information is provided in Table 1 and the sub-projects that are classified according to related Regional Directorates are given in Table 2.

Table 1. Project Summary Information

Project Name	Türkiye Emergency Road Rehabilitation and Reconstruction Project
Project Number	P000848
Sector/Subsector	Transport/Roads
Borrower	Republic of Türkiye
Project Implementation Agency	Ministry of Transport and Infrastructure, Türkiye
Implementation Period	June 1, 2024 June 1, 2026
Objective	To restore connectivity and enable safe and efficient movements of goods and people by rehabilitating essential transportation infrastructure located in the earthquake affected areas of Türkiye
Environmental and Social (E&S) Risk Category	Category B
Risk	Medium

Table 2. Classification of the Sub-projects

Responsible Regional Directorate	Sub-project No.	Sub-project Name	District/Province
5 th Regional Directorate (Mersin)	P1	<u>Tarsus-Adana-Gaziantep (TAG) Highway Rehabilitation:</u> TAG Highway Aslanlı Tunnel (Km:214+490)-Nurdağı Junction (Km: 223+115) Section, Repair of All Kinds of Damages and Strengthening of Viaducts Against Earthquakes in This Section Construction Work	Nurdağı/Gaziantep
	P2	<u>Hatay Province Roads Rehabilitation and Reconstruction:</u> İslahiye-Hassa-Kırıkhan Road (Km:24+500-84+500), Antakya-Reyhanlı Road (Km:0+000-42+500) Hot Bituminous Mixture Repair Work, Hatay Airport Road Soil Works, Art Structures and Superstructure Construction Work	Hatay



Responsible Regional Directorate	Sub-project No.	Sub-project Name	District/Province
	P3	<u>Antakya-Samandağ Road Reconstruction:</u> Antakya-Samandağ Road (Including Samandağ Crossing) Km: 0+000-26+850 Section Supply Construction Works	Samandağ/Hatay
8 th Regional Directorate (Elazığ)	P4	<u>Erkenek Tunnel Rehabilitation:</u> (Malatya-Akçadağ) Junction - Gölbaşı Road (Construction Works of Erkenek Tunnel Damaged in Earthquake and Erkenek Tunnel-Karanlıkdere Section Damaged in Earthquake)	Doğanşehir/Malatya Gölbaşı/Adıyaman
	P5	<u>Tohma, Ağın and Beylerderesi Bridges Rehabilitation:</u> Repair of Technological Bridges Damaged in Earthquake (Tohma, Ağın, Beylerderesi Bridges Earthquake Damage Repair)	Malatya Elazığ

1.1 Scope and Purpose of the ESIA

This ESIA report serves as a comprehensive document detailing the findings and analysis of the ESIA process and it is crucial for promoting sustainable development by integrating environmental and social considerations into project planning and decision-making processes. This report outlines the extent of the E&S assessments. It provides a detailed examination of potential E&S risks and impacts associated with the project, considering factors such as land use and soil, air quality, noise and vibration, water resources, biodiversity, cultural heritage, community health and safety, occupational health and safety, labor and working conditions, affected stakeholders and livelihoods. The report identifies measures to avoid, minimize, or mitigate adverse impacts, along with plans for monitoring and managing environmental and social risks during project implementation/lifecycle of the project.

The general purposes of the ESIA are summarized as follows:

- The ESIA report provides decision-makers, such as regulatory authorities, project proponents, and investors, with the information needed to make informed decisions regarding project approval, modification, or rejection,
- The report helps to anticipate and mitigate adverse impacts, reducing the likelihood of negative consequences during project implementation by identifying potential environmental and social risks,
- It ensures compliance with environmental and social regulations and standards, both at the national and international levels.
- It promotes transparency by disclosing the environmental and social implications of the proposed project to stakeholders and the public, fostering accountability in project decision-making processes.
- The report supports efforts to address conflicts and build consensus among diverse stakeholders by documenting stakeholder concerns and incorporating feedback into the assessment process.



1.2 Structure of the ESIA Report

The general outlines of the ESIA report covering the important environmental and social issues related to the Project are given in Table 3.

Table 3. Structure of the ESIA Report

Chapter	Name	Description
1	Introduction	Overview of the Project and its objectives
2	Regulatory Framework	Description of the legal and institutional context of the project, international requirements including AIIB requirements, a gap analysis between national legislation and AIIB ESF, along with specifications
3	Project Description	Details of the project design, project activities and components
4	Environmental and Social Baseline, Impact Assessment and Mitigation Measures	Subdivided into various sections addressing different environmental and social aspects such as the physical environment, biological environment, socio-economic environment, and cultural heritage
5	Environmental and Social Management Plan	Identification of the mitigation and management measures and monitoring requirements to ensure effective implementation of the E&S impacts and risk
6	Stakeholder Engagement	Description of the methods and outcomes of engaging with stakeholders
7	Grievance Redress Mechanism	Explanation of the methods to provide affected parties with a means to voice their grievances, seek solutions, and ensure accountability

1.3 Project Deliverables

The phased approach on environmental and social (E&S) assessment will be utilized for the proposed Project given the urgent need of assistance because of the earthquakes. In this context, a contract was signed between 5th Regional Directorate of Highways and Çınar Engineering Consultancy Inc. (ÇINAR) on 14.02.2024 for the preparation of Environmental and Social Documentation in accordance with the AIIB ESF and national legislation. These documents include the followings:

- Environmental and Social Due Diligence (ESDD) including separate Environmental and Social Action Plans (ESAPs) prepared for each sub-project under construction,
- Environmental and Social Impact Assessment (ESIA) Report including Environmental and Social Management Plans (which also cover Management of Change Procedure, Chance Find Procedure and project level Emergency Preparedness and Response Plan) prepared separately for each sub-project, identifying mitigation measures and monitoring requirements for each E&S issues in the subjects of land use and soil; noise and vibration; air quality and greenhouse gas; water resources, water quality and wastewater; resource and waste; cultural heritage; biodiversity; social issues; labor and working conditions; resettlement, land acquisition and livelihood restoration; occupational health and safety; community health, safety and security.



- Project level Stakeholder Engagement Plan (SEP) including sub-project level Grievance Redress Mechanisms (GRMs) and AIIB's Project-affected People's Mechanism (PPM),
- Project level Gender Action Plan (GAP),
- Project level Resettlement Plan (RP).

1.4 ESIA Methodology

The methodology for characterizing the environmental and social risks and impacts resulting from the Project's implementation has been formulated based on the frameworks outlined in relevant UK government publications on Environmental Impact Assessment (Institute of Environmental Management and Assessment- IEMA, 2011: The State of Environmental Impact Assessment Practice in the UK; Highways Agency 205/08: Volume 11, Section 2 Environmental Impact Assessment and Handbook for Scoping Projects: Environmental Impact Assessment), Scottish Natural Heritage's (SNH) Handbook on Environmental Impact Assessment (2013) and other available guidance documents on impact assessment (Canter, 1993; Standards Association of Australia, 1999, etc.).

According to best ESIA practices, the significance of impacts will be assessed by considering **the overall magnitude of the Project's impact on that particular receptor and the sensitivity of the receptor**. The magnitude of the impact will be evaluated utilizing quantitative methods whenever feasible, or alternatively, qualitative approaches primarily relying on professional judgment when quantitative assessment is not feasible. It is important to note that environmental and/or social impacts may vary in their nature, being either beneficial or adverse.

The overall magnitude of impacts will be assessed based on several key components. The magnitude of an impact or effect will be assessed through a comprehensive analysis of criteria, which may include but are not limited to the following:

- Geographical extent (wide, local or restricted)
- Reversibility (long term reversible/irreversible, medium-term reversible or short-term reversible)
- Duration (long term, medium term or short term)
- Frequency (continuous, recurrent, intermittent or one-off/rare)

Criteria for magnitude factors are provided in Table 4.

Table 4. Magnitude Factors and Scales

Factor	Scales		
	High	Medium	Low
Geographical extent	Wide	Local	Restricted
	Beyond the area of influence*	Within the area of influence*	Within the construction site
Reversibility	Long-term reversible / Irreversible	Medium-term reversible	Short-term reversible
	Reversible after the operation period or irreversible	Reversible within the operation period	Reversible within construction period or after one year of construction period
Duration	Long-term	Medium-term	Short-term

Factor	Scales		
	High	Medium	Low
Magnitude	After the operation period	Within the operation period	Within construction period
Frequency	Continuous/Recurrent	Intermittent	One-off/rare

*See Section 1.5

On the other hand, **the sensitivity of the receptor** will be determined based on comprehensive baseline information, taking into account factors such as public interest, designations, legal requirements, acceptability, sustainability, and any other relevant considerations. Additionally, where applicable, consultation with affected communities will be undertaken to ensure a thorough understanding of the sensitivity of the receptors involved.

The general criteria for assessing the sensitivity of the receptor and determining the overall magnitude are outlined in Table 5. Specific assessments and any methodological variations for individual environmental and/or social components are detailed in the relevant chapters of the ESIA Report.

Table 5. General Criteria for Identification of receptor Sensitivity and Impact Magnitude Levels

Level	Receptor Sensitivity	Impact magnitude	
		Adverse	Beneficial
High	Highly important (national and international scale of importance), high rarity, potential for substitution very limited	Loss of resource and/or quality and integrity of resources; severe damage to key characteristics, features or elements.	Large scale or major improvement of resource quality; extensive restoration or enhancement; major improvement of attribute quality.
Medium	Moderately important (regional scale of importance) and moderate rarity, potential for substitution limited	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features and elements	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality.
Low	Minor importance (local scale of importance), not rare	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring.
Negligible	No or very low importance and rarity	No or very minor loss or detrimental alteration to one or more characteristics, features or elements	No or very minor benefit to or positive addition of one or more characteristics, features or elements

Following the identification overall magnitude of an impact on that specific receptor and receptor sensitivity, the significance of the impact will be determined by using a standard matrix style approach, which consists of a 4x4 matrix. The matrix and general descriptions of each significance level identified in the matrix are provided in Table 6.

Table 6. Significance Assessment Matrix

		Receptor Sensitivity			
		High	Medium	Low	Negligible
Overall Magnitude	High				
	Medium				
	Low				
	Negligible				
	Major	Impacts are considered to be very important and are likely to be material in decision-making, which would be associated with sites or features of international, national or regional importance as well as local importance if the site or feature is subject to a major change. Mitigation measures are imperative to reduce the significance to lower levels before proceeding with the Project.			
Moderate	Impacts are not likely to be key decision-making factors. The cumulative impacts of such factors may influence decision-making, if they lead to an increase in the overall adverse impact on a particular receptor. If possible, impact significance are to be reduced to lower levels by taking mitigation measures; otherwise acceptance of associated risks is required for proceeding with the Project.				
Minor	Impacts may be raised as local factors, which are unlikely to be critical in the decision-making process, but important in enhancing the subsequent design of the Project. Assurance of compliance with standards and safety criteria is sufficient to proceed.				
Negligible	No impact or impacts are beneath the level of perception so that they are acceptable with normal operating procedures.				

Source: Adapted from IEMA, 2011; UK HA 205/08 Volume 11, Section 2; Canter, L., 1993; and other impact assessment methodology guidance/handbooks.

1.5 Area of Influence (AoI) and ESIA Study Area

According to the AIIB ESF (2022), the project area of influence (AoI) includes the area likely to be affected by the project, including all its ancillary aspects such as power transmission corridors, pipelines, canals, tunnels, relocation and access roads, borrow and disposal areas, and construction camps. It also includes unplanned developments induced by the project (e.g., spontaneous settlement, logging, or shifting agriculture along access roads).

In consideration of the above definition of the AoI, it is required to conduct ESIA studies in areas that at least cover the AoI. Thus, the overall ESIA study area has been defined to be wide enough to encompass the AoI for each environmental and social impact component.

AoI for each sub-project has been determined as a 250-meter corridor extending each side of the roads undergoing rehabilitation and reconstruction. Furthermore, a 250-meter radius area around the boundaries of each associated and auxiliary facility has also been specified as AoI, covering the construction and accommodation sites, quarries/borrow sites, asphalt plants, concrete plants, mechanical facilities etc. (see Table 15 and Section 4.1.). Specifically, for the biodiversity assessment, 100 m buffer to each research area (100 m for all construction areas and facilities) was considered as the Biodiversity Survey Area (BSA) (see also Appendix-3.3). For the cultural heritage assessment, the area of influence for the cultural heritage was determined as a 2-km corridor extending each side of the roads undergoing rehabilitation and 2-km radius area around the boundaries of each related facility.



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On the other hand, from the social perspective, study area for the assessment of social impacts may be extended up to 5 km, as necessary, to cover affected communities by taking into account the direct and indirect effects of the Project (see Section 4.8.1.1).

1.6 Limitations and Uncertainties

The conditions, limitations and uncertainties affecting the studies and evaluations carried out within the scope of the Environmental and Social Impact Assessment study are as follows:

- After the earthquakes occurred in February 2023, the delay or inability to submit official data and correspondence due to the disruption of requirements within the scope of national legislation, combined with the need to accelerate work due to the emergency situation, caused difficulties in obtaining data.
- The fact that road reconstruction and rehabilitation work has already started in some sub-projects (P1, P2, P3 and P5) has caused the current situation analyses to not reflect the conditions before the intervention.
- Since the P4 sub-project was still at the tender stage and the Contractor has not been assigned yet, difficulties have been experienced in determining the work plan and information on the auxiliary facilities to be used.
- Due to the medium/long-term adverse impacts caused by the devastating earthquakes, the conducted assessments may not reflect the steady state before the earthquake. After the earthquake, a high proportion of the population migrated to Ankara, Kayseri, Niğde, Konya and other provinces from the earthquake provinces. This population still lives in cities outside the earthquake provinces, but population records appear in the provinces within the Project impact area. The population in the project impact area does not currently live in residential buildings. The number of households living temporarily in temporary containers or in houses registered as solid in the area is high. These households will be able to return to their settled lives only when the housing construction and infrastructure works in the entire region are completed.
- The contractors involved in several infrastructure and superstructure reconstruction works at the region other than the sub-projects within the scope of this ESIA, has created a challenge in obtaining specific information for the sub-projects.



2 REGULATORY FRAMEWORK

2.1 National Legislation

Turkish Environmental Law No. 2872, which was issued in the Official Gazette No. 18132 on August 11, 1983, describes the fundamental principles required to protect the environment in accordance with sustainable development and sustainable environmental goals. The Environmental Law provides a legal framework for the development of environmental regulations in accordance with national and international standards.

In addition to Environmental Law and associated regulations, several laws in relation with environmental protection, pollution prevention and control, the human rights and safety are listed in Table 7.

Table 7. Highlighted Laws Covered by National Legislation

Law	Law Number
Agricultural Reform Law on Land Rearrangement in Irrigated Areas	3083
Electricity Market Law	6446
Energy Efficiency Law	5627
Expropriation Law	2942
Forestry Law	6831
Groundwater Law	167
Highway Traffic Law	2918
Labor Law	4857
Law on Conservation of Cultural and Natural Assets	2863
Law on Measures to be taken and Aids to be provided for the Disasters Effective in Public Life	7269
Law on Right to Information	4982
Law on Soil Conservation and Land Use	5403
Mining Law	3213
Municipality Law	5393
National Parks Law	2873
Occupational Health and Safety Law	6331
Pasture Law	4342
Public Health Law	1593
Resettlement Law	5543

Environmental, social and OHS-related regulations that are valid for the project within the above-mentioned laws are listed in Table 8.



Table 8. Prominent Regulations Covered by National Legislation

Regulation Name	Relevance of the legislation with the project	Official Gazette Date	Issue
Environmental Permits and Licenses (General)			
Regulation on Environmental Impact Assessment	Evaluating the activities carried out within the scope of the project, including related and auxiliary facilities, according to the Annex-1 and Annex-2 lists of the Regulation, and obtaining decisions on “EIA Out of Scope” “EIA Not Required” or “EIA Positive”	29.07.2022	31907
Regulation on Environmental Permits and Licenses	Evaluating the activities carried out within the scope of the project, including related and auxiliary facilities, according to the Annex-1 and Annex-2 lists of the Regulation, and obtaining necessary environmental permit(s) on air emissions, wastewater discharge and environmental noise.	10.09.2014	29115
Regulation on Environmental Audit	It covers the procedures and principles regarding environmental inspections and the application of administrative sanctions in accordance with Environmental Law No. 2872, as well as the related works and transactions to be carried out throughout the implementation period of the project.	12.06.2021	31509
Regulation Concerning Environmental Management Services	It explains the procedures and principles regarding the conditions, certification, and obligations of those who will provide environmental management services within the scope of the project.	01.11.2022	32000
Climate Change			
Regulation on Minimization of Ozone Depleting Substances	It determines the procedures and principles regarding the use and termination of substances controlled by the Montreal Protocol on Substances that Deplete the Ozone Layer, to be used within the scope of the project	07.04.2017	30031
Regulation on Monitoring of Greenhouse Gas Emissions	It covers monitoring, reporting, and verification of greenhouse gas emissions arising from activities included in the annexes of the regulation.	17.05.2014	29003
Land Use and Soils			
Regulation on Control of Soil Pollution and Point Source Contaminated Sites	It determines the principles for preventing soil contamination as a receiving environment due to project activities, identifying contaminated or potentially contaminated sites and sectors, and the cleanup and monitoring of contaminated soils and sites in alignment with sustainable development goals.	08.06.2010	27605
Regulation on Protection, Use and Planning of Agricultural Lands	It defines the procedures and principles for ensuring that project activities do not affect agricultural land, preventing misuse, and taking necessary measures in accordance with the principles of sustainable development.	09.12.2017	30265



Regulation Name	Relevance of the legislation with the project	Official Gazette Date	Issue
Regulation on the Implementation of Articles 17 and 18 of the Forest Law No. 6831	It regulates the procedures and processes for obtaining permits and collecting fees related to project activities in forested areas (such as material storage areas) if such activities are conducted.	30.11.2021	31675
Regulation on Land Consolidation and On-farm Development Services Implementation	The procedures and principles for the consolidation of agricultural lands during the expropriation process throughout the project's lifecycle will be applied if such consolidation is required.	07.02.2019	30679
Regulation Concerning the Rehabilitation of the Lands Disturbed by Mining Activities	It defines the procedures and principles for the restoration of the natural environment disturbed by mining activities, excavation, dumping, and waste left in nature for material and soil supply within the scope of the project.	23.01.2010	27471
Regulation on Pastures	It defines the procedures and principles for land use related to project activities planned to be carried out in pasture areas.	31.07.1998	23419
Water			
Regulation on Surface Water Quality	It determines the procedures and principles for monitoring, determining, and classifying the quality and quantity of surface water resources and for the measures to be taken to achieve good water status. Baseline measurements and/or analyses to evaluate the impact of project activities on water resources are carried out within this framework.	30.11.2012	28483
Regulation on Water Pollution Control	In the case of wastewater discharge resulting from project activities (such as effluent from a wastewater treatment plant), it specifies the standards that the discharged water must meet.	31.12.2004	25687
Regulation Concerned Water Intended for Human Consumption	It sets the appropriate quality standards for hygiene and health for mains water or groundwater used as drinking water by employees within the scope of the project.	17.02.2005	25730
Regulation Concerning Protection of Groundwater against Pollution and Deterioration	It establishes the principles for protecting the current state of groundwater from project activities, preventing pollution and degradation, and improving the water quality.	07.04.2012	28257
Regulation on Monitoring of Surface Water and Groundwater	It covers issues related to the monitoring of surface water and groundwater resources affected directly or indirectly by the project activities.	11.02.2014	28910
Regulation on Control of Pollution Caused by Hazardous Substances in and around the Water Bodies	It includes measures to detect, prevent and gradually reduce pollution caused by hazardous substances in water and its surroundings resulting from project activities and associated/auxiliary facilities	26.11.2005	26005



Regulation Name	Relevance of the legislation with the project	Official Gazette Date	Issue
Communique on Sampling of Surface Water, Groundwater and Sediment and Biological Sampling	It explains the requirements for taking samples, transporting, protecting, and storing samples in order to determine the impact of project activities on the aquatic environment (for baseline measurements, periodic monitoring, and measurements to be made in case of any grievances).	21.02.2015	29274
Waste Management			
Regulation on Control of Packaging Wastes	It includes requirements for effective waste management and disposal in line with the waste management hierarchy according to the type of waste generated during the construction and operation periods of the project.	26.06.2021	31523
Regulation on Waste Management		02.04.2015	29314
Regulation on the Control of Excavation Soil, Construction and Demolition Wastes		18.03.2004	25406
Regulation on the Control of Medical Wastes		25.01.2017	29959
Regulation on the Management of Waste Oils		21.12.2019	30985
Regulation on the Control of Vegetable Waste Oils		06.06.2015	29378
Regulation on the Control of Waste Batteries and Accumulators		31.08.2004	25569
Regulation on the Control of End-of-Life Tires		25.11.2006	26357
Regulation on Mining Wastes		15.07.2015	29417
Regulation on the Control of Waste Electrical and Electronic Equipment		26.12.2022	32055
Regulation on the Control of End-of-Life Vehicles		30.12.2009	27448
Regulation on Zero Waste	It contains the principles that must be adopted for the protection of the environment, human health, and all resources in waste management processes in line with the principles of sustainable development throughout the life of the project.	12.07.2019	30829
Regulation on the Landfill of Wastes	It explains the characteristics and requirements of the sanitary landfills to which the waste generated within the scope of the project and that cannot be recycled will be sent	26.03.2010	27533



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Regulation Name	Relevance of the legislation with the project	Official Gazette Date	Issue
Air Quality and Greenhouse Gas Emissions			
Regulation on the Control of Industrial Air Pollution	It covers the examination and determination of the prevention of air pollution resulting from project activities, the limit values that must be maintained in the receiving environments (sensitive receptors), and the flue gas emission limit values originating from associated/auxiliary facilities such as asphalt plants (as fixed emission sources).	03.07.2009	27277
Regulation on the Assessment and Management of Air Quality	It covers the necessary measures to define air quality targets and ensure good air quality in order to prevent or reduce the harmful effects of air pollution resulting from the activities carried out within the scope of the project on the environment and human health.	06.06.2008	26898
Regulation on the Control of Exhaust Gas Emissions	It contains the procedures and principles regarding the protection of living beings and the environment from the effects of air pollution caused by exhaust gases from motor vehicles used in project activities and driving in traffic. It ensures the reduction of exhaust gas pollutants, their control through measurements, and implementation	11.03.2017	30004
Regulation on Monitoring of Greenhouse Gas Emissions	It covers the procedures and principles for monitoring, reporting, and verifying both direct and indirect (due to the supply chain) greenhouse gas emissions arising from project activities, mainly from traffic/transportation and auxiliary/associated facilities.	17.05.2014	29003
Regulation on Increasing Efficiency in the Use of Energy Resources and Energy	It covers the procedures and principles for the effective use of energy during the construction and operation periods of the project, aiming to prevent energy waste, reduce energy costs, and increase efficiency in the use of energy resources to protect the environment.	27.10.2011	28097
Management of Chemicals			
Regulation on Classification, Labelling and Package of Materials and Mixtures	It regulates the administrative and technical procedures and principles for the classification, labeling, and packaging of chemicals and hazardous substances used in the project to ensure a high level of protection for human health and the environment and to facilitate their safe circulation.	11.12.2013	28848
Regulation on Safety Information Forms on Hazardous Substances and Mixtures	It regulates the administrative and technical procedures and principles for the preparation and distribution of safety data sheets to ensure effective control and supervision of the adverse effects that chemicals and hazardous substances used in the project may have on human health and the environment.	13.12.2014	29204



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Regulation Name	Relevance of the legislation with the project	Official Gazette Date	Issue
Regulation Regarding Prevention of Major Industrial Accidents and Mitigation of Their Effects ("BEKRA")	It determines the procedures and principles for measures to ensure a high level of effective and continuous protection against major industrial accidents in related and auxiliary facilities containing hazardous substances, and to minimize the potential damage to people and the environment.	02.03.2019	30702
Regulation Regarding Transport of Hazardous Materials on Highways	It defines the necessary procedures and principles for carrying out hazardous material transportation on public roads within the scope of the project in a safe, secure, and orderly manner, without harming human health, other living beings, or the environment.	18.06.2022	31870
Community and Occupational Health and Safety and Labor and Working Conditions			
Regulation on Occupational Health and Safety Risk Assessment	It regulates the procedures and principles for conducting risk assessments related to occupational health and safety in the project's activity areas, including related and auxiliary facilities.	29.12.2012	28512
Regulation on Occupational Health and Safety Services	It regulates the authorization of joint health and safety units for providing occupational health and safety services within the scope of the project, including the issuance and cancellation of authorization certificates, as well as their duties, powers, responsibilities, and working procedures.	29.12.2012	28512
Regulation on Duties, Authority, Responsibilities and Trainings of Occupational Health and Safety Specialists	It regulates the qualifications, training, and certification of occupational safety experts, as well as their duties, powers, responsibilities, and working procedures for the occupational health and safety services to be received within the project.	29.12.2012	28512
Regulation on Procedures and Principles of Occupational Health and Safety Training of Employees	It regulates the procedures and principles for providing occupational health and safety training to employees within the scope of the project.	15.05.2013	28648
Regulation on the Occupational Health and Safety Committees	It determines the working procedures and principles for occupational health and safety committees in workplaces with fifty or more employees where continuous work lasts more than six months.	18.01.2013	28532
Regulation on the Health and Safety Measures to be taken in Workplace Buildings and Additions	It specifies the minimum health and safety conditions for workplace buildings and extensions used in the project.	17.07.2013	28710
Regulation on Protection of Buildings from Fire	It defines the procedures and principles for measures, organization, training, and inspection before and during a fire in areas where project activities are conducted.	19.12.2007	26735



Regulation Name	Relevance of the legislation with the project	Official Gazette Date	Issue
Regulation on the Emergency Cases in Workplaces	It regulates the procedures and principles for preparing emergency plans in workplaces used for the project, covering prevention, protection, evacuation, fire fighting, first aid, and similar issues, as well as the safe management of these situations and the assignment of responsible employees.	18.06.2013	28681
First Aid Regulation	It regulates the procedures and principles for reducing the risk of death and injury due to accidents by ensuring the presence of first aiders based on the number of personnel in the project facilities; it also covers the establishment, operation, and inspection of centers for first aid instructor training, first aid training, and the certification of first aiders.	29.07.2015	29429
Regulation on Protection of Workers from Dangers of Explosive Environments	It regulates the procedures and principles for measures to protect employees from the health and safety risks of explosive atmospheres in the workplaces (such as quarries/borrow sites).	30.04.2013	28633
Communique on Hazard Classes List related to Occupational Health and Safety	It determines the hazard classes of workplaces used in the project for occupational health and safety purposes.	26.12.2012	28509
Regulation Concerning the Protection of Workers from Risks Associated with Noise	It defines the minimum requirements to protect employees from health and safety risks resulting from exposure to noise in the project's activity areas, particularly hearing-related risks.	28.07.2013	28721
Regulation Concerning the Protection of Workers from Risks Associated with Vibration	It establishes the minimum requirements for protecting employees from health and safety risks resulting from exposure to mechanical vibration within the scope of the project.	22.08.2013	28743
Regulation on Health and Safety Conditions in the Use of Work Equipment	It defines the minimum health and safety requirements for the use of work equipment in workplaces used for the project.	25.04.2013	28628
Regulation on Occupational Health and Safety in Construction Works	It defines the minimum occupational health and safety requirements for construction work within the scope of the project	05.10.2013	28786
Regulation on Health and Safety Regarding Temporary and Time Limited Works	It ensures that employees on temporary or fixed-term contracts within the scope of the project are provided with the same level of health and safety protection as other employees in the workplaces.	23.08.2013	28744
Regulation on Health and Safety Precautions Regarding Working with Chemicals	It defines the minimum requirements for protecting employees' health and ensuring a safe working environment from existing or potential risks arising from chemicals present, used, or processed in workplaces within the scope of the project.	12.08.2013	28733



Regulation Name	Relevance of the legislation with the project	Official Gazette Date	Issue
Regulation on Health and Safety Signs	It defines the minimum requirements for the implementation of health and safety signs to be used in workplaces.	11.09.2013	28762
Regulation on Dust Management	It defines the procedures and principles for dust control in workplaces used within the scope of the project to prevent risks arising from dust and ensure the protection of workers from its effects.	05.11.2013	28812
Regulation on Personal Protection Equipment	It defines the procedures and principles regarding the requirements for the PPEs purchased and used within the scope of the project.	01.05.2019	30761
Regulation on Usage of Personal Protective Equipment in Workplaces	It determines the procedures and principles regarding the features, supply, use, and other matters related to personal protective equipment to be used to prevent or adequately reduce risks in the workplaces within the scope of the project.	02.07.2013	28695
Regulation on Vocational Training of the Employees Working in Dangerous and Highly Dangerous Workplaces	It regulates the procedures and principles for the vocational training of employees in hazardous and very hazardous works within the scope of the project.	13.07.2013	28706
Act on the Procedures and Principles on Manufacture, Import, Transportation, Storing, Sales, Usage, Disposal and Control of Explosive Materials, Hunting Equipment and Similar Exempted from Monopoly	It contains the procedures and principles to be followed in quarries and borrow sites where blasting is carried out.	29.09.1987	19589
Noise			
Regulation on Environmental Noise Control	It covers the procedures and principles for controlling environmental noise and vibration originated from project activities to prevent their adverse effects on the environment and human health, and includes the limit values that must be met in receiving environments.	30.11.2022	32029
Regulation on Environmental Noise Emission Caused by Equipment Used Outdoors	It establishes the procedures and principles for the application of noise emission standards for equipment used in open areas within the scope of the project, including the collection of technical documents and information, compliance assessment procedures, and labeling.	30.12.2006	26392
Social			
Regulation on Implementation of Resettlement Law	It defines the procedures and principles for the implementation and supervision of the Resettlement Law, which regulates the settlement activities for immigrants, nomads, and those whose lands have been expropriated, as well as the requirements and measures for physical settlement arrangements in	02.12.2007	26718



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Regulation Name	Relevance of the legislation with the project	Official Gazette Date	Issue
	villages and the rights and obligations of the resettled individuals (valid for the land acquisition and expropriation process within the scope of the project).		
Regulation on the Implementation of Law Concerning Private Security Services	It establishes the procedures and principles for the requirements of private security services to be procured within the scope of the project.	07.10.2004	25606
Biodiversity			
Regulation on the Protection of Wetlands	It defines the procedures and principles for the protection, management, and development of wetlands within the project's area of influence.	04.04.2014	28962
Regulation on Wildlife Preservation and Wildlife Development Areas	It includes the procedures and principles for permitted and prohibited activities in wildlife preservation and wildlife development areas within the project's area of influence.	08.11.2004	25637
Others			
Regulation on Traffic in Highway	It covers measures to ensure traffic order on highways within the scope of the project's activities and addresses all issues related to traffic safety for people and property.	18.07.1997	23053
Regulation on Opening a Business and Working Licenses	It regulates the principles and procedures for issuing business opening and working licenses for the workplaces used in the project activities.	10.08.2005	25902
Regulation on Permits for Mining Activities	It regulates the principles and procedures for carrying out mining activities at quarries/borrow sites used in the project and the procedures for granting permits.	21.06.2005	25852



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2.1.1 Environmental Impact Assessment under the National Legislation

An EIA is a systematic approach to figure out the favorable and adverse impacts/risks of a defined project on the environment. This process is not a decision-making process in itself; it is a process that progresses in parallel with the decision-making process and acts as a supporting mechanism. It is the analysis and assessment of environmental impacts resulting from new projects and developments, including the social consequences and alternative solutions of all direct or indirect, permanent, or transient potential impacts.

EIA studies have been granted legal status through Article 10 of the Environmental Law No. 2872, which was published in the Official Gazette dated 11/8/1983 and numbered 18132 in our country. On 7 February 1993, the EIA Regulation was put into force and has undergone amendments many times to date, and it has been completely amended 8 times in total, all aimed at aligning with the European Union (EU) Legislation and the EU EIA Directive for harmonization purposes. Currently, the Environmental Impact Assessment Regulation, published in the Official Gazette dated 29/07/2022 and numbered 31907, is in force.

With the introduction of the online EIA Process Management System known as “e-çed”, institutions and organizations authorized by the MoEUCC can now submit EIA applications through this digital platform.

The EIA process consists of three phases:

- i. Environmental baseline studies
- ii. EIA Studies
- iii. Establishment of environmental and social management plans and monitoring activities

EIA studies will commence following environmental baseline studies. These baseline studies involve the following steps.

- Identifying facilities and settlements within the project area,
- Assessing existing environmental conditions,
- Determination of the methods and means for the determination of environmental impacts, determination of possible environmental (direct and indirect) impacts,
- Setting standards related to environmental impacts and determination of future distribution (investment and operation periods),
- Determination of analysis criteria in terms of quantity and quality,
- Determining and examining the existing transportation system,
- Taking the necessary images both in the project area and the environment in the field with the digital camera,
- Identifying and investigation of the nearest protected areas and sensitive ecosystems to the project area. In the case of presence of National Parks, Nature Parks, Wetlands Wildlife Protection Areas. Natural Heritage, Nature Conservation Areas, Reserve Areas. Biogenetic Reserves, Natural Sites and Monuments, Biosphere Archaeological, Historical, Cultural Mass, Special Environmental Protection Areas Special Protected Areas, Tourism Documents etc. in the activity area, further study should be done in this regard.

In Türkiye, the procedures for EIA studies differ based on whether the projects are listed in Annex I or Annex II of the EIA Regulation. For activities in the Annex-I list, an EIA Report is prepared. For activities in the Annex-II list, a Project Introduction File (PIF) is compiled.

A summarized representation of the EIA process in Türkiye is provided in Figure 1.



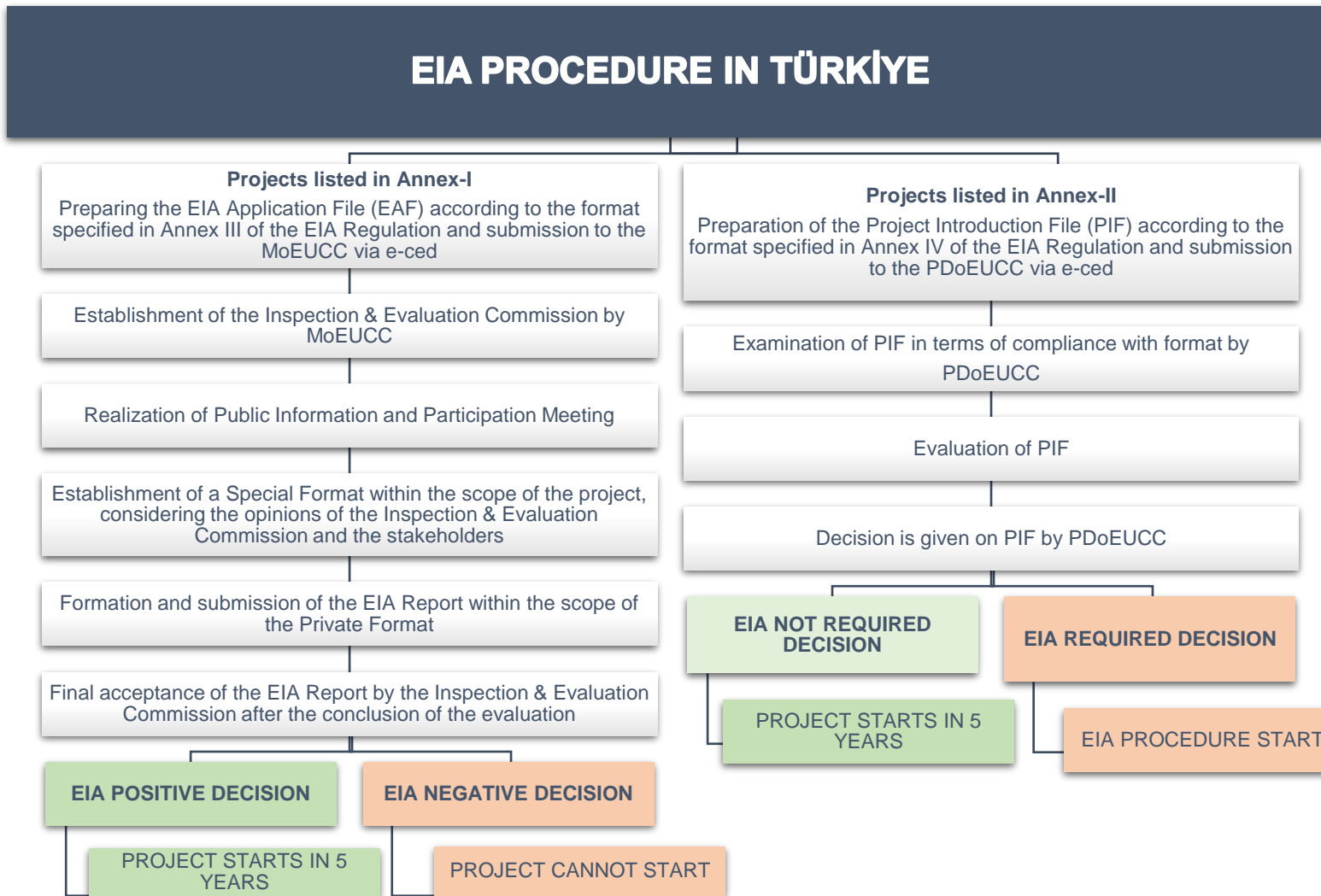


Figure 1. EIA Process in Türkiye

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According to the current EIA Regulation, the categorization of highway projects is specified as follows:

- Full EIA process is required for the following Annex-1 activity:
 - Highways and state roads (Article 9-c).
- Preparation of Project Introduction File is required to be conducted for the following Annex-2 activities:
 - Provincial roads and ring roads (except neighborhood and village roads) (Article 28-d),
 - Adding tunnels to highways and railways (Article 28-e).

In addition, under the “Extraordinary situations and special provisions” part within the scope of Article 24 in the EIA Regulation, the method for the EIA process to be applied for the following projects is determined by the MoEUCC:

- Projects involving the transformation of disaster-prone areas, reconstruction of investments destroyed or damaged by natural disasters, and urgent environmental pollution prevention projects necessitated by disasters, accidents, or similar emergencies.
- Projects encompassing modifications to those listed in Annex-1 or Annex-2, without a threshold value.

Moreover, under the “Projects that are entitled to exemption by law” part within the scope of Provisional Article 2, the following projects are exempt from the provisions of the EIA Regulation.

- Projects documented to have commenced production and/or operation before the publication date of the repealed Environmental Impact Assessment Regulation, published in the Official Gazette dated 7/2/1993 and numbered 21489.
- Projects included in the public investment program before 23/6/1997 and that commenced production or operation as of 29/5/2013, along with the structures and facilities necessary for their implementation.

On the other hand, below are the activities of the planned facilities within the project scope that fall under the EIA Regulation.

For Quarries/borrow sites:

- Within the scope of mining projects, open mines are planned for land surfaces of 25 hectares and above, including excavation and dumping areas (Article 25-a in the Annex-1 list)
- Extraction of minerals within the scope of mining projects (those not included in the Annex-1 list) (Article 45-a in the Annex-2 list)
- Facilities that carry out at least one of the crushing, screening, washing, drying, or ore preparation processes within the scope of mining projects (Article 45-e in the Annex-2 list)

For asphalt plants:

- Asphalt plant facilities (Article 22 in the Annex-2 list)

For concrete plants & deep soil mixing:

- Ready-mixed concrete facilities with a production capacity of 100 m³/hour or more (Article 18-b in the Annex-2 list)
- Facilities with a production capacity of 5 tons/hour and above, producing shaped materials using cement or other binding materials (Article 18-c in the Annex-2 list)



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Within the scope of the Türkiye Emergency Road Rehabilitation and Reconstruction Project, the EIA process carried out for the sub-projects is summarized below and the EIA decisions are provided in Appendix-2.1.

- For the İslahiye-Hassa-Kırıkhan Road, as per the official letters from Hatay Provincial Directorate of EUCC (dated 7.12.2023 and numbered E-26634441-220.03-8142460) and Gaziantep Provincial Directorate of EUCC (numbered E-46818599-000-8190252), the activities to be carried out within the scope the sub-project were determined as "EIA out of scope".
- For Hatay Airport Road, the decision "EIA out of scope" was made by Hatay Provincial Directorate of EUCC, dated 7.12.2023 and numbered E-26634441-220.03-8141979.
- For Antakya-Reyhanlı Road, the "EIA is out of scope" decision was made by Hatay Provincial Directorate of EUCC within the scope of the official letter dated 07.12.2023.
- For Antakya-Samandağ Road, as per the official letter from Hatay Provincial Directorate of EUCC, dated 18.12.2023 and numbered E-26634441-611.02-8160875, the "EIA is out of scope" decision was made.
- For TAG Highway-Aslanlı Tunnel-Nurdağı Junction Road, the sub-project was considered exempt from the EIA Regulation as per the official letter from Gaziantep Provincial Directorate of EUCC, dated 05.01.2024 and numbered E-46818599-220.03-8417181.
- For Beylerderesi Bridge, as per the official letter from Malatya Provincial Directorate of EUCC, dated 21.12.2023 and numbered E-90215094-220.99-8285690, the sub-project is exempt from the EIA.
- For Tohma Bridge, as per the official letter from Malatya Provincial Directorate of EUCC, dated 15.12.2023 and numbered E-90215094-220.03-8235886, the sub-project is out of scope in accordance with the national EIA Regulation.
- For Ağın Bridge, as per the official letter from Elazığ Provincial Directorate of EUCC, dated 14.12.2023 and numbered E-14698725-220.03-8216290, maintenance, repair and renovation operations of the Ağın Bridge were evaluated as out of scope since they are not included in the EIA Regulation Lists.
- For Erkenek Tunnel, the sub-project was considered exempt from the EIA Regulation (within the framework of the 2nd paragraph of the provisional article 2) as per the official letter from Malatya Provincial Directorate of EUCC, numbered E-90215094-220.99-8286086.

On the other hand, the EIA decisions/institutional opinions for the related and auxiliary facilities (such as quarries/material borrow sites, concrete plants, asphalt plants, crusher/crushing and screening facilities/mechanical facilities, etc.) that have been obtained so far and have deficiencies are summarized in Table 9.



Table 9. EIA Decisions/Institutional Opinions for the Related and Auxiliary Facilities

Sub-project Name	Location	Related and Auxiliary Facilities	EIA Decision/Opinion
Tarsus-Adana-Gaziantep (TAG) Highway Rehabilitation (P1)	Ceyhan Construction and Accommodation Site	<ul style="list-style-type: none"> ▪ Asphalt plant with a capacity of 320 tons/hour (Hot Bituminous Mixture production) ▪ Biological package WWTP with 20 m³/day capacity 	<ul style="list-style-type: none"> ▪ "EIA Not Required Decision" issued by Adana Provincial Directorate of Environment and Urbanization, dated 27.02.2020 with decision number of 90438820 220-02 E-202097-1186 for asphalt plant facility. ▪ The WWTP project approval letter is available, dated 25.06.2022 and numbered 79694804-110.03.03-E.17593, issued by Adana Provincial Directorate of Environment and Urbanization. Beside, the identity certificate of the WWTP also exists.
Tarsus-Adana-Gaziantep (TAG) Highway Rehabilitation (P1)	Bahçe (Ayran) Concrete Plant	<ul style="list-style-type: none"> ▪ Concrete Plant with a capacity of 90 m³/hour 	<ul style="list-style-type: none"> ▪ The "EIA Out of Scope" decision was made by the Osmaniye Provincial Directorate of EUCC with the letter dated 04.03.2024 and numbered E-51765934-220.03-8941680.
Tarsus-Adana-Gaziantep (TAG) Highway Rehabilitation (P1)	Tatarlı Basalt Quarry	<ul style="list-style-type: none"> ▪ Mechanical plant/crusher with a capacity of 500 tons/hour 	<ul style="list-style-type: none"> ▪ Facility activities were evaluated as 'out of scope' in accordance with (repealed) Provisional Article 3 of the EIA Regulation No. 29186 dated 25.11.2014, as per the official letter from the Adana Provincial Directorate, dated 13.07.2020, numbered 90438820-220.03-E.19946.
Tarsus-Adana-Gaziantep (TAG) Highway Rehabilitation (P1)	Başpınar Limestone Quarry	<ul style="list-style-type: none"> ▪ Only material extraction will be conducted. ▪ 1,200,000 tons of limestone will be produced annually. Work will be conducted in the quarry for a duration of 24 months, with 96 explosions per year. 	<ul style="list-style-type: none"> ▪ Facility activities were evaluated as 'out of scope' in accordance with (repealed) Article 24 (Extraordinary Situations and Special Provisions) and Provisional Article 2 of the EIA Regulation No. 31907 dated 29.07.2022, as per the official letter from the MoEUCC, dated 08.02.2024 and numbered E-14108550-220.01-8709304.
Hatay Province Roads Rehabilitation and Reconstruction (P2)	Kızılkaya Construction and Accommodation Site	<ul style="list-style-type: none"> ▪ Crushing and Screening Facility 	<ul style="list-style-type: none"> ▪ The decision of 'EIA is not required' for the addition of a crushing and screening facility to the existing facility was given by the Hatay Provincial Directorate of EUCC on 02.03.2024. ▪ This EIA opinion also covers the construction and accommodation site.
Hatay Province Roads Rehabilitation and Reconstruction (P2)	Kızılkaya Quarry	<ul style="list-style-type: none"> ▪ Asphalt Plant 768,000 tons/year ▪ Crusher with a capacity of 390,000 tons/year 	<ul style="list-style-type: none"> ▪ There is an "EIA out of scope" decision for the quarry dated 13.07.2007 and numbered 6400-190-2042 obtained from Hatay Provincial Environment and Forestry Directorate. ▪ For the Asphalt Plant Facility, the "EIA is not Required" decision was obtained by the Contractor (FEZA) from Hatay Provincial Directorate of Environment and Urbanization on 29.01.2018.

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Sub-project Name	Location	Related and Auxiliary Facilities	EIA Decision/Opinion
			<ul style="list-style-type: none"> ▪ The decision of 'EIA is not required' for the addition of a crushing and screening facility to the existing facility was given by the Hatay Provincial Directorate of EUCC on 02.03.2024.
Hatay Province Roads Rehabilitation and Reconstruction (P2)	Antakya-Reyhanlı Road near the Demirköprü bridge	<ul style="list-style-type: none"> ▪ Concrete plant with a capacity of 50 m³/hour 	<ul style="list-style-type: none"> ▪ Since the concrete plant capacity is below the limit (100 m³/hour) value specified in the EIA Regulation lists, it is considered out of scope for EIA.
Antakya-Samandağ Road Reconstruction (P3)	Kuruyer Construction and Accommodation Site	<ul style="list-style-type: none"> ▪ Concrete plant capacity: 95 m³/h (constructed) ▪ Asphalt plant capacity: 240 tons/h (constructed) ▪ Mechanical plant capacity: 400 ton/h (planned) 	<ul style="list-style-type: none"> ▪ There is an "EIA is out of scope" decision dated 01.03.2024 and numbered E-26634441-220.03-8932722, received from Hatay Provincial Directorate of EUCC for the concrete plant. ▪ The "EIA Not Required" decision for the asphalt plant was obtained by the Contractor (DEHA) from Hatay Provincial Directorate of EUCC on 06.06.2024. ▪ The EIA opinion for the mechanical plant has not yet been obtained. The EIA opinion must be obtained if the mechanical plant will be established.
Antakya-Samandağ Road Reconstruction (P3)	Kuruyer Limestone Quarries	<ul style="list-style-type: none"> ▪ One part of the quarries was allocated to the Contractor (DEHA) by 5th Regional Directorate of Highways. ▪ In the current situation, the Contractor (DEHA) is not planning to operate the quarry. They will purchase aggregate from other companies operating in Kuruyer Limestone Quarries. 	<ul style="list-style-type: none"> ▪ There is an "EIA Not Required" decision taken by 5th Regional Directorate of Highways dated 08.11.2023 for the Limestone Quarry and Crushing Screening Facilities project, which is permitted on a 24.91-hectare area for raw material production with permit certificate of 31/2023-09 (ER: 3480631).
Erkenek Tunnel Rehabilitation (including Malatya-Akçadağ-Gölbaşı Road) (P4)	Reşadiye Limestone Quarry	<ul style="list-style-type: none"> ▪ Concrete plant capacity: 200 m³/h (planned) ▪ Crusher with a capacity of 300 ton/h (planned) ▪ Mechanical plant capacity: 400-600 ton/h (planned) 	<ul style="list-style-type: none"> ▪ Necessary procedures/transactions will be initiated after the tender process.



2.1.2 Project-Related Licenses, Permits and Approvals

The essential environmental permits and/or licenses required for the Project considering reconstruction and rehabilitation activities of the existing roads, bridges and viaducts and relevant facilities including construction and accommodation sites, quarries/borrow sites, material storage areas along with temporary facilities such as concrete plants, asphalt plants, mechanical plants and crushing and screening facilities are listed in Table 10.

Table 10. Essential Environmental Permits and/or Licenses

Issue	Related Permit, License or Approval	Relevant Legislation
Land Use	Permit for the use of agricultural lands for non-agricultural purposes	Law on Soil Protection and Land Use (Law No: 5403)
	Soil Protection Project Approval	Law on Soil Protection and Land Use (Law No: 5403) Regulation on the Application of the Law on Soil Protection and Land Use By-law on the Use, Protection and Consolidation of Agricultural Lands
	Permit for the use of pasturelands (change of the allocation purpose)	Pasture Law (Law No: 4342)
	Land use agreements with state authorities for state owned lands	Laws and regulations relevant to the specific land use type in question
	Approval of Expropriation Plans	Expropriation Law (Law No: 2942)
Construction and Accommodation Sites	Permits, approvals and institutional opinions required for crossing roads, railroads, water bodies, canals, power supply lines, pipelines, protected areas etc.	Turkish Electricity Transmission Company (TEİAŞ) Petroleum Pipeline Company (BOTAŞ) Cultural Heritage Preservation Regional Board Directorate and/or Relevant Provincial Directorate of Culture and Tourism General Directorate of State Hydraulic Works Turkish State Railways General Directorate of Nature Conservation and National Parks (or Relevant Regional Directorates of the Ministry of Agriculture and Forestry)
	Workplace notification for camp sites	Regulation on Opening a Business and Working Licenses
	Permit for fuel storage	Regulation on Environmental Permit and License
	Environmental permit for concrete plants	Regulation on Environmental Permit and License
	Environmental permit for asphalt plants	Regulation on Environmental Permit and License
	Environmental permit for mechanical plant/crusher	Regulation on Environmental Permit and License



Issue	Related Permit, License or Approval	Relevant Legislation
	Environmental permit for the operation of package WWTP	Regulation on Environmental Permit and License
	Groundwater Usage	Law on Groundwater Resources
	Approval for industrial waste management plans	Waste Management Regulation
	Agreements made with licensed waste management and disposal companies	Waste Management Regulation
	Wastewater treatment plant identity	Water Pollution Control Regulation
	Permit for private security	Regulation on the Implementation of the Law Concerning Private Security Services
Quarries and Borrow Sites	Raw material production license	Mining Law Regulation on Permits for Mining Activities
	Certificate for starting up and operating a workplace	Regulation on Opening a Business and Working Licenses
	EIA Decision for the quarries and material borrow sites	EIA Regulation
	Blasting Permit	Regulation on Environmental Impact Assessment
	Health Protection Strip	Regulation on Opening a Business and Working Licenses
	Groundwater Usage	Law on Groundwater Resources
	Approval for industrial waste management plans	Waste Management Regulation
	Agreements made with licensed waste management and disposal companies	Waste Management Regulation
	Environmental permit for concrete plants	Regulation on Environmental Permit and License
	Environmental permit for asphalt plants	Regulation on Environmental Permit and License
	Environmental permit for mechanical plant/crusher	Regulation on Environmental Permit and License
	Permit for fuel storage	Regulation on Environmental Permit and License
	Permit for private security	Regulation on the Implementation of the Law Concerning Private Security Services

On the other hand, the environmental permits/institutional opinions for the related and auxiliary facilities (such as quarries/material borrow sites, concrete plants, asphalt plants, crusher/crushing and screening facilities/mechanical facilities, etc.) that have been obtained so far and have deficiencies are summarized in Table 11.



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Table 11. Permits/Institutional Opinions for the Related and Auxiliary Facilities

Sub-project Name	Location	Related and Auxiliary Facilities	Environmental Permit Status
Tarsus-Adana-Gaziantep (TAG) Highway Rehabilitation (P1)	Ceyhan Construction and Accommodation Site	<ul style="list-style-type: none"> ▪ Asphalt plant with a capacity of 320 tons/hour (Hot Bituminous Mixture production) ▪ Biological package WWTP with 20 m³/day capacity 	<ul style="list-style-type: none"> ▪ Environmental Permit Certificate which is valid until 12.10.2026, was issued by Adana Provincial Directorate of Environment and Urbanization, dated 13.10.2021 with document number of 288804714.0.1 on air emission (for the asphalt plant) and wastewater discharge (for the package WWTP) on behalf of the Contractor (SNH).
Tarsus-Adana-Gaziantep (TAG) Highway Rehabilitation (P1)	Bahçe (Ayran) Concrete Plant	<ul style="list-style-type: none"> ▪ Concrete Plant with a capacity of 90 m³/hour 	<ul style="list-style-type: none"> ▪ It was stated by the Contractor (SNH) that the environmental permit process is continuing (in the process of applying for a temporary activity certificate). The facility should not be operated until obtaining the temporary activity certificate.
Tarsus-Adana-Gaziantep (TAG) Highway Rehabilitation (P1)	Tatarlı Basalt Quarry	<ul style="list-style-type: none"> ▪ Mechanical plant/crusher with a capacity of 500 tons/hour 	<ul style="list-style-type: none"> ▪ Environmental Permit certificate or exemption letter issued by Adana Provincial Directorate of EUCC has not been shared. It has been stated that environmental permit process will be initiated following the completion of the physical deficiencies.
Tarsus-Adana-Gaziantep (TAG) Highway Rehabilitation (P1)	Başpınar Limestone Quarry	<ul style="list-style-type: none"> ▪ Only material extraction will be conducted. ▪ 1,200,000 tons of limestone will be produced annually. Work will be conducted in the quarry for a duration of 24 months, with 96 explosions per year. 	<ul style="list-style-type: none"> ▪ Environmental Permit certificate or exemption letter issued by Gaziantep Provincial Directorate of EUCC has not been shared. It has been declared that since no activity is currently being carried out in the Başpınar Quarry, no process has been initiated for an environmental permit. Before starting activities, a decision related to the environmental permit must be obtained from the Provincial Directorate of EUCC, and the necessary requirements must be fulfilled.
Hatay Province Roads Rehabilitation and Reconstruction (P2)	Kızılkaya Construction and Accommodation Site	<ul style="list-style-type: none"> ▪ Crushing and Screening Facility 	N/A
Hatay Province Roads Rehabilitation and Reconstruction (P2)	Kızılkaya Quarry	<ul style="list-style-type: none"> ▪ Asphalt Plant 768,000 tons/year ▪ Crusher with a capacity of 390,000 tons/year 	<ul style="list-style-type: none"> ▪ There is an environmental permit for the asphalt plant obtained by the Contractor (FEZA) on air emission issued by Hatay Provincial Directorate of EUCC, valid until 11.09.2028. ▪ 5th Regional Directorate of Highways has a raw material production permit numbered 31/2006-11 (ER:3119679) in an area of 17.19 hectares. ▪ The Contractor (FEZA) has a blasting permit obtained from Hatay Governorship for this quarry. ▪ It was stated by the Contractor (FEZA) that the environmental permit will be renewed to include quarry and crusher once the capacity report is obtained.



Sub-project Name	Location	Related and Auxiliary Facilities	Environmental Permit Status
Hatay Province Roads Rehabilitation and Reconstruction (P2)	Antakya-Reyhanlı Road near the Demirköprü bridge	<ul style="list-style-type: none"> ▪ Concrete plant with a capacity of 50 m³/hour 	<ul style="list-style-type: none"> ▪ The environmental permit for the concrete plant within the scope of Regulation on Environmental Permit and License has not been obtained by the Contractor (FEZA) yet.
Antakya-Samandağ Road Reconstruction (P3)	Kuruyer Construction and Accommodation Site	<ul style="list-style-type: none"> ▪ Concrete plant capacity: 95 m³/h (constructed) ▪ Asphalt plant capacity: 240 tons/h (constructed) ▪ Mechanical plant capacity: 400 ton/h (planned) 	<ul style="list-style-type: none"> ▪ The environmental permit process must be initiated before the asphalt plant, concrete plant and mechanical plant become operational.
Antakya-Samandağ Road Reconstruction (P3)	Kuruyer Limestone Quarries	<ul style="list-style-type: none"> ▪ One part of the quarries was allocated to the Contractor (DEHA) by 5th Regional Directorate of Highways. ▪ In the current situation, the Contractor (DEHA) is not planning to operate the quarry. They will purchase aggregate from other companies operating in Kuruyer Limestone Quarries. 	<ul style="list-style-type: none"> ▪ It should be checked by the Contractor (DEHA) before the aggregate purchase that the required permits for the quarries and crushing & screening facilities have been obtained by the companies which are operating the related facilities.
Erkenek Tunnel Rehabilitation (including Malatya-Akçadağ-Gölbaşı Road) (P4)	Reşadiye Limestone Quarry	<ul style="list-style-type: none"> ▪ Concrete plant capacity: 200 m³/h (planned) ▪ Crusher with a capacity of 300 ton/h (planned) ▪ Mechanical plant capacity: 400-600 ton/h (planned) 	<ul style="list-style-type: none"> ▪ Necessary procedures/transactions will be initiated after the tender process.

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2.2 International Standards

2.2.1 AIIB's Environmental and Social Framework

AIIB is a multilateral financial institution, whose purpose, as set out in its Articles of Agreement (Articles), is to: (a) foster sustainable economic development, create wealth and improve infrastructure connectivity in Asia, by investing in infrastructure and other productive sectors; and (b) promote regional cooperation and partnership in addressing development challenges by working in close collaboration with other multilateral and bilateral development institutions.

The Articles require the AIIB's operations to comply with policies addressing environmental and social impacts, among other policies. The Environmental and Social Framework (ESF) incorporates AIIB's policy addressing environmental and social impacts. The ESF amended in November 2022, replaces the May 2021 ESF and entered into effect on November 22, 2022.

The Environmental and Social Policy (ESP) of AIIB comprises mandatory environmental and social requirements for each Project and is accompanied by (a) three associated mandatory Environmental and Social Standards (ESSs) setting out requirements applicable to Clients on; and (b) an Environmental and Social Exclusion List (ESEL) which sets forth activities and items that are excluded from financing by AIIB and that the Client is required to exclude from the Project.

The ESSs cover the following:

- ESS 1: Environmental and Social Assessment and Management,
- ESS 2: Land Acquisition and Involuntary Resettlement, and
- ESS 3: Indigenous Peoples.

ESS 1 (Environmental and Social Assessment and Management): When the Bank, AIIB, has determined, in consultation with the Client, that the Project is likely to have adverse environmental and/or social risks and impacts, it requires the Client to conduct an environmental and social assessment relating to these risks and impacts, and design appropriate measures to avoid, minimize, mitigate, offset or compensate for them, all as required under ESS 1.

The objective of ESS 1 is to achieve the environmental and social soundness and sustainability of Projects and to support the integration of environmental and social considerations into the Project decision-making process and implementation.

ESS 1 applies if the Project is likely to have adverse environmental risks and impacts or social risks and impacts (or both). The scope of the environmental and social assessment and management measures are proportional to the risks and impacts of the Project. ESS 1 provides both for quality environmental and social assessment and for management of risks and impacts through effective mitigation and monitoring measures during the course of Project implementation.

ESS 2 (Land Acquisition and Involuntary Resettlement): If the Project is likely to involve Involuntary Resettlement the Bank requires the Client to address this in the social section of the assessment report, complemented by more in-depth coverage, as required under ESS 2. The Client covers this in a plan or framework, as applicable, which may be called a land acquisition and resettlement plan, land acquisition plan or resettlement plan (LARP/LAP/RP) or, in the case of a framework, a land acquisition and resettlement planning framework, land acquisition planning framework or resettlement planning framework (LARPF/LAPF/RPF). This plan or framework is provided to the Bank as a freestanding document, an annex to the assessment report, or incorporated as a recognizable element of the report.



The objectives of ESS 2 are: (a) to avoid Involuntary Resettlement wherever feasible; (b) to minimize Involuntary Resettlement by exploring Project alternatives; (c) where avoidance of Involuntary Resettlement is not feasible, to enhance, or at least restore, the livelihoods of all displaced persons in real terms relative to pre-Project levels and to provide resettlement assistance; (d) to understand and address gender-related risks and differential impacts of Involuntary Resettlement; (e) to improve the overall socioeconomic status of the displaced poor and other vulnerable groups; and (f) to conceive and implement resettlement activities as sustainable development programs, providing sufficient resources to enable the persons displaced by the Project to share in Project benefits.

ESS 2 applies if the Project would or may involve Involuntary Resettlement (including Involuntary Resettlement of the past or foreseeable future that the Bank determines is directly linked to the Project).

ESS 3 (Indigenous Peoples): If the Project would involve Indigenous Peoples the Bank requires the Client to address this in the social section of the assessment report, complemented by more in-depth coverage, as required under ESS 3. The Client covers impacts on Indigenous Peoples in an Indigenous Peoples Plan or Indigenous Peoples planning framework, which is provided to the Bank as a freestanding document, an annex to the assessment report, or incorporated as a recognizable element of the report.

ESS 3 is not applicable for the Projects in Türkiye, since there is no communities or groups of people which can be identified/defined as indigenous peoples in the country.

2.2.2 Other E&S Guidelines

The following E&S Guidelines are also applicable to the project as reference technical documents for determining performance levels and measures to manage the hazards and risks related to environmental, social and OHS issues established for the project:

- World Bank Group (WBG) General Environmental, Health and Safety (EHS) Guidelines,
- WBG EHS Guidelines for Construction Materials Extraction.

2.2.3 International Environmental and Social Conventions

Türkiye has joined several conventions and protocols aimed at managing global and regional environmental resources, biodiversity, and cultural heritage. These agreements, which encompass environmental, biodiversity, archaeology, cultural heritage, and labor-related matters, are outlined in Table 12. Türkiye's involvement in these global treaties will be considered when formulating suitable management strategies for safeguarding the aforementioned issues.

Table 12. International Agreements, Conventions and Protocols

International Agreements, Conventions and Protocols	Entry Into Force Date	Date of Approval/ Entry into Force by Türkiye
Environmental Protection		
The Convention for the Protection of Marine Environment and the Coastal Region of the Mediterranean (Barcelona Convention)	1978	2002
The International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage (FUND)	18.12.1971	18.12.1971



International Agreements, Conventions and Protocols	Entry Into Force Date	Date of Approval/ Entry into Force by Türkiye
International Convention on Civil Liability for Oil Pollution Damage	29.11.1969	29.11.1976
Convention for the Protection of the Black Sea Against Pollution (Bucharest) and its protocols including the Protocol for the Protection of Biological and Landscape Diversity in the Black Sea	21.04.1992	14.12.1992
Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal	22.03.1989	28.12.1993
Stockholm Convention on Persistent Organic Pollutant (POPs)	22.05.2001	23.05.2001
Air Quality and Climate Change		
Convention on Long Range Transboundary Air Pollution (CLRTAP)	13.11.1979	23.03.1983
Vienna Convention for the Protection of the Ozone Layer	22.03.1985	08.09.1990
Montreal Protocol on Substances Depleting the Ozone Layer (1990)	16.09.1987	19.01.1991
United Nations Framework Convention on Climate Change (UNFCCC)	09.05.1992	24.05.2004
Kyoto Protocol	11.12.1997	26.08.2009
United Nations Convention to Combat Desertification in Countries Experiencing Serious Drought and/or Desertification, particularly in Africa	26.12.1996	31.08.1998
Biodiversity		
International Convention on Wetlands of International Importance especially as Waterfowl Habitat (RAMSAR Convention)	02.02.1971	13.11.1994
Convention for the Conservation of European Wildlife and Natural Habitats (BERN)	19.09.1979	01.09.1984
UN Convention on Biological Diversity and the Cartagena Protocol on Biosafety	24.05.2000	17.06.2003
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)	01.07.1975	27.12.2001
Mediterranean Sea Protocol Concerning Specially Protected Areas and Biodiversity (1988)	23.03.1986	29.09.1986
Convention on the Conservation of Migratory Species of Wild Animals (CMS)	23.06.1979	01.03.1982
Agreement on the Conservation of Populations of European Bats (EUROBATS)	04.12.1991	04.10.1994
Convention to Combat Desertification (CCD)	14.10.1994	14.10.1994
Convention (International Treaty) on Plant Genetic Resources for Food and Agriculture	03.11.2001	17.07.2006
European Landscape Convention	20.10.2000	10.06.2003
Cultural Heritage		
Convention on the Protection of the World Cultural and Natural Heritage	16.11.1972	14.02.1983
European Charter of the Architectural Heritage	26.09.1975	12.03.1985
European Convention on the Protection of the Archaeological Heritage	06.05.1969	29.11.1999
European Cultural Convention	19.12.1954	10.10.1957
Convention for the Protection of the Architectural Heritage of Europe	03.10.1985	16.05.1994
Convention for the Protection of Human Rights and Fundamental Freedoms (ETS No. 5) (the European Convention on Human Rights) and its protocols	04.11.1950	04.11.1950
UNESCO Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property	14.11.1970	25.12.1979
UNESCO Convention for the Safeguarding of the Intangible Cultural Heritage	17.11.2003	17.10.2006



International Agreements, Conventions and Protocols	Entry Into Force Date	Date of Approval/ Entry into Force by Türkiye
UNESCO Convention on the Protection and Promotion of the Diversity of Cultural Expressions	20.10.2005	20.10.2005
UNESCO Convention concerning the Protection of the World Cultural and Natural Heritage	16.11.1972	16.01.1983
Labor, Safety and Health		
ILO Safety and Health in Construction Convention	20.06.1988*	11.01.1991
ILO Occupational Safety and Health Convention	22.06.1981*	22.04.2005
ILO Worst Forms of Child Labor Convention	17.06.1999*	17.01.2001
ILO Forced Labor Convention	28.06.1930*	23.06.1998
ILO Minimum Age Convention	26.06.1973*	26.06.1997
ILO Freedom of Association and Protection of the Right to Organize Convention	09.07.1948*	03.07.1951
ILO Worker's Representatives Convention	23.06.1971*	12.07.1993
ILO Human Resources Development Convention	24.06.1975*	29.09.1977
ILO Employment Policy Convention	09.06.1964*	27.11.1967
ILO Social Security Convention	28.06.1952*	29.01.1975
ILO Equal Remuneration Convention	29.06.1951*	19.07.1967
ILO Discrimination (Employment and Occupation) Convention	25.06.1958*	19.07.1967
ILO Abolition of Forced Labor Convention	25.06.1957*	29.03.1961
ILO Right to Organize and Collective Bargaining Convention	01.06.1949*	23.01.1952

*The dates of entry into force are provided.



2.3 Gap Analysis

Major gaps between national legislation and AIIB ESSs together with the instruments prepared and/or additional studies conducted to fill/address the gaps identified for the project are summarized in Table 13.

Table 13. Comparison Between National Legislation and AIIB ESSs

ESS	Scope / Aim of the ESS	Gaps between the Turkish Legislation and AIIB ESSs	E&S instruments/additional studies to be performed for addressing the gaps identified for the project
ESS1 Environmental and Social Assessment and Management	Environmental and Social Standard (ESS) 1 applies if the Project is likely to have adverse environmental risks and impacts or social risks and impacts (or both). The scope of the environmental and social assessment and management measures are proportional to the risks and impacts of the Project. ESS 1 provides both for quality environmental and social assessment and for management of risks and impacts through effective mitigation and monitoring	<p>The main gaps between the national EIA and the ESS1 are as follows:</p> <ul style="list-style-type: none"> ▪ The process of integrating social impact assessment into the Turkish EIA has started in recent years. Especially with the EIA Regulation published in the Official Gazette dated 29.07.2022 and numbered 31907, social impact assessment has started to be included in Turkish EIA. Turkish EIA process is currently open for improvement but requires a fully integrated process to reach ESS1. ▪ In addition, the requirement to address cumulative impacts of other concurrent other projects is limited in Turkish EIA legislation. Under ESS1, cumulative impact assessment is in a more important position. Additionally, where the project involves specifically identified physical elements, aspects, and (associated) facilities that are likely to generate impacts, environmental and social risks and impacts have to be identified in the context of the project's area of influence under ESS1. ▪ The preparation of Environmental and Social Management Plans together with the Stakeholder Engagement Plan (during the EIA application process) has been included in Turkish legislation with the latest regulation. However, the management plans prepared are less comprehensive than the ones required under ESS1. ▪ In addition, ESS1 supports the use of an effective grievance redress mechanism that can facilitate early indication and prompt remediation for those who believe that they have been harmed by a client's actions. ▪ Supply chain management is also highlighted in ESS1. <p><u>Labor and Working Conditions</u></p> <p>Turkish national laws and regulations are generally close to the requirements of ESS1 in labor and working conditions. The grievance redress mechanism for workers is the most important gap between the national legislative requirements and ESS1. There are no specific requirements for the establishment and implementation of a grievance redress mechanism in Turkish national legislation.</p>	<p>According to national EIA Regulation projects are classified into two categories as Annex I and Annex II projects, which is mainly based on magnitude or capacity of planned investment, rather than associated risks and impacts. Therefore, Projects are screened with respect to Annex I and Annex II of the EIA Regulation. However, in ESS1, projects are categorized into one of four categories as Category A, Category B, Category C or Category FI by taking into consideration the type, nature, location, sensitivity and scale of the Project, proportional to the significance of the Project's potential environmental and social risks and impacts. Projects are screened on a case-by-case basis.</p> <p>In this respect, this project (sub-projects) (except related facilities such as concrete plant, quarries, etc.) is exempt from the national EIA Regulation, but it is categorized as Category B under the AIIB's ESP.</p> <p>In order to address/bridge this gap, ESIA report (along with ESDD report and ESMP, specific for five sub-projects, including mitigation measures and monitoring requirements for each E&S issues in the subjects of land use and soil; noise and vibration; air quality; water resources, water quality and wastewater; resource and waste; cultural heritage; biodiversity; social issues; labor and working conditions; occupational health and safety; community health, safety and security; hazardous and chemical materials) is being prepared. Besides,</p>

ESS	Scope / Aim of the ESS	Gaps between the Turkish Legislation and AIIB ESSs	E&S instruments/additional studies to be performed for addressing the gaps identified for the project
	measures during the course of Project implementation.	<p>Türkiye is party to a multitude of ILO conventions, including but not limited to conventions on equal treatment of employees, gender equality, child labor, forced labor, Occupational Health and Safety (OHS), right of association and minimum wage. Accordingly, the current Turkish Labor Law (No.4857) is to large extent consistent with international requirements.</p> <p>At the project level, in order to ensure that camp site arrangements, accommodation and working conditions meet ILO standards, national studies are carried out, including gender equality and anti-discrimination, Sexual Exploitation and Abuse/Sexual Harassment (SEA/SH), child labor, forced labor, labor rights and freedom of association.</p> <p><u>Resource Efficiency and Pollution Prevention</u></p> <p>Most Turkish national laws and regulations are in line with European Union (EU) directives. There is no major gap between ESS1 and Turkish national legislation. National EIA process is quite successful in identifying impacts but does not require provision of a detailed overview of mitigation methods and monitoring. However, within the scope of ESS1, the client needs to consider alternatives and implement technically and financially feasible and cost-effective options to reduce project related GHG emissions during the design and operation of the project.</p> <p>Sub-management plans and monitoring programs have started to be integrated into Turkish legislation with the recent EIA Regulation. Furthermore, there are no major gaps between the impacts and mitigation methods in the national legislation and ESS1 on major environmental issues such as waste, air pollution, water resources, wastewater, noise level. On the other hand, ESS1 requires application of pollution prevention and control technologies and practices under the Project consistent with international good practice, as reflected in internationally recognized standards, such as the World Bank Group (WBG) Environmental, Health and Safety (EHS) Guidelines.</p> <p><u>Community Health and Safety</u></p> <p>In Turkish national legislation, the general principles of community health, safety and security are fragmented under different regulations. The general principles are like ESS1. However, social issues such as labor influx, gender impacts and violence-based risks are more prominent under the ESS1 along with cumulative assessment and communication mechanism with external stakeholders.</p> <p><u>Biodiversity Management</u></p> <p>There is no gap in terms of policy level but internationally recognized areas of high biodiversity value including key biodiversity areas, important nature areas, important</p>	<p>the relevant requirements of the WBG EHS Guidelines will be applied to the Project in accordance with the ESS1. In cases where the Turkish requirements differ from the levels and measures presented in the WBG EHS Guidelines, the more stringent one (such as the most stringent discharge and emission standards) will be applied in the project specifications.</p> <p>In terms of biodiversity management, biodiversity assessments made within the scope of the ESIA will cover internationally recognized areas of high biodiversity value and habitat assessment and biodiversity management plan (BMP) will be prepared, when necessary, in this respect.</p> <p>In terms of cultural management, intangible cultural heritage will be considered within the scope of the ESIA and Chance Find Procedure will be given as an Appendix in each ESMP document.</p> <p>KGM website includes "Complaint Notification Form for Real Persons" and "Complaint Notification Form for Legal Entities" (https://www.kgm.gov.tr/Sayfalar/KGM/SiteTr/Root/SikayetGeriBildirim.aspx).</p> <p>SEP (including GRM) will be prepared to develop a gender-sensitive grievance redress mechanism procedure that includes these and also includes employee complaints, where anonymous complaints can be reported, and to eliminate/close this gap. KGM does not have a stakeholder engagement plan and grievance redress mechanism that will meet the project needs and AIIB standards. SEP/GRM will also be disclosed to stakeholders within the scope of AIIB requirements.</p> <p>In terms of gender equality, site accommodation and working conditions were evaluated with a gender</p>



ESS	Scope / Aim of the ESS	Gaps between the Turkish Legislation and AIIB ESSs	E&S instruments/additional studies to be performed for addressing the gaps identified for the project
		<p>bird areas and important plant areas are not fully assessed/considered under national legislation.</p> <p>There is no clear requirement for habitat assessment in national legislation as well.</p> <p><u>Cultural Management</u></p> <p>The national legislation covers most of the requirements of the ESS1 in cultural management. However, as ESS1 defines the cultural heritage covering both tangible and intangible heritage, and Law No. 2863 covers only the movable and immovable tangible cultural and natural assets.</p> <p>Under ESS1, the preparation and use of the Chance Find Procedure is primarily expected during construction activities, especially for the protection of tangible cultural heritage. In contrast, for intangible forms such as socio-cultural aspects, the implementation of a code of conduct and providing training to all employees become prominent compared to the national legislation.</p> <p><u>Stakeholder Engagement and Information Disclosure</u></p> <p>In the Turkish EIA legislation, EIA Report for the projects in the list of Annex-I will be made available to the public opinion at the headquarters of MoEUCC or provincial directorates. Following MoEUCC's final assessment of the EIA report, the Governor's Office will disclose its reasoned decision publicly. For the projects in the list of Annex-II, the final Project Introduction File (PIF) will be disclosed publicly at the Provincial Directorates. Similarly, public information and consultation meetings are held only the projects listed in Annex-I of the Turkish EIA Regulation.</p> <p><u>Gender Equality</u></p> <p>There is no national legislation to identify potential gender-specific adverse risks and effects.</p> <p>However, analyzes should be carried out in accordance with AIIB requirements, plans and procedures should be developed with gender sensitive analyzes and should include equality of opportunity and socioeconomic empowerment of women.</p>	<p>sensitive approach. According to ESDD evaluations regarding accommodation and working conditions, the Project does not cause a discriminatory or negative impact in terms of gender and does not include conditions that will lead to gender inequality. However, in order to improve the project management system in this direction, a gender sensitive approach must be included in all the requirements and the system to be developed. Moreover, Gender Action Plan (GAP) will be prepared and implemented in five sub-projects in accordance with international standards.</p>
ESS2 Involuntary Resettlement	<p>This Environmental and Social Standard (ESS) 2 addresses impacts of Project-related land acquisition, including</p>	<p>Turkish legislation on land acquisition basically corresponds to the requirements envisaged by ESS 2. However, some gaps include Resettlement Plan (RP) preparation, the implementation of the plan, impact assessment on vulnerable groups, restoration of land-based livelihoods and the lack of recognition of informal land users and squatters.</p> <p>There are the following gaps between Turkish national legislation and international standards on land acquisition:</p> <ul style="list-style-type: none"> ▪ Buildings and structures are compensated with depreciations; therefore, full 	<p>Within the scope of the ESS2 Involuntary Resettlement, the Project includes a Project-specific ESIA report with mitigation measures on eliminating the negative impacts that may occur on the fixed assets, agriculture and livestock livelihoods of the local people during the construction or transportation process, and a risk assessment regarding the loss of livelihood and economic</p>



ESS	Scope / Aim of the ESS	Gaps between the Turkish Legislation and AIIB ESSs	E&S instruments/additional studies to be performed for addressing the gaps identified for the project
	restrictions on land use and access to assets and natural resources, which may cause physical displacement (relocation, loss of land or shelter), and/or economic displacement (loss of land or assets, or restrictions on land use, assets and natural resources leading to loss of income sources or other means of livelihood)	<p>replacement cost is not provided.</p> <ul style="list-style-type: none"> ▪ According to the Resettlement Law (Law No. 5543), compensation in kind cannot be made except resettlement by the state. ▪ Disclosure and stakeholder engagement, Project level grievance redress mechanism are not defined as a part of the land acquisition process, ▪ Entitlement defining are limited to the legal title holders of the assets or lands for National Legislation; informal, users, tenants, common land users are not defined as beneficiary and the PAPs without recognizable claims are not eligible for expropriation compensation. ▪ In Turkish Resettlement Law, the cut-off date is defined a three-year residence time limit for non-owners. ▪ Restoration of livelihoods of PAPs are not covered in national legislation and no requirements are defined for the displaced poor or other vulnerable groups to improve their socioeconomic situation. 	<p>displacement of the local people in accordance with the AIIB requirements.</p> <p>A project-level RP will be developed, with a particular emphasis on Antakya-Samandağ Road (for P3) (Including Samandağ Crossing) Km: 0+000-26+850 Section Supply Construction Works, within the jurisdictions of the 5th Regional Directorate of Highways (Mersin). Besides, mitigation measures related to livelihood restoration will be provided in the ESIA in accordance with the potential livelihood losses caused from the Project impacts, based on the determination of livelihoods of local people, socioeconomic status of households and vulnerable groups in accordance with AIIB requirements.</p> <p>For the sub-project P5, regarding the Tohma Bridge, land for a temporary campsite including a two-storey house structure, has been rented from a private landowner. The landowner also engages in animal husbandry and dairy farming on the remaining parcel of land. On the other hand, regarding the Ağın Bridge, even though project works have a content that will not affect the fishing activity and fishing area, the PAPs carrying out the fishing and the business will be interviewed within the scope of the Project's livelihood impact and ecosystem services impact assessment under the ESIA.</p>

* ESS 3: Indigenous Peoples is not applicable for the Projects in Türkiye, since there is no communities or groups of people which can be identified/defined as indigenous peoples in the country.



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3 PROJECT DESCRIPTION

The Project objective is to restore connectivity and enable safe and efficient movement of goods and people by rehabilitating essential transportation infrastructure located in the earthquake-affected areas of Türkiye.

The Project will rehabilitate and reconstruct roads, tunnels, and bridges damaged by the February 2023 earthquakes in southeastern Türkiye. It will be implemented through five (5) sub-projects, focusing on rehabilitating and enhancing transportation infrastructure to meet safety and capacity standards. Additionally, climate-resilient measures will be integrated to mitigate and withstand the impacts of future climate and geological events.

The overall project covers the reconstruction and rehabilitation activities to be carried out in the Provinces of Hatay, Gaziantep, Adiyaman, Malatya and Elazığ. The location map of the sub-projects is given in Figure 2.



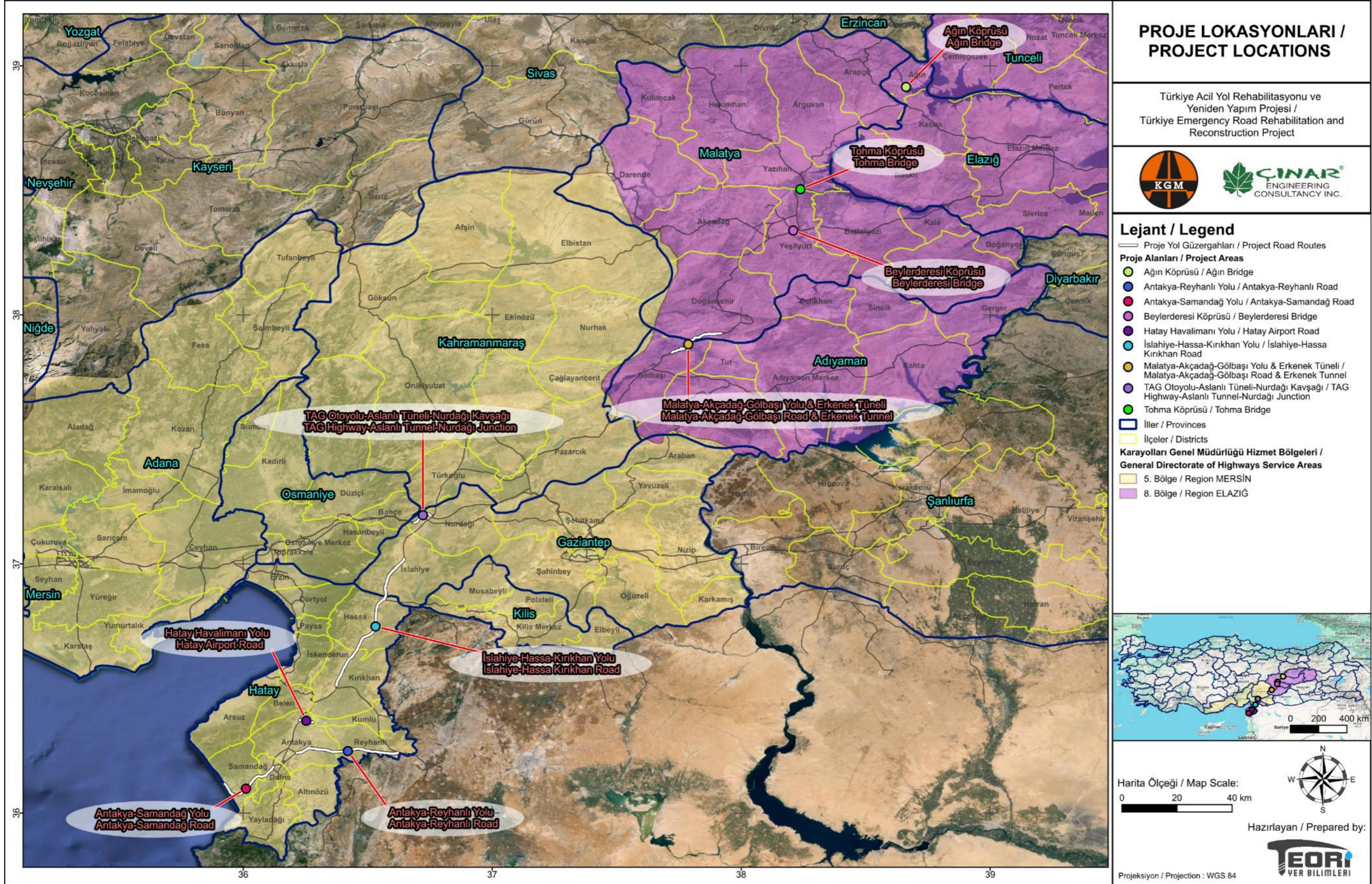


Figure 2. Project Locations Map

For the implementation of the sub-projects, most of the contracts were signed between KGM and different contractors and work completion dates were determined. Contractor names, contract dates and current completion percentages of sub-projects are presented in Table 14. A separate Environmental and Social Due Diligence (ESDD) study (CNR-KGM-TERRRP-ESDD-001) has also been conducted covering the sub-projects where construction works are ongoing (i.e. for P1, P2, P3 and P5).

Table 14. Contact Names and Contractor Information of the Sub-Projects

Responsible Regional Directorate	Subproject No.	Subproject Name	Contractor Name	Contract Date	Commencement Date	Expected Completion Date	Current Construction Progress*	Number of Workers to be Employed
5 th Regional Directorate (Mersin)	P1	TAG Highway Aslanlı Tunnel (Km:214+490)-Nurdağı Junction (Km: 223+115) Section, Repair of All Kinds of Damages and Strengthening of Viaducts Against Earthquakes in This Section Construction Work	SNH İnşaat	04.05.2023	05.05.2023	05.05.2025	29.07%	200
	P2	Islahiye-Hassa-Kırıkhan Road (Km:24+500-84+500), Antakya-Reyhanlı Road (Km:0+000-42+500) Hot Bituminous Mixture Repair Work, Hatay Airport Road Soil Works, Art Structures and Superstructure Construction Work	FEZA	05.05.2023	09.05.2023	31.01.2025	64.09%	200
	P3	Antakya-Samandağ Road (Including Samandağ Crossing) Km: 0+000-26+850 Section Supply Construction Works	DEHA	03.01.2024	17.01.2024	02.08.2025	1.20 %	100
8 th Regional Directorate (Elazığ)	P4	(Malatya-Akçadağ) Junction - Gölbaşı Road (Construction Works of Erkenek Tunnel Damaged in Earthquake and Erkenek Tunnel-Karanlıkdere Section Damaged in Earthquake)	Hi-Ka İnşaat	30.07.2024	31.07.2024	25.05.2025	-	150
	P5	Repair of Technological Bridges Damaged in Earthquake (Tohma, Ağın, Beylerderesi Bridges Earthquake Damage Repair)	ENKON	16.10.2023	20.10.2023	25.09.2024	72%	50

*These are the completion percentages of the work done as of 07.06.2024

The following parts provide detailed information about the sub-projects.



3.1 Sub-project Components

3.1.1 Sub-projects Under the Responsibility of 5th Regional Directorate of Highways

3.1.1.1 Sub-project 1: Tarsus-Adana-Gaziantep (TAG) Highway Rehabilitation

Scope of the sub-project: This sub-project will repair damages on TAG Highway between Aslanlı Tunnel and Nurdağı Junction, spanning 8.63 km, and including five viaducts (Şehitler, Nurdağı, Atatürk, Turgut Özal, and Başpınar). The damages comprise cracks, settlements, explosions, and deep cracks in the embankments of the main body of the highway and in the expansion joints, deck concrete, approach fills, earthquake bearings, supports, and elevations in the viaducts. Temporary solutions, such as the installation of steel plates, were implemented immediately after the earthquakes, ensuring the motorway remains operational. AIIB financing will be invested in carrying out comprehensive repairs and in strengthening the motorway and viaducts to enhance their resilience against earthquakes.

The sub-project location map is given in Figure 3.

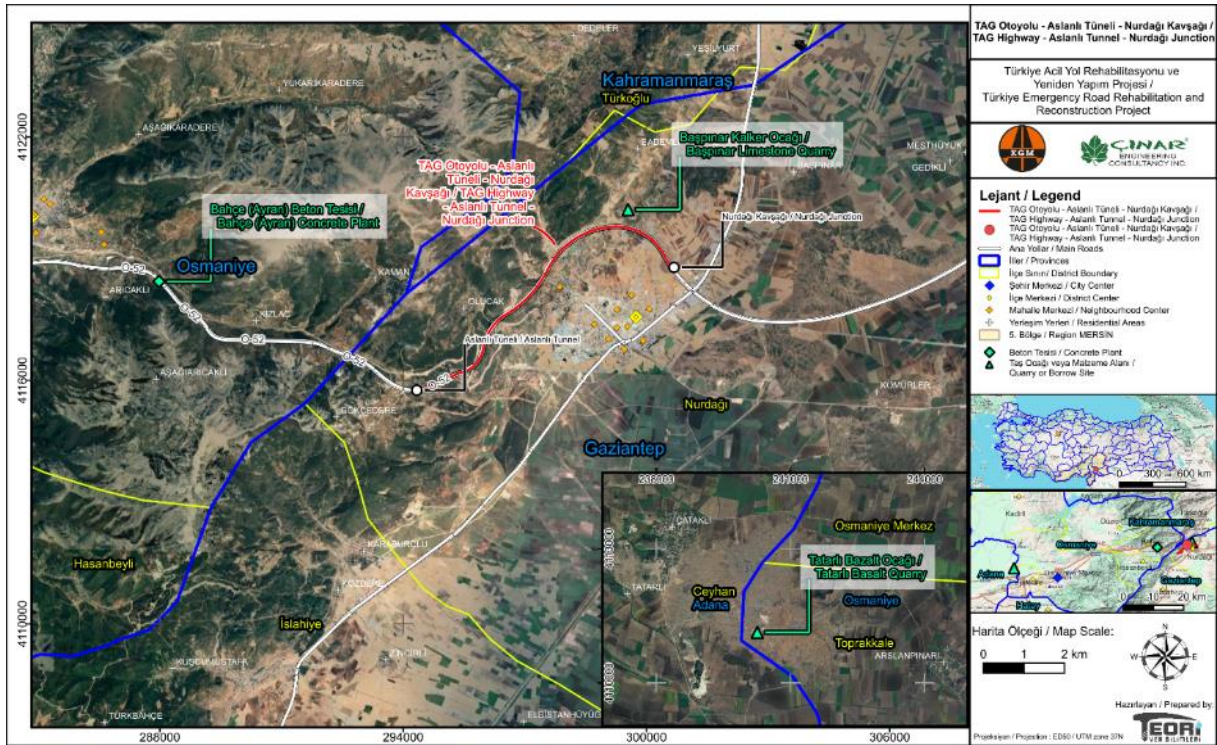


Figure 3. TAG Highway-Aslanlı Tunnel-Nurdağı Junction Sub-project Area

The Contractor's main accommodation site, Ceyhan Construction and Accommodation Site, which has been actively used since 2019 for different projects, will be utilized for this sub-project. Additionally, lodgings of 5th Regional Directorate of Highways will be used for accommodation.

Due to the earthquakes that occurred on 06.02.2023, damages occurred in the expansion joints, floor concretes, approach fillings, earthquake wedges, supports and elevations of five (5) viaducts; Şehitler, Nurdağı, Atatürk, Turgut Özal and Başpınar Viaducts (see Figure 4).



Figure 4. Location of the Viaducts within the scope of the sub-project

3.1.1.2 Sub-project 2: Hatay Province Roads Rehabilitation and Reconstruction

İslahiye-Hassa-Kırıkhan Road (D825): Repair works on the Fevzipaşa Junction and Sulumağara Bridges and various locations along a 20 km section of a road which was left with transverse and longitudinal cracks after the earthquake. Road repair and asphalt renewal works will be carried out between KM:24+500 – 84+500.

The sub-project location map is given in Figure 5.

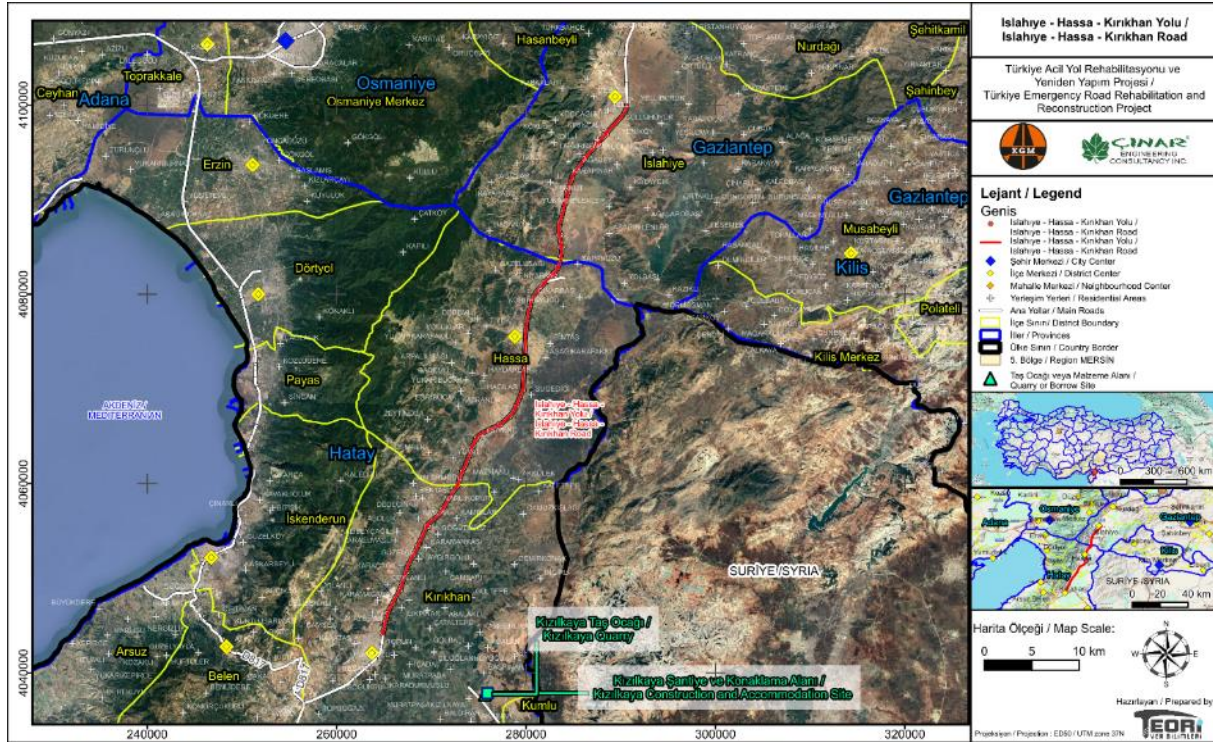


Figure 5. İslahiye-Hassa-Kırıkhan Road Sub-project Area

Antakya-Reyhanlı Road (D420): Reconstruction of a 2 km section of a 4-lane road, repair of the superstructure at various locations of a 10 km section, reconstruction of a two-lane, 100-meter-long bridge at the Demirköprü location that collapsed due to the earthquake, and Bituminous Hot Mixture repair works for 1 km bridge connecting roads.

The sub-project location map is given in Figure 6.

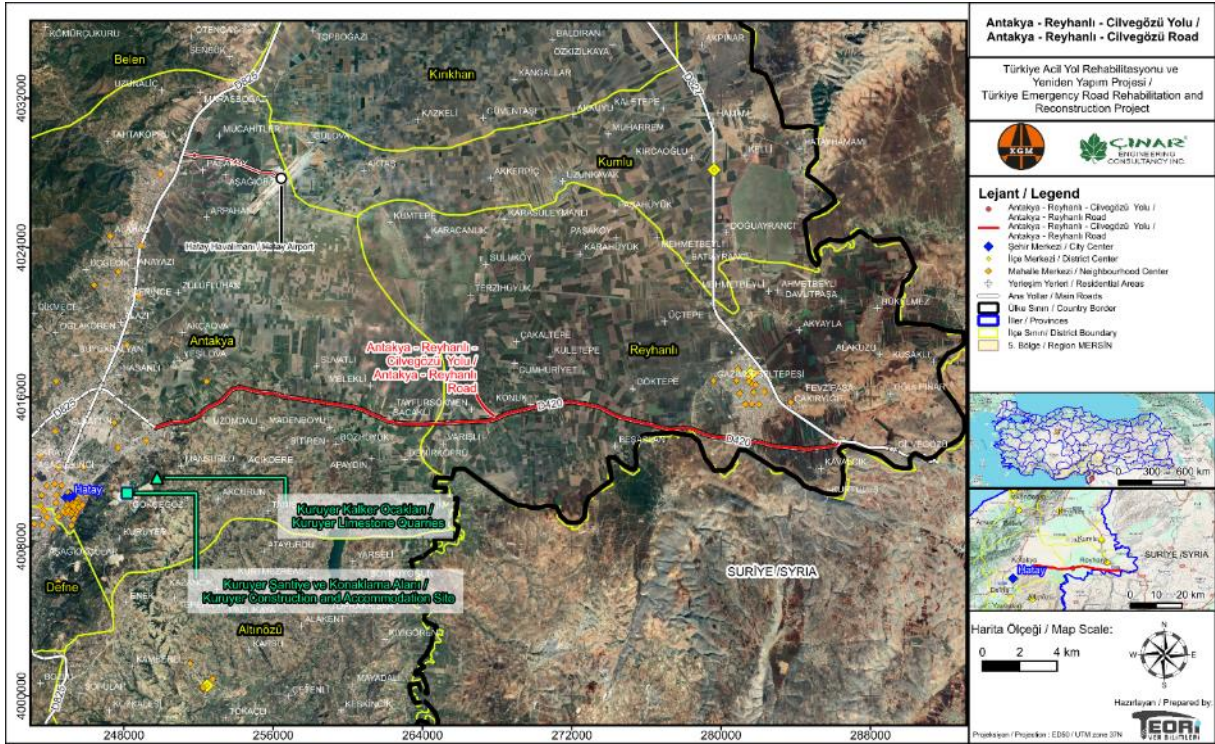


Figure 6. Antakya-Reyhanlı Road Sub-project Area

Hatay Airport Road: Reconstruction of 2.5 km of the 5 km road and repair of superstructure of the remaining 2.5 km section.

The sub-project location map is given in Figure 7.



Figure 7. Hatay Airport Road Sub-project Area

3.1.1.3 Sub-project 3: Antakya-Samandağ Road Reconstruction

Scope of the sub-project: Reconstruction of the 27 km two-lane (one lane per direction) Antakya-Samandağ Road, including the Samandağ Ring Road that circles the city of Samandağ on the south and east side will be carried out. Additionally, reclamation works for landslide control and the reconstruction of a bridge located in Sutaşı Neighborhood are also planned.

The sub-project location map is given in Figure 8.

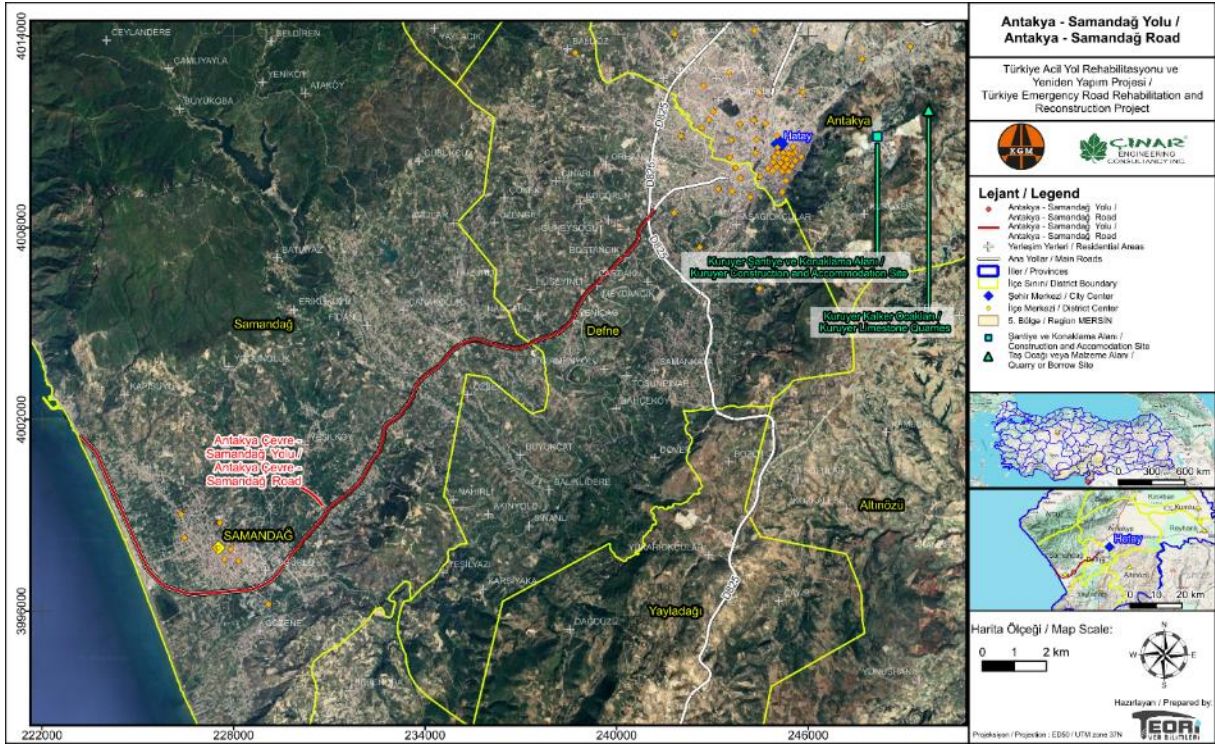


Figure 8. Antakya-Samandağ Road Sub-project Area

3.1.2 Sub-projects Under the Responsibility of 8th Regional Directorate of Highways

3.1.2.1 Sub-project 4: Erkenek Tunnel Rehabilitation

Scope of the sub-project: Repair of Erkenek Tunnel and damaged sections along the state road D850 from Erkenek Tunnel to Karanlıkdere. The Malatya- Sürgü-Gölbaşı Road experienced damages to road embankments, engineering structures and superstructure due to the earthquakes. The Erkenek Tunnel suffered damages in concrete pavement, tunnel floor, and electromechanical systems. The proposed solution involves the reconstruction of the 20 km road and tunnel, along with the rehabilitation of a landslide that occurred on the road.

The sub-project location map is given in Figure 9.

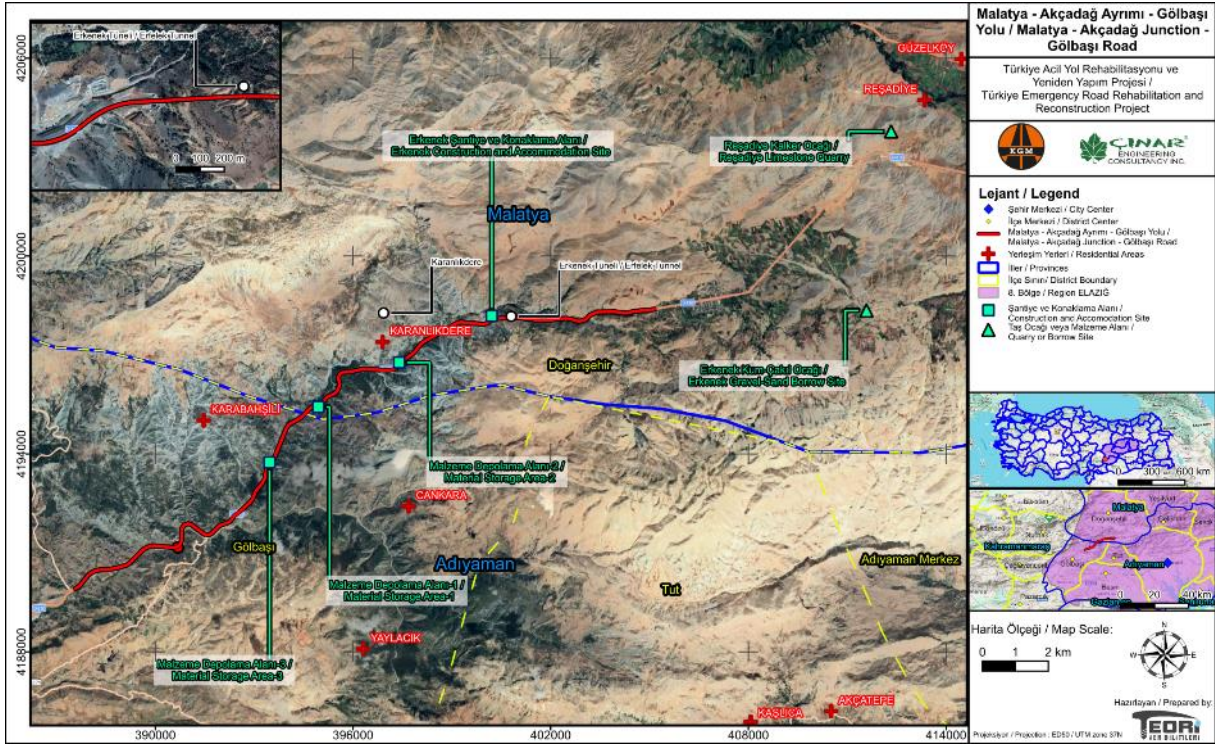


Figure 9. Malatya-Akçadağ-Gölbasi Road & Erkenek Tunnel Sub-project Area

3.1.2.2 Sub-project 5: Tohma, Ağın, and Beylerderesi Bridges Rehabilitation

Scope of the sub-project: Repair and reinforcement of three technological bridges damaged by the earthquake.

The Tohma Bridge experienced structural issues in its modular expansion joints situated on both sides of the bridge legs. The seismic bearings and expansion joints of the Tohma Bridge will be replaced within the scope of the sub-project.

On the Ağın Cable-Stayed Bridge, damage includes the breakage of cables within 3 cable tendons and structural problems, such as Teflon peeling, affecting a total of 4 pot supports — one on each side leg and one on each middle leg. It is planned to carry out damage detection and repair work for 32 inclined suspension wires.

The Beylerderesi Bridge exhibits cracks ranging from 2.5 to 3 mm in width on the walls of the edge opening segments, and there is damage to the modular expansion joints at both entrances of the bridge. The structural bearings and expansion joints of the Beylerderesi Bridge will be replaced within the scope of the sub-project.

The sub-project location maps are given in Figure 10, Figure 11 and Figure 12 for Tohma, Ağın and Beylerderesi Bridges, respectively.



Figure 10. Tohma Bridge Sub-project Area



Figure 11. Ağın Bridge Sub-project Area

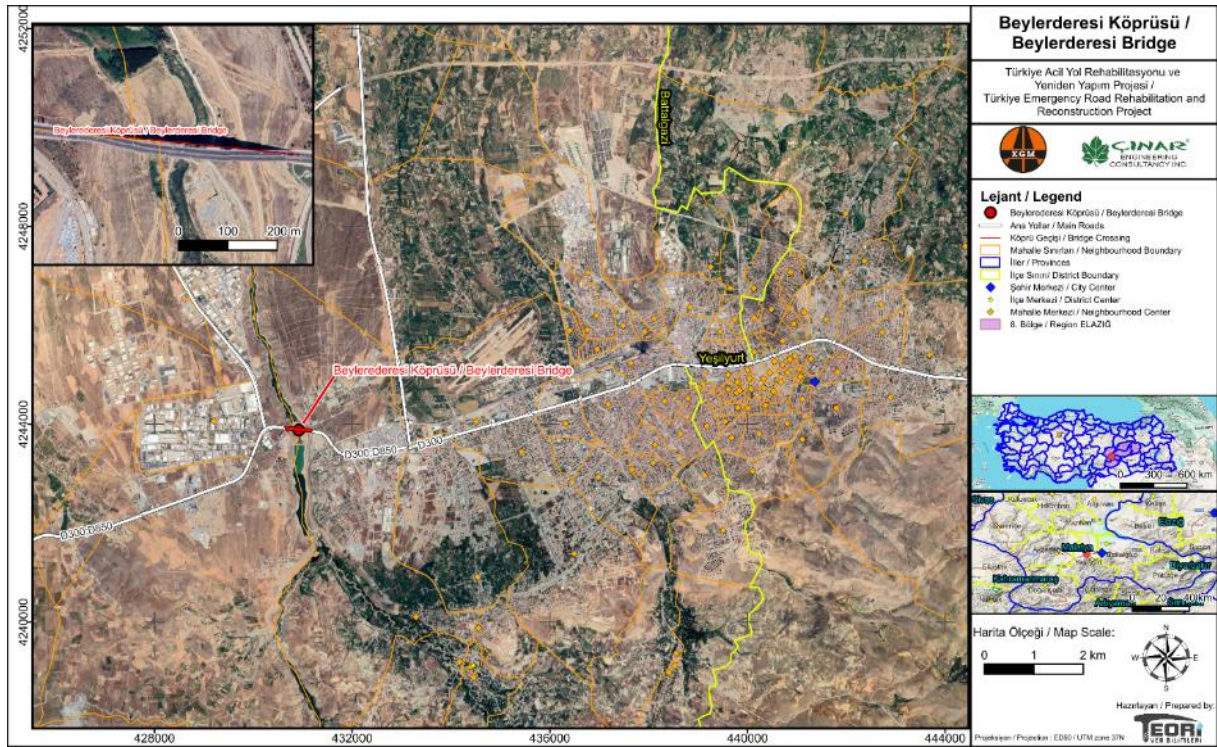


Figure 12. Beylerderesi Bridge Sub-project Area

3.1.3 Related and Auxiliary Facilities

The related and auxiliary facilities including construction sites, accommodation sites, quarries/material borrow sites, material storage areas that will be used or are planned to be used for the reconstruction and rehabilitation works within the scope of each sub-project are provided in Table 15.

Table 15. Related Facilities Planned to be used in the Project

Sub-project No	Sub-project Name	Related/Auxiliary Facilities		Specifications and properties of the facility	
P1	Tarsus-Adana-Gaziantep (TAG) Motorway Rehabilitation	Ceyhan Construction and Accommodation Site		Asphalt plant with a capacity of 320 tons/hour Accommodation Site	
		Başpınar Limestone Quarry		Only material extraction	
		Tatarlı Basalt Quarry		Mechanical plant/crusher with a capacity of 500 tons/hour	
		Bahçe (Ayrar) Concrete Plant		Concrete Plant with a capacity of 90 m ³ /hour	
P2	Hatay Province Roads Rehabilitation and Reconstruction	İslahiye-Hassa-Kırıkhan Road	Kızılkaya Construction and Accommodation Site	Accommodation Site	
			Kızılkaya Limestone Quarry	Asphalt Plant 768,000 tons/year Crusher with a capacity of 390,000 tons/year	
		Antakya-Reyhanlı Road	Kuruyer Construction and Accommodation Site		Concrete plant capacity: 95 m ³ /h Asphalt plant capacity: 240 tons/h Mechanical plant capacity: 400 ton/h (planned)
			Kızılkaya Limestone Quarry		Asphalt Plant 768,000 tons/year Crusher with a capacity of 390,000 tons/year
			Sub-project Construction Site (Demirköprü construction)		Concrete plant with a capacity of 50 m ³ /hour
		Hatay Airport Road	Kızılkaya Construction and Accommodation Site		Accommodation Site
			Kızılkaya Limestone Quarry		Asphalt Plant 768,000 tons/year Crusher with a capacity of 390,000 tons/year
			Sub-project Construction Site		Deep soil mixing machines (DSM) and cementitious materials preparation stations
P3	Antakya-Samandağ Road Reconstruction	Kuruyer Construction and Accommodation Site		Concrete plant capacity: 95 m ³ /h Asphalt plant capacity: 240 tons/h Mechanical plant capacity: 400 ton/h (planned)	
		Kuruyer Limestone Quarries*		Aggregate will be purchased from other licensed companies operating in Kuruyer Limestone Quarries.	
P4	Erkenek Tunnel Rehabilitation (including Malatya-Akçadağ-Gölbaşı Road)	Erkenek Construction and Accommodation Site		Accommodation Site	
		Reşadiye Limestone Quarry		Concrete plant capacity: 200 m ³ /h (planned) Crusher with a capacity of 300 ton/h (planned) Mechanical plant capacity: 400-600 ton/h (planned)	
		Erkenek Gravel-Sand Borrow Site		N/A	
		Three (3) Material Storage Areas		N/A	
P5	Tohma, Ağin and Beylerderesi Bridges Rehabilitation	Tohma Bridge	Tohma Construction and Accommodation Site	N/A (Materials will be purchased from abroad and assembly/installation works will be carried out.)	
		Ağin Bridge	Ağin Construction Site		
		Beylerderesi Bridge	N/A		

* Kuruyer Limestone Quarries are divided into four parts and three of which are currently operated by different contractors working with KGM on other projects. One part of the quarry was allocated to the Contractor (DEHA) by 5th Regional Directorate of Highways. In the current situation, DEHA is not planning to operate the quarry.

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3.2 Legally Protected and Internationally Recognized Areas of High Biodiversity Value

There are identified two different types of high biodiversity value areas; Legally Protected Areas and Internationally Recognized Areas. Legally Protected Areas are those that meet the IUCN definition for a protected area, while Internationally Recognized Areas of high biodiversity value include World Heritage Natural Sites, Biosphere Reserves, Key Biodiversity Areas, Important Bird Areas, Ramsar Wetlands of International Importance, and Alliance for Zero Extinction Sites among others. When a project is located within a legally protected or internationally recognized area, AllB ESS1 sets requirements in addition to those that are related to critical habitat. These may include;

- restrictions on access to legally designated parks and protected areas;
- restrictions on access to other common property resources; or
- restrictions on land use within utility easements or safety zones.

Where the Project occurs within or has the potential to adversely affect an area that is legally protected or internationally recognized or designated for protection, potentially adverse impacts will be identified and assessed. The mitigation hierarchy will be applied to avoid, or when avoidance is not feasible, to mitigate those adverse impacts that would compromise the integrity, conservation objectives or biodiversity importance of the area. All measures will be complied so that the Project also will be applicable with national laws and regulations relating to protected areas.

In line with this approach, areas that have been designated a status under the Turkish protected area system, as well as areas designated as KBAs (Important Nature Areas [INA], Important Bird Areas [IBA], Important Plant Areas [IPA], Areas of Zero Extinction [AZE]) were screened for the purpose of this ESIA.

3.2.1 National Legally Protected Areas

The International Union for Conservation of Nature (IUCN) proposes the following definition for a protected area¹, which today is widely used around the globe, and recognized as the definition of legally protected areas:

“IUCN defines a protected area as: A clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values.”

Legally protected areas are an essential component of biodiversity conservation efforts, as are the ecosystem services provided by the ecological functions they provide. In Türkiye, the Ministry of Agriculture and Forestry is the primary official body in charge of developing and implementing national biodiversity conservation policies, action plans, conservation area designation, and a variety of other related tasks carried out by central and local directorates within the Ministry's organizational structure. IUCN Protected Area Management Categories² were adopted to restructure the Turkish Protected Area System in 2006 through the Biodiversity and Natural Resource Management Project undertaken by the Ministry's General

¹ IUCN. 2017. Protected Areas: IUCN Global Protected Areas Programme and IUCN World Commission on Protected Areas Delivering the Promise of Sydney. Access link: <https://www.iucn.org/theme/protected-areas>

² Dudley, N., Shadie, P. & Stolton, S. 2013. Guidelines for Applying Protected Area Management Categories including IUCN WCPA Best Practice Guidance on Recognising Protected Areas and Assigning Management Categories and Governance Types. Switzerland: IUCN



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Directorate of Nature Conservation and National Parks³. The IUCN Protected Area Management Categories provide a global framework and are recognized by the Convention on Biological Diversity, with the initial goal of fostering a shared understanding of protected areas within and between countries. Categorization is done in accordance with the primary management objectives for a protected area, which are based on the following principles:

- assignment to a category is a not a commentary on management effectiveness,
- the categories systems are international; national names for protected areas may differ, and
- all categories are important; and gradation of human intervention is implied.

As a result, legally protected areas in Türkiye have been re-classified under the six protected area management categories defined by the IUCN Guidelines, which identify the following as the primary reasons for management:

- I. Strict protection [Ia) Strict nature reserve and Ib) Wilderness area]
- II. Ecosystem conservation and protection (i.e., National Park)
- III. Conservation of natural features (i.e., Natural Monument)
- IV. Conservation through active management (i.e., habitat/species management area)
- V. Landscape/seascape conservation and recreation (i.e., protected landscape (seascape))
- VI. Sustainable use of natural resources (i.e., managed resource protected area)

Legally protected areas around the project area and their IUCN protected area categories are represented according to sub-projects. Distances for the sub-projects under the responsibility of 5th Regional Directorate of Highways: TAG Highway-Aslanlı Tunnel-Nurdağı Junction is given in Table 16; İslahiye-Hassa-Kırıkhan Road is given in Table 17; Hatay Airport Road is given in Table 18; Antakya-Reyhanlı Road is given in Table 19; and Antakya-Samandağ Road is given in Table 20.

Distances for the sub-projects under the responsibility of 8th Regional Directorate of Highways: Malatya-Akçadağ-Gölbaşı Road & Erkenek Tunnel is given in Table 21; Beylerderesi Bridge is given in Table 22; Tohma Bridge is given in Table 23; and Ağın Bridge is given in

3 Thomas, L. 2006. Türkiye Korunan Alan Yönetiminde IUCN Kategori Sistemi. Ankara: Çevre ve Orman Bakanlığı Doğa Koruma ve Milli Parklar Genel Müdürlüğü.



Table 24.

The maps showing the locations of the protected areas with respect to the sub-projects are presented in Appendix-3.1.

Table 16. Legally Protected Areas near TAG Highway-Aslanlı Tunnel- Nurdağı Junction

Protected Area	IUCN Protected Area Category	Distance to TAG Highway-Aslanlı Tunnel-Nurdağı Junction (km)	Distance to Ceyhan Construction and Accommodation Site (asphalt plant) (km)	Distance to Başpınar Limestone Quarry (km)	Distance to Tatarlı Basalt Quarry (Mechanical plant/crusher) (km)	Distance to Bahçe (Ayran) Concrete Plant (km)
Yumurtalık Lagoon NP	II, IV, V, VI	98.67	25.52	103.69	52.77	93.21
Karatepe Aslantaş NP	II, IV, V, VI	38.22	57.83	41.05	20.31	30.10
Aladağlar NP	II, IV, V, VI	132.96	84.70	134.13	95.12	125.19
Belemelik NatP	II	151.68	73.86	155.54	100.25	144.41
Karataş NatP	II	131.47	50.28	137.65	83.96	126.82
Şahin Hill NatP	II	43.60	52.35	51.68	23.11	39.56
Çiftmazı NatP	II	38.64	55.16	45.57	19.73	33.61
Dağılcak NatP	II	86.10	64.51	88.31	52.94	78.99
Obruk Waterfall NatP	II	109.00	122.45	107.94	102.71	103.70
Huzurlu NatP	II	26.35	71.63	33.10	37.48	25.73
Hisar Pine Grove NatP	II	36.39	99.44	40.31	67.85	40.56
Gaziantep National Struggle NatP	II	65.17	150.36	64.00	115.17	72.36
Burç NatP	II	55.17	145.28	52.57	107.97	62.49
Yamaçtepe NatP	II	51.58	142.43	48.25	104.93	58.74
Dülük Baba NatP	II	55.20	147.59	51.46	109.49	62.14
Körçoban NR	Ib ,II	53.77	105.02	53.84	70.52	52.71
Tekkoz-Kengerli Düz NR	Ib ,II	36.90	59.80	42.28	30.19	32.73
Tuzla Lake WDA	Ib ,II, IV	150.13	57.67	154.79	97.02	143.65
Zorkun Plateau WDA	Ib ,II, IV	33.48	54.24	39.02	18.28	26.66
Tahta Köprü WDA	Ib ,II, IV	22.36	88.78	26.35	55.12	26.22
Birecik Fırat WDA	Ib ,II, IV	110.34	205.83	111.83	168.30	116.59
Akyatan Lake WDA	Ib ,II, IV	133.60	45.57	139.03	82.78	127.90
Hopur Topaşır WDA	Ib ,II, IV	153.35	68.66	157.30	100.09	145.55
Hançerderesi WDA	Ib ,II, IV	90.07	115.91	93.99	92.10	90.66
Arsuz WDA	Ib ,II, IV	107.43	75.22	112.30	82.45	104.81
Seyhan Dam WDA	Ib ,II, IV	116.56	27.03	121.33	62.55	109.66
Karafıldağ WDA	Ib ,II, IV	145.87	75.88	148.76	96.79	139.19
Yahyalı Aladağlar WDA	Ib ,II, IV	148.29	110.46	149.77	114.74	141.21
Demirkazık WDA	Ib ,II, IV	153.44	95.12	159.58	115.63	150.41
Altınözü WDA	Ib ,II, IV	113.83	100.68	119.03	102.36	114.02
Dağ Ceylanı WDA	Ib ,II, IV	56.92	87.75	62.18	65.89	58.26
Lake Haydar WLI	II,IV,V	45.48	81.94	50.91	55.68	46.64
Kastabala WLI	II,IV,V	43.14	42.96	48.25	5.63	36.58
Dipsiz Lagoon WNI	II,IV,V	160.65	66.71	167.75	106.54	154.75
Gölbaşı Lake WNI	II,IV,V	73.01	88.36	78.32	73.87	74.15

Protected Area	IUCN Protected Area Category	Distance to TAG Highway-Aslanlı Tunnel-Nurdağı Junction (km)	Distance to Ceyhan Construction and Accommodation Site (asphalt plant) (km)	Distance to Başpınar Limestone Quarry (km)	Distance to Tatarlı Basalt Quarry (Mechanical plant/crusher) (km)	Distance to Bahçe (Ayran) Concrete Plant (km)
Yumurtalık Lagoon RA	II,IV,V	97.39	24.51	103.65	52.33	92.73
Akyatan Lagoon RA	II,IV,V	133.82	46.60	140.26	83.82	129.08

Overall Assessment: All the national protected areas are out of range. No impact is expected on the protected areas. Mitigation measure regarding land use, soil and geology, noise and vibration, air quality and greenhouse gas emissions, water resources, water quality and wastewater management, and resource and waste management should be implemented.

NP: National Park
 NatP: Nature Park
 NR: Nature Reserve
 WDA: Wildlife Development Area
 WLI: Wetland of Local Importance
 WNI: Wetland of National Importance
 RA: Ramsar Area



Table 17. Legally Protected Areas near İslahiye-Hassa-Kırıkhan Road

Protected Area	IUCN Protected Area Category	Distance to İslahiye-Hassa-Kırıkhan Road (km)	Distance to Kızılkaya Limestone Quarry (Asphalt plant and crusher) (km)	Distance to Kızılkaya Construction and Accommodation Site (km)
Belen Pass NatP	II	12.48	23.11	23.11
Şahin Tepesi NatP	II	27.21	59.14	59.14
Çiftmazı NatP	II	28.01	66.04	66.04
Huzurlu NatP	II	7.74	57.38	57.38
Hisar Pine Grove NatP	II	19.52	48.48	48.48
Gaziantep National Struggle NatP	II	68.05	90.43	90.43
Burç NatP	II	63.79	94.83	94.83
Yamaçtepe NatP	II	61.87	95.38	95.38
Dülükbaba NatP	II	68.01	103.79	103.79
Tekkoz-Kengerli Düz NR	Ib ,II	18.01	53.02	53.02
Zorkun Plateau WDA	Ib ,II, IV	21.49	57.37	57.37
Tahta Köprü WDA	Ib ,II, IV	6.52	45.14	45.14
Birecik Fırat WDA	Ib ,II, IV	122.95	141.88	141.88
Arsuz WDA	Ib ,II, IV	34.30	44.40	44.40
Altınözü WDA	Ib ,II, IV	36.25	36.35	36.35
Dağ Ceylanı WDA	Ib ,II, IV	7.55	within the area	within the area
Haydar Lake WLI	II,IV,V	at the border	31.24	31.24
Kastabala WLI	II,IV,V	40.39	80.51	80.51
Mileyha WLI	II,IV,V	61.48	64.07	64.07
Gölbaşı Lake WNI	II,IV,V	9.66	2.61	2.61
Karkamış Flood Plain WNI	II,IV,V	107.95	139.70	139.70

Overall Assessment: İslahiye-Hassa-Kırıkhan Road is at the border of Haydar Lake Wetland of Local Importance (WLI). Due to the existence of the road, attention should be paid to dust formation and noise generation during the work carried out in the area. In this context, continuous spraying should be done to prevent dust formation. Appropriate equipment and work machines should be used to prevent noise generation. If noise cannot be prevented, work should be stopped in the early morning and evening hours during breeding periods. No impact is expected, due to the road is an existing infrastructure and construction works will be performed on the existing road. Kızılkaya Limestone Quarry and Kızılkaya Construction and Accommodation Site is within the boundaries of Dağ Ceylanı Wildlife Development Area (WDA). The target species of the area is the Mountain Gazelle (*Gazella gazella*). The species is very sensitive and timid. It is very affected by noise and human activities. Therefore, within the scope of the works to be done in this area, attention should be paid to dust formation, noise (especially blasting) and road accidents. Roads should be constantly sprayed to prevent dust formation. In order to prevent noise generation, appropriate equipment and work machines should be used. Also, Gölbaşı Lake Wetland of National Importance (WNI) is in near surroundings. No impact is expected on the protected area. Mitigation measures regarding land use, soil and geology, noise and vibration, air quality and greenhouse gas emissions, water resources, water quality and wastewater management, and resource and waste management should be implemented.

NatP: Nature Park
NR: Nature Reserve
WDA: Wildlife Development Area
WLI: Wetland of Local Importance
WNI: Wetland of National Importance

Table 18. Legally Protected Areas near Hatay Airport Road

Protected Area	IUCN Protected Area Category	Distance to Hatay Airport Road (km)	Distance to Deep Soil Mixing Stations (km)
Belen Pass NatP	II	11.25	11.25
Şahin Tepesi NatP	II	64.57	64.57
Tekkoz-Kengerli Düz NR	Ib ,II	61.53	61.53
Arsuz WDA	Ib ,II, IV	19.12	19.12



Protected Area	IUCN Protected Area Category	Distance to Hatay Airport Road (km)	Distance to Deep Soil Mixing Stations (km)
Altınözü WDA	Ib ,II, IV	20.48	20.48
Dağ Ceylanı WDA	Ib ,II, IV	22.16	22.16
Lake Haydar WLI	II,IV,V	48.85	48.85
Mileyha WLI	II,IV,V	41.17	41.17
Gölbaşı Lake WNI	II,IV,V	24.15	24.15

Overall Assessment: All the national protected areas are out of range. No impact is expected on the protected areas.

NatP: Nature Park
NR: Nature Reserve
WDA: Wildlife Development Area
WLI: Wetland of Local Importance
WNI: Wetland of National Importance

Table 19. Legally Protected Areas near Antakya-Reyhanlı Road

Protected Area	IUCN Protected Area Category	Distance to Antakya-Reyhanlı Road (km) (including Demirköprü location)	Distance to Kuruyer Construction and Accommodation Site (concrete plant and asphalt plant - planned mechanical plant) (km)
Belen Pass NatP	II	23.88	29.77
Şahin Tepesi NatP	II	76.93	83.05
Tekkoz-Kengerli Düz NR	Ib ,II	73.63	80.22
Arsuz WDA	Ib ,II, IV	16.80	18.04
Altınözü WDA	Ib ,II, IV	5.39	1.86
Dağ Ceylanı WDA	Ib ,II, IV	16.84	37.09
Lake Haydar WLI	II,IV,V	53.52	66.01
Mileyha WLI	II,IV,V	26.70	26.21
Gölbaşı Lake WNI	II,IV,V	24.73	39.63

Overall Assessment: All the national protected areas are out of range. No impact is expected on the protected area.

NatP: Nature Park
NR: Nature Reserve
WDA: Wildlife Development Area
WLI: Wetland of Local Importance
WNI: Wetland of National Importance

Table 20. Legally Protected Areas near Antakya-Samandağ Road

Protected Area	IUCN Protected Area Category	Distance to Antakya-Samandağ Road (km)
Belen Pass NatP	II	33.48
Şahin Tepesi NatP	II	86.08
Tekkoz-Kengerli Düz NR	Ib ,II	83.78
Arsuz WDA	Ib ,II, IV	7.07
Altınözü WDA	Ib ,II, IV	7.36
Dağ Ceylanı WDA	Ib ,II, IV	44.35
Lake Haydar WLI	II,IV,V	71.41
Mileyha WLI	II,IV,V	0.18
Gölbaşı Lake WNI	II,IV,V	46.04



Protected Area	IUCN Protected Area Category	Distance to Antakya-Samandağ Road (km)
Overall Assessment: Mileyha Wetland of Local Importance (WLI) is located 180 m south to the Antakya-Samandağ Road. No impact is expected on the protected area. Regular spraying is necessary to prevent dust formation. No impact is expected on the other protected areas as well.		
NatP: Nature Park NR: Nature Reserve WDA: Wildlife Development Area WLI: Wetland of Local Importance WNI: Wetland of National Importance		

Table 21. Legally Protected Areas near Malatya-Akçadağ-Gölbashi Road & Erkenek Tunnel

Protected Area	IUCN Protected Area Category	Distance to Malatya-Akçadağ-Gölbashi Road & Erkenek Tunnel (km)	Distance to three permanent material storage areas (km)	Distance to Erkenek Construction and Accommodation Site (km)	Distance to Reşadiye limestone quarry (planned concrete plant, crusher and mechanical plant) (km)	Distance to Erkenek gravel-sand borrow site (km)
Nemrut Mountain NP	II, IV, V, VI	58.69	58.72	63.85	52.34	52.95
Turgut Özal NatP	II	62.28	62.32	65.41	48.17	58.28
Baydağı NatP	II	57.27	57.30	60.32	54.13	53.05
Günpınar Waterfalls NatP	II	78.98	79.02	80.01	81.53	85.47
Gölbashi Lakes NatP	II	7.32	7.35	22.54	35.74	32.61
Overall Assessment: All the national protected areas are out of range. No impact is expected on the protected Areas.						
NP: National Park NatP: Nature Park						

Table 22. Legally Protected Areas near Beylerderesi Bridge

Protected Area	IUCN Protected Area Category	Distance to Beylerderesi Bridge (km)
Turgut Özal NatP	II	14.77
Baydağı NatP	II	11.10
Günpınar Waterfalls NatP	II	73.27
Overall Assessment: All the national protected areas are out of range. No impact is expected on the protected Areas.		
NatP: Nature Park		

Table 23. Legally Protected Areas near Tohma Bridge

Protected Area	IUCN Protected Area Category	Distance to Tohma Bridge (km)	Distance to Tohma Construction and Accommodation Site (km)
Turgut Özalp NatP	II	21.08	20.77
Baydağı NatP	II	20.14	20.17
Günpınar Şelalesi TP/Günpınar Waterfalls NatP	II	71.05	70.93
Overall Assessment: All the national protected areas are out of range. No impact is expected on the protected areas.			
NatP: Nature Park			

Table 24. Legally Protected Areas near Ađın Bridge

Protected Area	IUCN Protected Area Category	Distance to Ađın Bridge (km)	Distance to Ađın Construction Site (km)
Hazar Lake NatP	II	73.69	73.69
Hazar Lake WNI	II,IV,V	72.08	71.90
South Keban Dam Lake WNI	II,IV,V	66.84	66.90
Overall Assessment: All the national protected areas are out of range. No impact is expected on the protected areas.			
NatP: Nature Park WNI: Wetland of National Importance			

3.2.2 Internationally Recognized Areas

Internationally Recognized Areas are defined as "areas of recognized importance to biodiversity conservation but are not always legally protected". These include World Heritage Natural Sites, Biosphere Reserves, Key Biodiversity Areas, Important Bird Areas, Ramsar Wetlands of International Importance, and Alliance for Zero Extinction Sites among others.. Internationally recognized areas of high biodiversity value will often qualify as critical habitat; for instance, areas that meet the criteria of the IUCN's Protected Area Management Categories Ia, Ib and II, or the majority of KBAs, which encompass, among others, Important Bird and Important Plant Areas.

In Trkiye, besides the Ministry's official work, there are various non-governmental organizations (NGOs), academic entities, as well as individual researchers and professionals who work in collaboration or independently to better understand Trkiye's natural resources and put forward impactive conservation strategies to ensure survival of habitats and species, some of which constitute unique ecosystems of global conservation value.

Dođa Derneđi, published an inventory on KBAs in Trkiye in 2006 in collaboration with then the Ministry of Environment and Forestry, integrating survey results across the country with expert opinions⁴. The preparation of the inventory was the first time the KBA approach was applied at a national scale, which was based on principles developed by BirdLife International for bird species in their "Important Bird Areas" studies. One of the fundamental functions of the inventory is defined as "providing resource for areas and species that should be worked upon to reach zero extinction".

Internationally recognized areas around the project area and their IUCN protected area categories are given in according to sub-projects. Distances for the sub-projects under the responsibility of 5th Regional Directorate of Highways: TAG Highway-Aslanlı Tunnel-Nurdađı Junction is given in Table 25; İslahiye-Hassa-Kırıkhan Road is given in

⁴ Eken, G., Bozdogan, M., Isfendiyaroglu, S., Kılıç, D.T.& Lise, Y. 2006. Trkiye'nin Onemli Doga Alanlari. Ankara: Dođa Derneđi



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Table 26; Hatay Airport Road is given in Table 27; Antakya-Reyhanlı Road is given in



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Table 28; and Antakya-Samandağ Road is given in Table 29.

Distances for the sub-projects under the responsibility of 8th Regional Directorate of Highways: Malatya-Akçadağ-Gölbaşı Road & Erkenek Tunnel is given in



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Table 30; Beylerderesi Bridge is given in Table 31; Tohma Bridge is given in Table 32; and Ađın Bridge is given in Table 33.

The maps showing the locations of the internationally recognized areas with respect to the sub-projects are presented in Appendix-3.2.



Table 25. Internationally Recognized Areas near TAG Highway-Aslanlı Tunnel- Nurdağı Junction

Protected Area	Distance to TAG Highway-Aslanlı Tunnel- Nurdağı Junction (km)	Distance to Ceyhan Construction and Accommodation Site (asphalt plant) (km)	Distance to Başpınar Limestone Quarry (km)	Distance to Tatarlı Basalt Quarry (Mechanical plant/crusher) (km)	Distance to Bahçe (Ayran) Concrete Plant (km)
Aladağlar INA	88.99	67.72	118.46	73.87	108.06
Amanos Mountains INA	2.21	46.62	2.19	15.04	within the area
Araban Hills INA	60.82	153.18	54.60	113.28	66.29
Bolkar Mountains INA	156.32	69.46	118.07	100.21	148.30
Ceyhan Delta INA	97.21	23.85	104.27	52.00	92.60
Feke INA	88.99	70.50	92.36	58.24	82.30
Gavur Lake INA	9.54	106.30	8.62	65.50	18.32
South Euphrates Valley and Birecik Steppe INA	75.06	175.86	76.09	135.87	88.66
Karkamış INA	110.13	206.23	111.59	170.16	121.91
Kastabala Valley INA	34.88	47.23	39.11	7.84	27.83
Seyhan Delta INA	125.76	42.64	131.43	76.77	120.05
Sugözü-Akkum INA	73.71	25.60	79.99	29.10	69.82
Yeşilce INA	15.12	112.29	16.19	73.75	26.67
Yılankale Hills INA	83.57	2.86	89.76	29.56	29.07
Aladağlar IPA	120.64	76.34	122.88	80.98	113.38
Seyhan Delta IPA	133.56	47.90	139.65	84.40	128.56
Ceyhan Delta IPA	99.25	24.89	106.00	54.19	95.23
Amanos Mountains IPA	At the border	52.46	within the area	17.81	within the area
Aladağlar IBA	120.64	77.24	136.89	80.98	124.73
Yumurtalık Lagoon IBA	98.33	27.00	104.56	53.14	93.88
Akyatan Lake IBA	128.00	43.52	134.09	80.05	123.49
Gavur Lake IBA	18.12	108.05	11.77	68.09	21.51
Nur Mountains IBA	31.17	61.42	36.86	27.24	26.99
Yumurtalık Lagoon RA	97.30	24.71	103.62	52.90	93.25
Akyatan Lagoon RA	134.12	46.56	140.08	84.98	129.06

Overall Assessment: TAG Highway-Aslanlı Tunnel- Nurdağı Junction is located at the border and, Başpınar Limestone Quarry, and Bahçe (Ayran) Concrete Plant are located within the Amanos Mountains Important Plant Area (IPA). TAG Highway-Aslanlı Tunnel- Nurdağı Junction and Bahçe (Ayran) Concrete Plant are existing infrastructures and construction works will be performed on the existing road. Therefore, no impact is expected. Regular spraying is necessary to prevent dust formation. Başpınar Limestone Quarry will be constructed. According to the survey conducted and literature research, no threatened species were observed/identified. For biodiversity conservation, it is suggested that trees should be re-planted and dust formation should be prevented. Bahçe (Ayran) Concrete Plant is also located within Amanos Mountains Important Nature Area (INA). Due to the concrete plant is an existing facility no impact is expected. Regular spraying is necessary to prevent dust formation.

INA: Important Nature Area

IPA: Important Plant Area

IBA: Important Bird Area

RA: Ramsar Area

Table 26. Internationally Recognized Areas near İslahiye-Hassa-Kırıkhan Road

Protected Area	Distance to İslahiye-Hassa-Kırıkhan Road(km)	Distance to Kızılkaya Limestone Quarry (Asphalt plant and crusher) (km)	Distance to Kızılkaya Construction and Accommodation Site (km)
Altınözü Hills INA	17.36	20.43	18.91
Amanos Mountains INA	2.78	16.77	16.65
Araban Hills INA	72.80	126.48	128.93
Burnaz Coast INA	36.87	56.16	57.38
Gavur Lake INA	30.50	92.81	94.37
South Euphrates Valley and Birecik Steppe INA	89.16	125.39	127.10
İncirli Hills INA	8.94	1.76	3.75
Karkamış INA	134.25	139.63	141.45
Kılıç Mountain INA	64.35	67.67	65.69
Samandağ Dunes INA	61.21	66.36	64.45
Yeşilce INA	24.06	75.08	77.07
Amanos Mountains IPA	At the border	10.17	10.50
Nur Mountains IBA	4.55	18.72	19.47
Gavur Lake IBA	33.45	94.08	96.26
Lower Orontes Hydrobasin AZE	12.09	1.98	3.15

Overall Assessment: İslahiye-Hassa-Kırıkhan Road is located at the border of Amanos Mountains Important Plant Area (IPA). No impact is expected, due to the road is an existing infrastructure and construction works will be performed on the existing road. Regular spraying is necessary to prevent dust formation.

INA: Important Nature Area
 IPA: Important Plant Area
 IBA: Important Bird Area
 AZE: Area of Zero Extinction

Table 27. Internationally Recognized Areas near Hatay Airport Road

Protected Area	Distance to Hatay Airport Road (km)	Distance to Deep Soil Mixing Stations (km)
Altınözü Hills INA	within the area	within the area
Amanos Mountains INA	3.43	3.74
Burnaz Coast INA	56.19	56.81
İncirli Hills INA	25.03	27.02
Kılıç Mountain INA	45.76	45.06
Samandağ Dunes INA	43.74	42.64
Amanos Mountains IPA	0.04	1.82
Nur Mountains IBA	8.81	10.73
Lower Orontes Hydrobasin AZE	3.96	4.72

Overall Assessment: Hatay Airport Road and Deep Soil Mixing Stations are within the Altınözü Hills Important Nature Area (INA). No impact is expected, due to the road and facility are existing infrastructure and facility and construction works will be performed on the existing road. Regular spraying is necessary to prevent dust formation.

INA: Important Nature Area
 IPA: Important Plant Area
 IBA: Important Bird Area
 AZE: Area of Zero Extinction

Table 28. Internationally Recognized Areas near Antakya-Reyhanlı Road

Protected Area	Distance to Antakya-Reyhanlı Road (km) (including Demirköprü location)	Distance to Kuruyer Construction and Accommodation Site (concrete plant and asphalt plant- planned mechanical plant) (km)
Altınözü Hills INA	within the area	within the area
Amanos Mountains INA	9.11	10.79
Burnaz Coast INA	71.50	73.88
İncirli Hills INA	25.51	42.68
Kılıç Mountain INA	30.48	27.34
Samandağ Dunes INA	28.96	26.21
Amanos Mountains IPA	10.24	10.84
Nur Mountains IBA	14.70	15.16
Lower Orontes Hydrobasin AZE	8.24	19.74

Overall Assessment: Antakya-Reyhanlı Road and Kuruyer Construction and Accommodation Site are within the Altınözü Hills Important Nature Area (INA). No impact is expected, due to the road and facility are existing infrastructure and facility and construction works will be performed on the existing road. Regular spraying is necessary to prevent dust formation.

INA: Important Nature Area
 IPA: Important Plant Area
 IBA: Important Bird Area
 AZE: Area of Zero Extinction

Table 29. Internationally Recognized Areas near Antakya-Samandağ Road

Protected Area	Distance to Antakya-Samandağ Road (km)
Altınözü Hills INA	0.83
Amanos Mountains INA	within the area
Burnaz Coast INA	76.21
İncirli Hills INA	49.07
Kılıç Mountain INA	7.19
Samandağ Dunes INA	within the area
Amanos Mountains IPA	within the area
Nur Mountains IBA	15.22
Lower Orontes Hydrobasin AZE	26.80

Overall Assessment: Antakya-Samandağ Road is within the Amanos Mountains Important Nature Area (INA), Samandağ Dunes Important Nature Area (INA), and Amanos Mountains Important Plan Area (IPA). No impact is expected, due to the road is an existing infrastructure and construction works will be performed on the existing road. Regular spraying is necessary to prevent dust formation. Also, Altınözü Hills Important Nature Area (INA) is located 0.83 km east and Kılıç Mountain Important Nature Area (INA) is located 7.19 km south to the Antakya-Samandağ Road. No impact is expected on these areas.

INA: Important Nature Area
 IPA: Important Plant Area
 IBA: Important Bird Area
 AZE: Area of Zero Extinction

Table 30. Internationally Recognized Areas near Malatya-Akçadağ-Gölbaşı Road & Erkenek Tunnel

Protected Area	Distance to Malatya-Akçadağ-Gölbaşı Road & Erkenek Tunnel (km)	Distance to Three permanent material storage areas (km)	Distance to Erkenek Construction and Accommodation Site (km)	Distance to Reşadiye limestone quarry (planned concrete plant, crusher and mechanical plant) (km)	Distance to Erkenek gravel-sand borrow site (km)
Adıyaman Gölbaşı Lakes INA	5.64	17.80	21.16	34.24	30.98
Karakaya Dam INA	80.01	79.07	76.19	64.22	69.32
Nemrut Mountains INA	60.35	68.54	65.68	54.13	54.68
S. Euphrates Valley Birecik Steppe INA	44.66	47.84	48.45	52.83	47.30
Bozova INA	60.34	63.30	63.92	60.89	56.30
Tohma Valley INA	58.85	58.83	57.95	57.58	62.09
Kubbe Mountains INA	10.38	14.95	13.03	2.80	7.70
Araban Hills INA	36.97	64.66	49.11	60.34	55.34
Tohma Valley IPA	60.72	61.69	65.77	61.67	65.80
Overall Assessment: All the internationally recognized areas are out of range. No impact is expected on the internationally recognized areas.					
INA: Important Nature Area IPA: Important Plant Area					

Table 31. Internationally Recognized Areas near Beylerderesi Bridge

Protected Area	Distance to Beylerderesi Bridge (km)
Karakaya Barajı ÖDA/Karakaya Dam INA	23.71
Kubbe Dağı ÖDA/Kubbe Mountain INA	1.62
Tohma Vadisi ÖDA/Tohma Valley INA	44.34
Tohma Vadisi ÖBA/Tohma Valley IPA	51.83
Overall Assessment: All the internationally recognized areas are out of range. No impact is expected on the internationally recognized areas.	
INA: Important Nature Area IPA: Important Plant Area	

Table 32. Internationally Recognized Areas near Tohma Bridge

Protected Area	Distance to Tohma Bridge (km)	Distance to Tohma Construction and Accommodation Site (km)
Karakaya Dam INA	13.05	13.88
Kubbe Mountain INA	16.30	16.12
Tohma Valley INA	44.06	43.64
Tohma Valley IPA	53.29	53.93
Overall Assessment: All the internationally recognized areas are out of range. No impact is expected on the internationally recognized areas.		
INA: Important Nature Area IPA: Important Plant Area		

Table 33. Internationally Recognized Areas near Ağin Bridge

Protected Area	Distance to Ağin Bridge (km)	Distance to Ağin Construction Site (km)
Soth Keban Dam INA	64.38	73.74
Southeast Taurus Threshold INA	103.95	64.57
Hazar Lake INA	74.34	73.68

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Protected Area	Distance to Ađın Bridge (km)	Distance to Ađın Construction Site (km)
Karakaya Dam INA	47.85	47.75
Munzur Mountains INA	6.50	6.84
Overall Assessment: All the internationally recognized areas are out of range. No impact is expected on the internationally recognized areas.		
INA: Important Nature Area		

3.3 Project Alternatives

Since the project involves the reconstruction and rehabilitation of existing roads and bridges that were damaged by the earthquake, selecting alternative locations are not feasible. It is essential to realize the project urgently to recover from the earthquake damages. Therefore, no-project alternative cannot be considered as well due to emergency nature of the project. However, various technological and design alternatives are available to enhance the resilience of the project area against potential future natural disasters. Türkiye's infrastructure strategy post-2023 earthquakes is centered on building systems that are not only earthquake-resistant but also resilient to a variety of climate-induced hazards. This holistic approach to sustainable reconstruction incorporates resilience and sustainability into the rebuilding process. For example, traditional rigid concrete or iron retaining walls will be replaced with geosynthetic reinforced walls where suitable. These innovative walls offer greater flexibility, lacking rigid components, which enables them to absorb both horizontal and vertical shifts occurring during and post-construction. This adaptability makes them exceptionally resistant to earthquakes. Moreover, these geosynthetic walls are equipped with special plant-holding facades, seamlessly integrating them into the natural environment by fostering greenery shortly after construction. For ground stabilization, the subprojects will incorporate geocomposite floor reinforcements where suitable to mitigate potential shifts at the base, enhancing the overall structural integrity. Cutting-edge materials from Europe and the Republic of Korea that bear the "CE" marking, such as cables, bearings, and expansion joints will be used in the refurbishment of bridges within subproject 5.

On the other hand, there could be site and/or technology alternatives for the selection of related and auxiliary facilities (such as quarry/borrow sites, asphalt plant, concrete plant, etc.). The key criteria for assessing the selection alternatives for related/auxiliary facilities are indicated in Table 34.

Table 34. Key Criteria for Assessing the Selection Alternatives for Related/Auxiliary Facilities

Criteria	Description
Environmental Impact	Impact on air, water, soil, and ecosystems.
Regulatory Compliance	Adherence to laws, regulations, and permits.
Technical Feasibility	Viability of construction, technology, and operations.
Economic Viability	Cost-effectiveness and financial feasibility of the facility.
Social Impact	Impacts on local communities and stakeholders.
Operational Efficiency	Effectiveness in performing functions and resource management.
Health and Safety	Ensuring a safe working environment and emergency preparedness.
Site Suitability	Assessing the location for construction and future needs.
Environmental Restoration	Plans for site reclamation and long-term environmental management.
Sustainability	Long-term environmental, economic, and social impacts and practices.
Community Impact	Impact on local infrastructure, property values, and public health.
Alternative Availability	Availability of other sites or methods for achieving the project goals.



Criteria	Description
Resource Availability	Availability of necessary raw materials and resources.
Environmental Risks	Identification and management of potential environmental risks.

The selected quarries within the scope of the project are deemed suitable due to their current use for other projects (existing in mostly anthropogenically modified habitats), their proximity to the sub-project areas, and their relative distance from residential areas, protected areas, and water bodies. It has also been observed that the construction sites, asphalt plants, concrete plants, and crushing screening/mechanical facilities are located in similarly suitable areas. Provided that environmental regulations are adhered to; these sites are not anticipated to cause significant environmental or social impacts. Additionally, due to challenges in debris management caused by the dumping of construction and demolition waste in vacant lands due to earthquakes in the region, it is recommended to evaluate alternatives for the disposal of excavation wastes within the framework of rehabilitation projects in coordination with the MoEUCC, rather than storing it in material storage areas determined by KGM.

For the blasting operations carried out in the quarries/borrow sites located close to residential areas, alternatives to blasting such as hydraulic hammers or mechanical methods could be considered. The number of holes to be blasted in one shot and the total charge amounts per shot should be optimized by applying modern blasting techniques. On the other hand, for the operations of the asphalt plants, lower-temperature asphalt production techniques should be used by incorporating recycled materials in the production process, such as reclaimed asphalt pavement in asphalt plants and recycled concrete aggregates.



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4 ENVIRONMENTAL & SOCIAL BASELINE, IMPACT ASSESSMENT AND MITIGATION MEASURES

Environmental and social baseline, impact assessment and mitigation measures are discussed in this chapter on following topics:

- Land Use, Soils and Geology
- Noise and Vibration
- Air Quality and Greenhouse Gas Emissions
- Water Resources, Water Quality and Wastewater Management
- Resource and Waste Management
- Cultural Heritage
- Biological Environment
- Socio-Economic Environment
- Resettlement and Land Acquisition and Livelihood
- Labor and Working Conditions
- Community Health, Safety and Security
- Occupational Health and Safety

Given the scope and scale of the Project that all works are conducted on the existing roads/bridges, after taking the mitigation measures resulting from this ESIA process, the Project is expected to have negligible contribution to the cumulative impacts, and therefore there is no need for a detailed cumulative impact assessment.

4.1 Land Use, Soils and Geology

4.1.1 Methodology and Project Standards

The sub-projects under the responsibility of the 5th Regional and 8th Regional Directorates of Highways have been evaluated as a whole in terms of land use, soil and geology, and the characteristics are given separately for the sub-projects on the maps. The Area of Influence (Aol) for the project has been determined to include a 250-meter corridor extending each side of the sub-project roads undergoing rehabilitation and reconstruction. Furthermore, a 250-meter radius area around the boundaries of each related/auxiliary facility which are given in Table 15.

Basic data on land use, soil and geology for the project were compiled from the following sources:

- Land Asset Data of the Ministry of Agriculture and Forestry
- Database of General Directorate of Land Registry and Cadaster
- Geographical Information System (GIS)
- Public Database:
 - General Directorate of Mineral Research and Exploration (MTA)
 - Disaster and Emergency Management Presidency (Earthquake Research Department Database)
 - Disaster and Emergency Management Presidency (Natural Disasters Database).

According to the data of the Ministry of Agriculture and Forestry, there are orchards, scrubs, agricultural areas, pasture, forests, vineyards, residential-industrial areas, and water bodies. Accordingly, the activities to be carried out under the Project will be subject to the provisions of the national laws and regulations listed below:



- Agricultural Reform Law on Land Rearrangement in Irrigated Areas
- Law on Soil Conservation and Land Use
- Pasture Law
- Regulation on Protection of Agricultural Lands and Land Consolidation
- Governing Regulation on Soil Conservation and Land Use
- Regulation on the Control of Soil Pollution and Lands Polluted by Point Sources

The significance of the impacts was assessed based on the sensitivity of the receptors and the overall magnitude of the impact as described in Section 1.4. The magnitude of the impact is determined using quantitative or, where this is not possible, qualitative methods based mainly on professional judgement.

4.1.2 Baseline Conditions

4.1.2.1 Land Use

4.1.2.1.1 Land Use Distribution

In this chapter, the total area assessed in terms of land use for the projects in the 5th region is 77.42 km², and 14.61 km² for the projects in the 8th region. According to data from the Ministry of Agriculture and Forestry, Aol includes orchards, scrubs, agricultural areas, pasture, forests, vineyards, residential-industrial areas, and water bodies. In the 5th and 8th regions, agricultural areas predominate. Additionally, the 8th region has a significant area of pastureland.

The land use distribution of Aol both 5th and 8th region is given in Table 35 and land use maps for all sub-projects are presented in Figure 13 to Figure 20.

Table 35. Land Use Distribution of Aol

Land Use Type	Abbreviation	5 th Region Area (km ²)	5 th Region (%)	8 th Region Area (km ²)	8 th Region (%)	Total Area (km ²)	Total Percentage (%)
Orchard (Irrigated)	Bs	0.00	0.00	0.12	0.82	0.12	0.14
Shrubs	F	1.95	2.52	0.13	0.89	2.08	2.38
Non-irrigated Agricultural Areas (Fallow)	K	1.64	2.12	3.75	25.67	5.39	6.16
Pasture	M	9.98	12.89	5.14	35.17	15.12	17.26
Non-irrigated Agricultural Areas (without Fallow)	N	21.91	28.30	0.00	0.00	21.91	25.02
Forest	O	2.85	3.68	3.09	21.16	5.94	6.79
Irrigated Agricultural Areas	S	27.00	34.88	0.45	3.07	27.45	31.35
Irrigated Agriculture (Insufficient)	Sy	6.34	8.20	0.00	0.00	6.34	7.25
Vineyard (Dry)	V	2.35	3.04	0.86	5.88	3.21	3.67
Industrial/Residential Area or Water Body	Y/Ys/Br	3.39	4.37	1.07	7.35	4.46	5.09
Total		77.42	100.00	14.61	100.00	92.03	100.00

4.1.2.1.2 Land Use Capability (LUC)

Land use capability refers to the inherent potential of a piece of land to support specific human activities and land uses based on its physical, environmental, and ecological characteristics. It involves an assessment of the land's suitability for various purposes, such as agriculture, infrastructure development, conservation, or recreational use.

Land use capability classes that are defined by the Ministry of Agriculture and Forestry are presented in Table 36.

Table 36. Descriptions of Land Use Capability Classes

Arability	Capability Class	Description	Factors Restricting Agriculture
Agricultural lands suitable for soil cultivation	I	Soils have good drainage; they are not exposed to flood damage. They are suitable for anchor crops and other intensively grown crops. First-class lands irrigated where there is little precipitation are those that have less than 1% inclination, deep, loamy structure, good water holding capacity, and moderately permeable soils.	There is no or little limitation.
	II	Second class land is a good land that can be easily cultivated only by taking some special measures.	Special mitigation measures are required for soil and water loss.
	III	The third-class land is a moderately good land for the anchor crops, which generates a lot of income by using a good crop rotation and applying appropriate agricultural methods.	Moderate inclination, excessive sensitivity to erosion, excessive wetness, shallow soil, presence of base stone, excess sandiness or graveliness, low water holding capacity and low productivity are the properties of this class of land.
	IV	With suitable ploughing, some special agricultural crops can be cultivated. Generally, it needs special care during agricultural use.	There are serious limitations related with soil depth, stone content, humidity and inclination
Agricultural lands not suitable for soil cultivation	V	This class includes soils that are even or slightly inclined, stony or very moist. These are not suitable for ploughing and cultivation. Generally, they are used for meadow or forestry area	They have weak drainage and a structure not suitable for ploughing.
	VI	This is not suitable for ploughing and cultivation. They are mostly used as pasture and forestry area.	Very serious limitations are present owing to inclination and shallow soil.
	VII	It is not economic for agricultural activities; however, it is suitable for weak pasture or afforestation areas	There are limitations owing to shallow soil, stone content, inclination and erosion.
Non-arable lands	VIII	It is not suitable for vegetation. It can be used for recreational purposes or as wildlife protection area.	These include marshland, desert, terrains containing very deep cavities, high mountainous, overly defective, stony lands.

Source: Republic of Türkiye, Ministry of Agriculture and Forestry

The suitability of different land classes for cultivation, grazing and forestry activities is identified within the scope of the Technical Procedure on Soil and Land Classification Standards published by the former Ministry of Agriculture and Rural Services in 2008, as presented in Table 37.

Table 37. Suitable Land Uses According to the Land Use Capability Classes

Land Use Capability	———— Increase in Land Use Intensity ———▶								
	Wildlife	Forestry	Grazing			Agriculture			
			Limited	Moderate	Intensive	Limited	Moderate	Intensive	Very Intensive
<i>Class I</i>									
<i>Class II</i>									
<i>Class III</i>									
<i>Class IV</i>									
<i>Class V</i>									
<i>Class VI</i>									
<i>Class VII</i>									
<i>Class VIII</i>									

Source: Republic of Türkiye, Ministry of Agriculture and Forestry

The distribution of land use capability classes of the Project Aol is given in Table 38. As seen in the table, the 5th region generally consists of Classes I, II, and III, while in the 8th region, Class VII is the most common, along with a majority of Class III lands. While Classes I, II, and III are agricultural lands suitable for soil cultivation, Class VII is classified as agricultural land not suitable for soil cultivation. All land use capability classes for sub-projects are presented in Figure 13, Figure 14, Figure 15, Figure 16, Figure 17, Figure 18, Figure 19 and Figure 20.

Table 38. Land Use Capability Classes of the Project Study Area

Land Use Capability Classes	5 th Region		8 th Region		Total Area (km ²)	Total Percentage
	Area (km ²)	%	Area (km ²)	%		
Class I	15.36	19.84	0.45	3.07	15.81	17.17
Class II	12.85	16.59	0.00	0.00	12.85	13.96
Class III	20.81	26.89	3.63	24.88	24.45	26.57
Class IV	8.80	11.37	0.36	2.47	9.17	9.96
Class V	0.00	0.00	0.00	0.00	0.00	0.00
Class VI	5.40	6.98	0.53	3.62	5.93	6.45
Class VII	10.93	14.12	8.58	58.71	19.51	21.20
Class VIII	0.54	0.70	0.07	0.46	0.61	0.66
No Data	2.72	3.52	0.99	6.78	3.71	4.03
Total	77.42	100.00	14.61	100.00	92.03	100.00

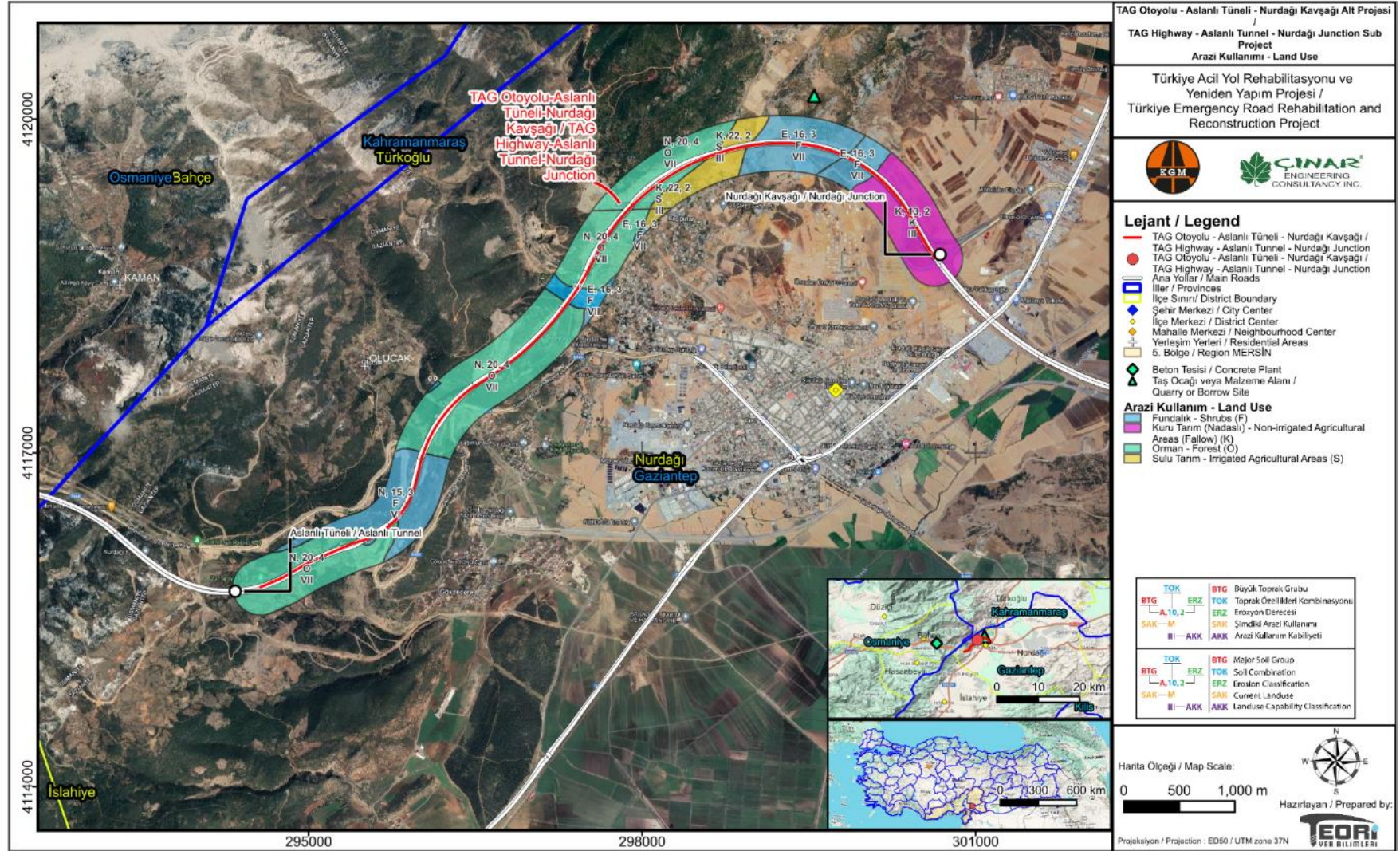


Figure 13. Land Use Map of TAG Highway – Aslanlı Tunnel – Nurdağı Junction Sub-Project

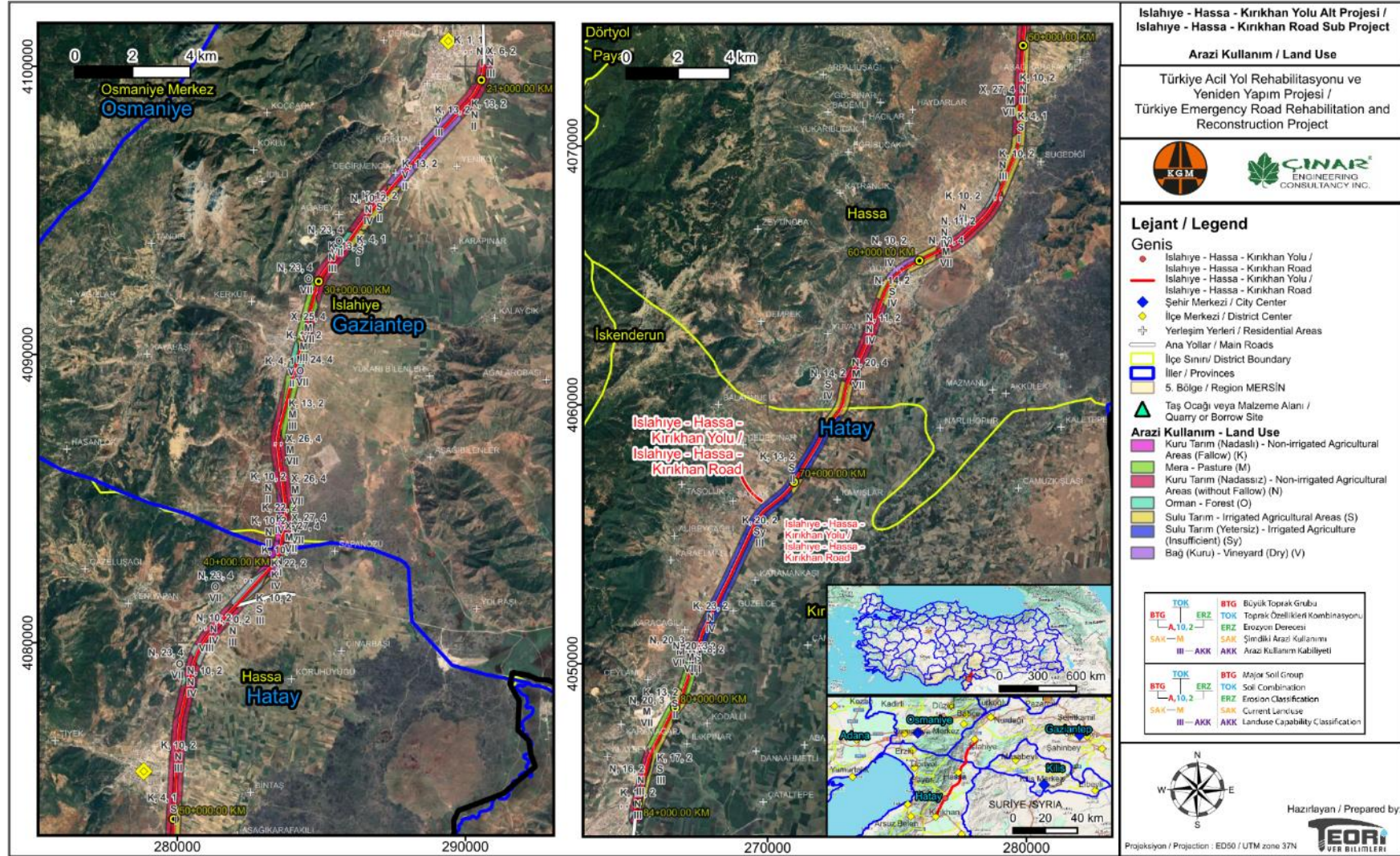


Figure 14. Land Use Map of İslahiye – Hassa – Kırkhan Road Sub-Project

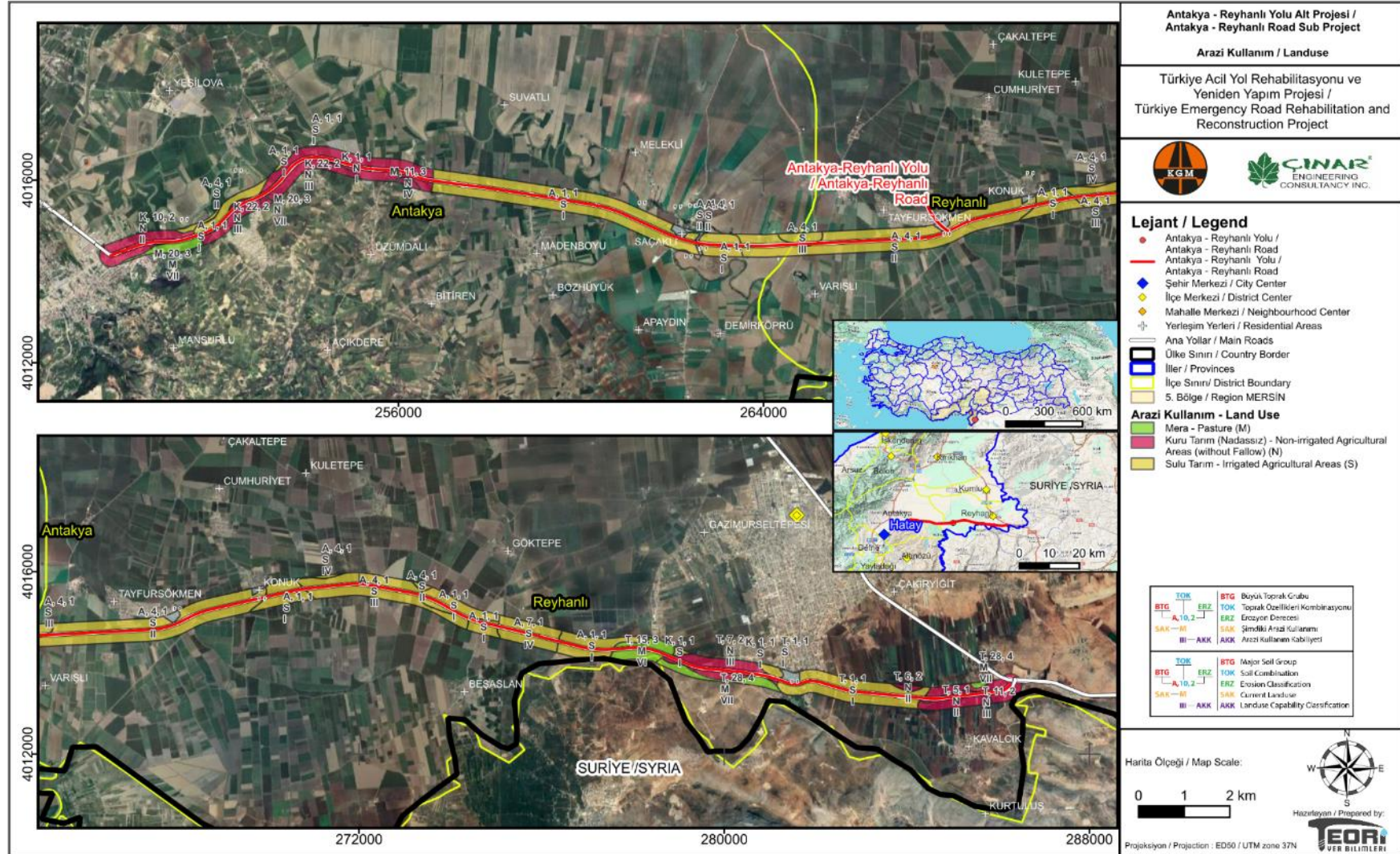


Figure 15. Land Use Map of Antakya – Reyhanlı Road Sub-Project

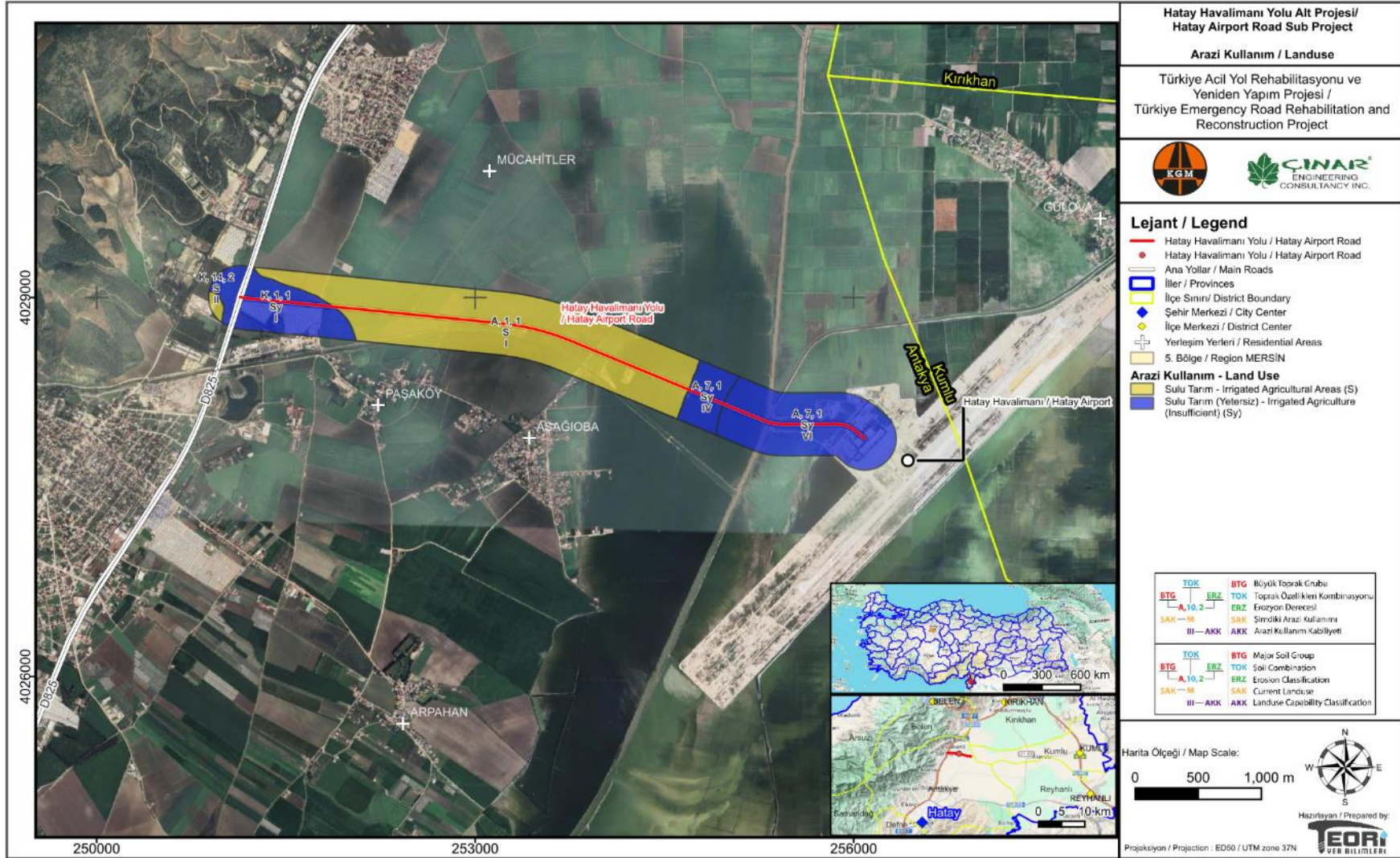


Figure 16. Land Use Map of Hatay Airport Sub-Project



Figure 17. Land Use Map of Antakya – Samandağ Road Sub-Project



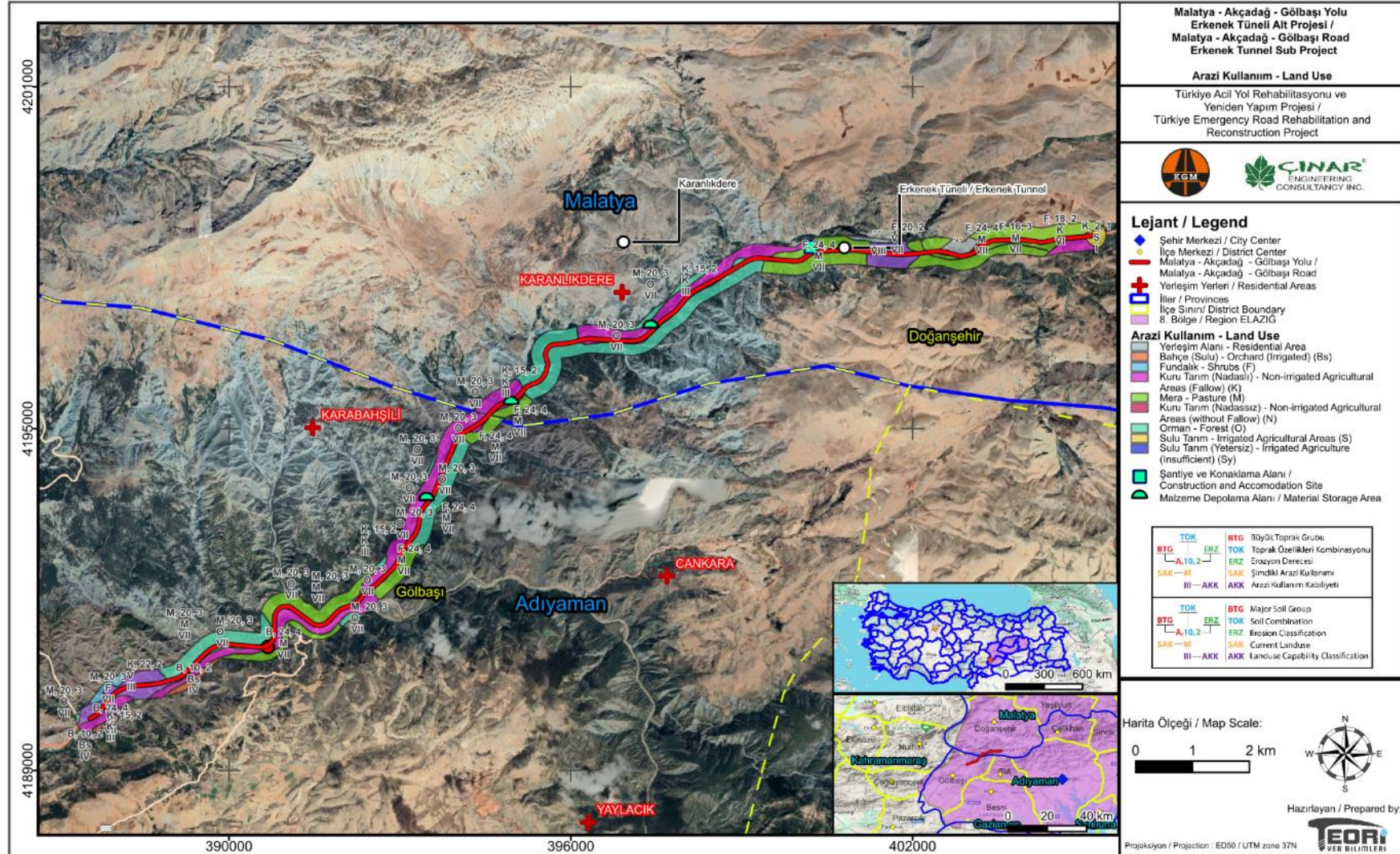


Figure 18. Land Use Map of Malatya – Akçadağ - Gölbaşı Road Sub-Project

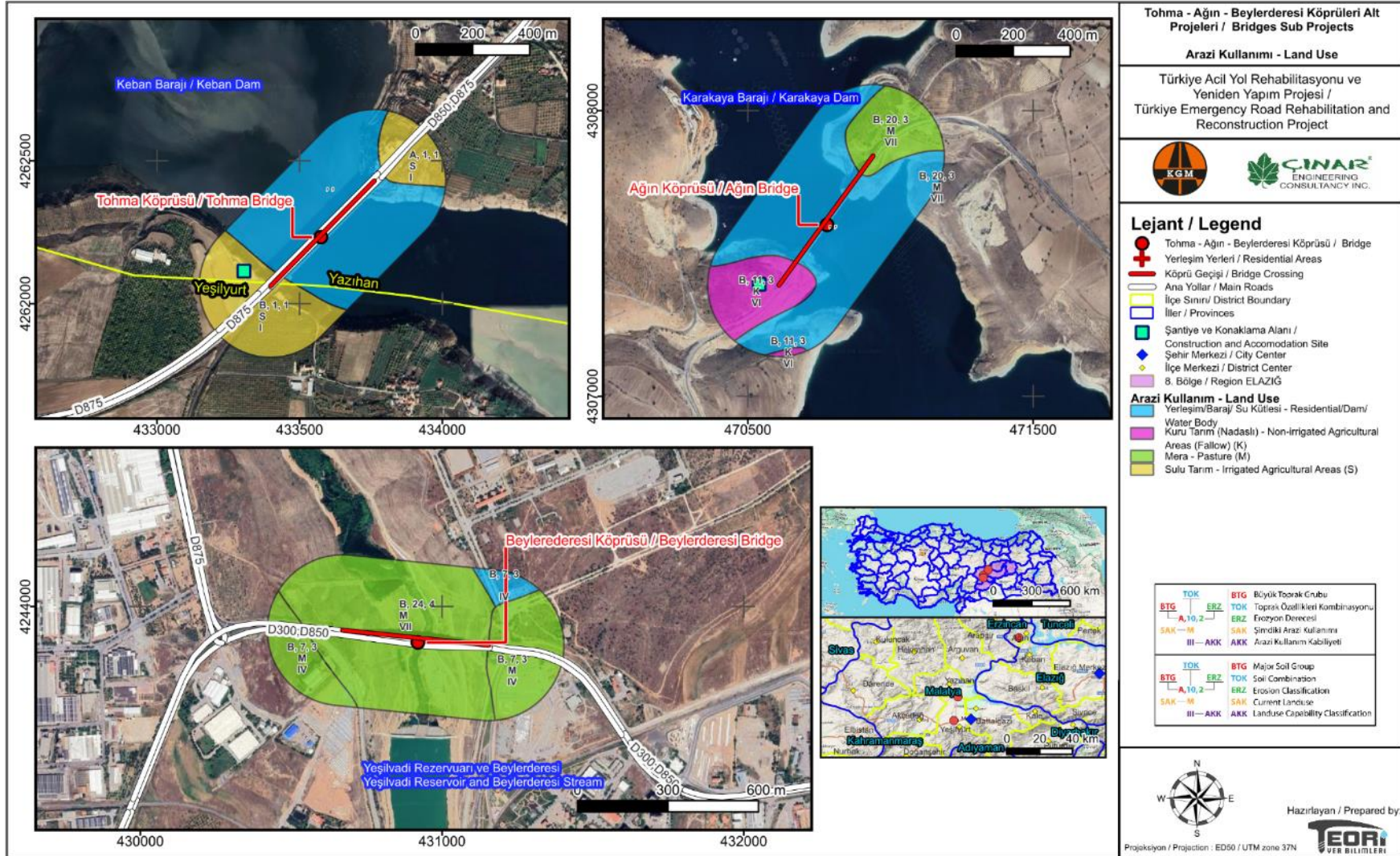


Figure 19. Land Use Map of Tohma – Ağın and Beylerderesi Bridges Sub-project

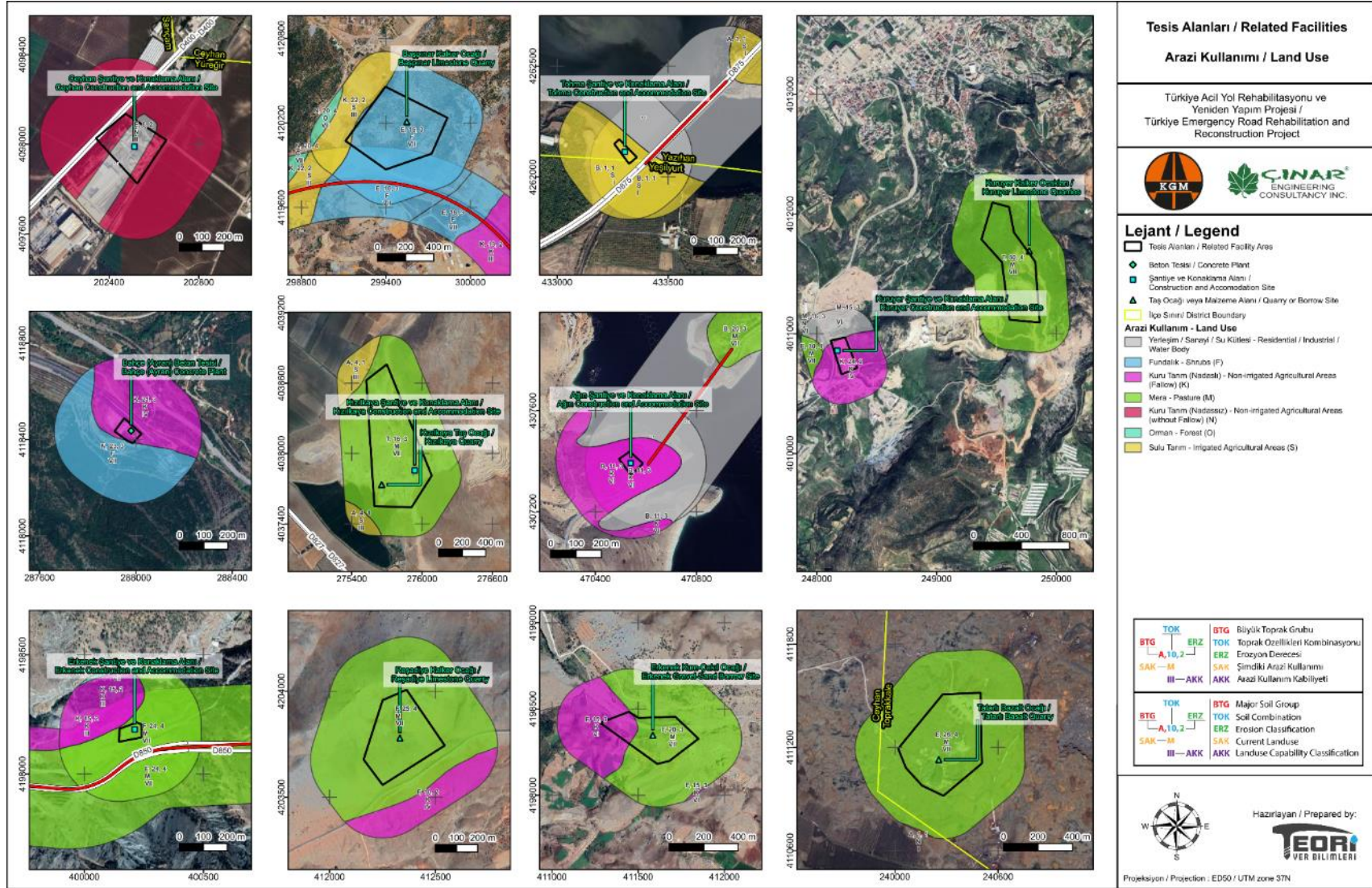


Figure 20. Land Use Map of Related Facilities



4.1.2.2 Soil

4.1.2.2.1 Major Soil Groups

In the ESIA Report of the proposed project, a critical aspect of the evaluation is related to the assessment of main soil groups within a 250-meter impact area on each side along the sub-project routes as well as a 250-meter radius area around the boundaries of each related/auxiliary facility.

The evaluation of main soil groups is crucial for understanding and mitigating the potential impacts of the project on soil quality and, consequently, on the broader environment and local communities.

According to the data of the Ministry of Agriculture and Forestry, the major soil type distribution of Aol is listed in Table 39 and the major soil group maps for all sub-projects are presented in Figure 21, Figure 22, Figure 23, Figure 24, Figure 25, Figure 26, Figure 27 and Figure 28.

Table 39. Distribution of Major Soil Groups in the Aol

Major Soil Groups	Abbreviation	5 th Region Area (km ²)	5 th Region (%)	8 th Region Area (km ²)	8 th Region (%)	Total Area (km ²)	Total Percentage (%)
Alluvial Soils	A	19.18	24.77	0.05	0.31	19.22	20.89
Brown Soils	B	0.00	0.00	1.42	9.72	1.42	1.54
Red Brown Mediterranean Soil	E	2.56	3.31	0.00	0.00	2.56	2.78
Reddish Brown Soils	F	0.00	0.00	4.59	31.41	4.59	4.99
Colluvial Soils	K	30.38	39.24	3.73	25.53	34.11	37.06
Brown Forest Soils	M	3.03	3.91	3.77	25.78	6.79	7.38
Limeless Brown Forest Soils	N	11.53	14.89	0.00	0.00	11.53	12.53
Red Mediterranean Soil	T	6.52	8.42	0.00	0.00	6.52	7.08
Basaltic Soils	X	0.97	1.25	0.00	0.00	0.97	1.05
Residential/ Industrial Zone/ Water Body	-	3.26	4.21	1.06	7.24	4.32	4.70
Total		77.42	100.00	14.61	100.00	92.03	100.00

The table shows the major soil groups in the 5th and 8th regions. In the 5th region, the most common soils are Colluvial Soils (39.24%) and Alluvial Soils (24.77%). In the 8th region, the most prevalent soils are Reddish Brown Soils (31.41%), Brown Forest Soils (25.78%) and Colluvial Soils (25.53%). Overall, Colluvial Soils dominate both regions at 37.06%, followed by Alluvial Soils at 20.89%.

Major soil groups determined within the Aol are defined in Table 40.

Table 40. Major Soil Group Description in the Aol

Soil Group	Abbreviation	Description
Alluvial Soils	A	These young soils that form on fresh sedimentary deposits have no layers or development of their layers is quite low. Yet they contain mineral layers of different characteristics. These soils are mostly under the influence of groundwater. Significant in terms of agriculture, these soils are suitable for all culture plants that the climate allows. Productivity can range from very high to very low.
Brown Soils	B	These soils are mostly found in arid and semi-arid climates. The natural vegetation on them consists of short grasses and bushes. They contain a lot of calcium in their profile. They are rich in plant nutrients. Their

Soil Group	Abbreviation	Description
		natural drainage is good. Their color is brown, as their name suggests. Organic matter content is medium. There is mostly a hardened lime accumulation layer under the subsoil. A gypsum accumulation layer may exist beneath this. These soils remain dry for long periods in summer. Temperatures are low in winter and spring, when most of the precipitation falls. Therefore, except for short periods in spring and autumn, chemical and biological activities in the soil are slow.
Red Brown Mediterranean Soil	E	Except for color, almost all of their properties are the same or similar to Brown soils. Again, like them, they are found in arid and semi-arid climates. Their natural vegetation is grass and shrubs. Their natural drainage is good. Biological activity is low in these soils. Their natural fertility is high.
Reddish Brown Soils	F	Natural vegetation is mixed grasses and shrubs, sometimes small trees. Their natural drainage is good. Natural efficiency is medium. The bottom soil is clayier and denser than the top and the calcareous content is higher.
Colluvial Soils	K	These soils that form on colluvial materials, which are deposited after carried for short distances through gravity, landslide, surface runoff, or nearby streams, are young and resemble soils of higher land in the surroundings. They involve layers of various sizes of segments based on the precipitation and runoff severity, and inclination. These layers are not parallel to one another, as in alluvial soils. Their drainage is good. Soils are occasionally subject to flooding. Type of the natural vegetation depends on the climate. When irrigated, they provide good agricultural productivity.
Brown Forest Soils	M	These soils were formed on the main substance with high lime content. They have poorly developed layers. Their reactions are neutral or calcareous. Lime accumulation occurs in the lower parts of the subsoil. Their drainage is good.
Limeless Brown Forest Soils	N	These soils have a dark layer on top and a slightly different layer on the bottom. The soils are non-calcareous and the reaction is acid, neutral or alkaline. Their natural productivity is not high.
Red Mediterranean Soil	T	The most obvious characteristics of these soils are the brick red color of the entire profile and the lack of organic matter in the topsoil. Soil carbonates consist of washed clay. During the dry summer season, there is no water available to plants in these lands. Additionally, plants cannot benefit sufficiently from the phosphate in these soils. Since these lands are mostly shallow, stony and rocky, they are not very suitable for grazing. Since their drainage is good, there is no salinity problem in these soils.
Basaltic Soils	X	These are heavy clay, dark colored soils and their profiles are not well developed. These often contain no lime. Soil reaction varies between neutral and medium calcareous. Soils are relatively poor in organic matter. Since their physical properties are bad, their efficiency is mostly low. Since some of the soils are quite stony, they should be cleaned from the stones for intensive use.

Source: Republic of Türkiye, Ministry of Agriculture and Forestry

4.1.2.2.2 Soil Erosion

Erosion is the phenomenon of soil clusters being transported by factors such as water and wind and consequently accumulating in different environments from where they belong. Soil erosion is a two-step process that involves breaking up clumps of soil into individual or portable particles and transporting them with water and air streams.

Erosion affects agricultural productivity negatively and creates a sedimentation-based pollution in the surface water basin where it is located.



Soil erosion degree in Türkiye is evaluated based on the erosion classification scheme put forward by the U.S. Department of Agriculture, adopted by several national authorities. Accordingly, the GDRS Database has a four-degree classification as the following:

- Degree 1: None or very low level of erosion
- Degree 2: Moderate level of erosion
- Degree 3: Severe level erosion
- Degree 4: Very severe erosion

According to the soil data of the Ministry of Agriculture and Forestry, the distribution of soils on the Aol by erosion degrees is presented in Table 41. The soil erosion maps for all sub-projects are presented in Figure 21 to Figure 28.

Table 41 shows the distribution of water erosion degrees in the 5th and 8th regions. The 5th region primarily experiences Degree 1 (33.37%) and Degree 2 (43.50%) erosion, while the 8th region is most affected by Degree 2 (29.70%) and Degree 3 (38.92%) erosion. Combined, Degree 2 erosion is the most prevalent at 41.31%, followed by Degree 1 at 28.56%.

Table 41. Erosion Degree Classification of Aol

Erosion Degree	5 th Region Area (km ²)	5th Region %	8 th Region Area (km ²)	8th Region %	Total Area (km ²)	Total Percentage
Degree 1 Water Erosion	25.84	33.37%	0.45	3.07%	26.28	28.56%
Degree 2 Water Erosion	33.68	43.50%	4.34	29.70%	38.02	41.31%
Degree 3 Water Erosion	7.28	9.41%	5.69	38.92%	12.97	14.09%
Degree 4 Water Erosion	7.36	9.50%	3.08	21.07%	10.43	11.34%
No data	3.26	4.21%	1.06	7.24%	4.32	4.70%
Total	77.42	100.00%	14.61	100.00%	92.03	100.00%

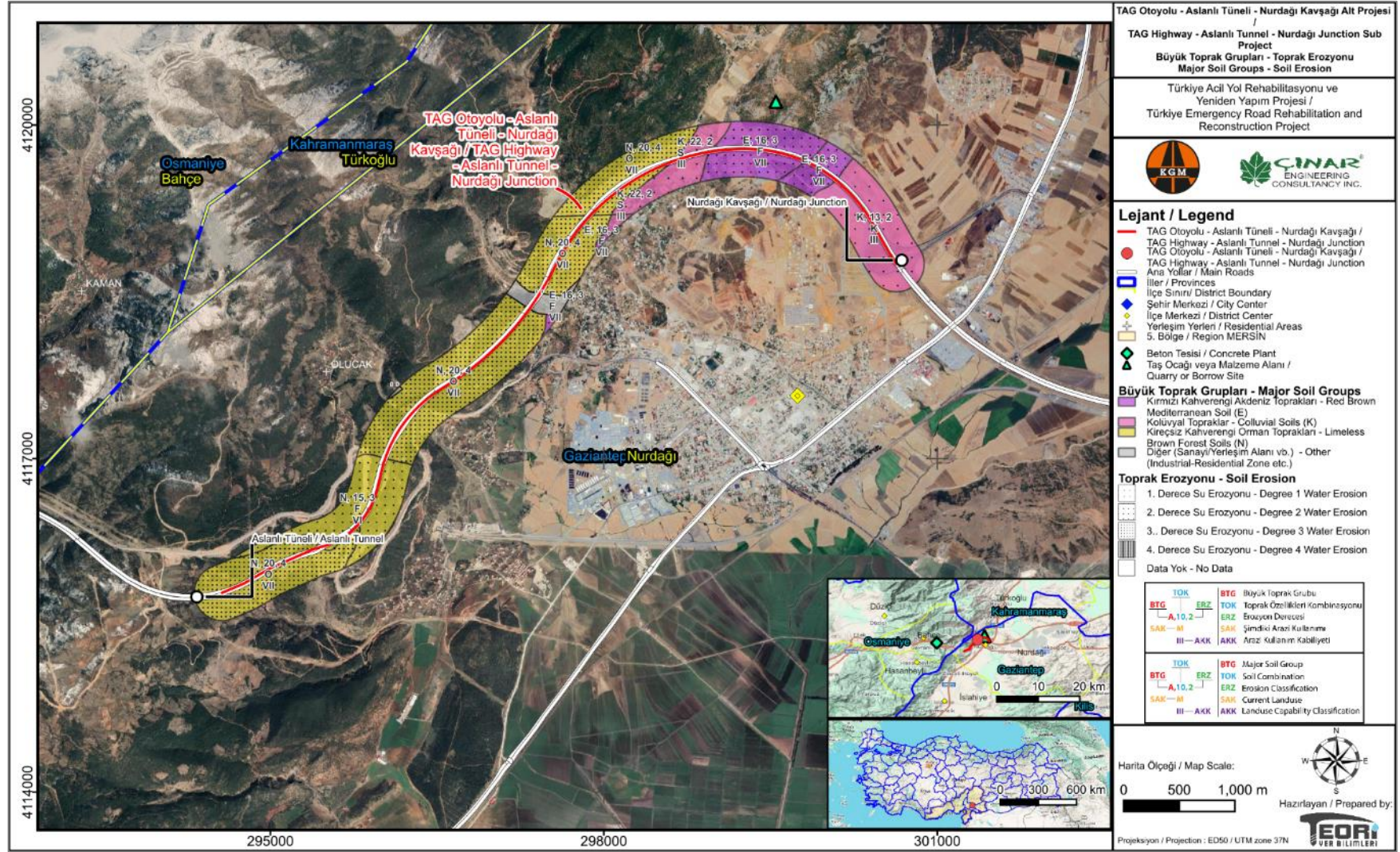


Figure 21. Major Soil Groups and Soil Erosion Map of TAG Highway – Aslanlı Tunnel – Nurdağı Junction Sub-project

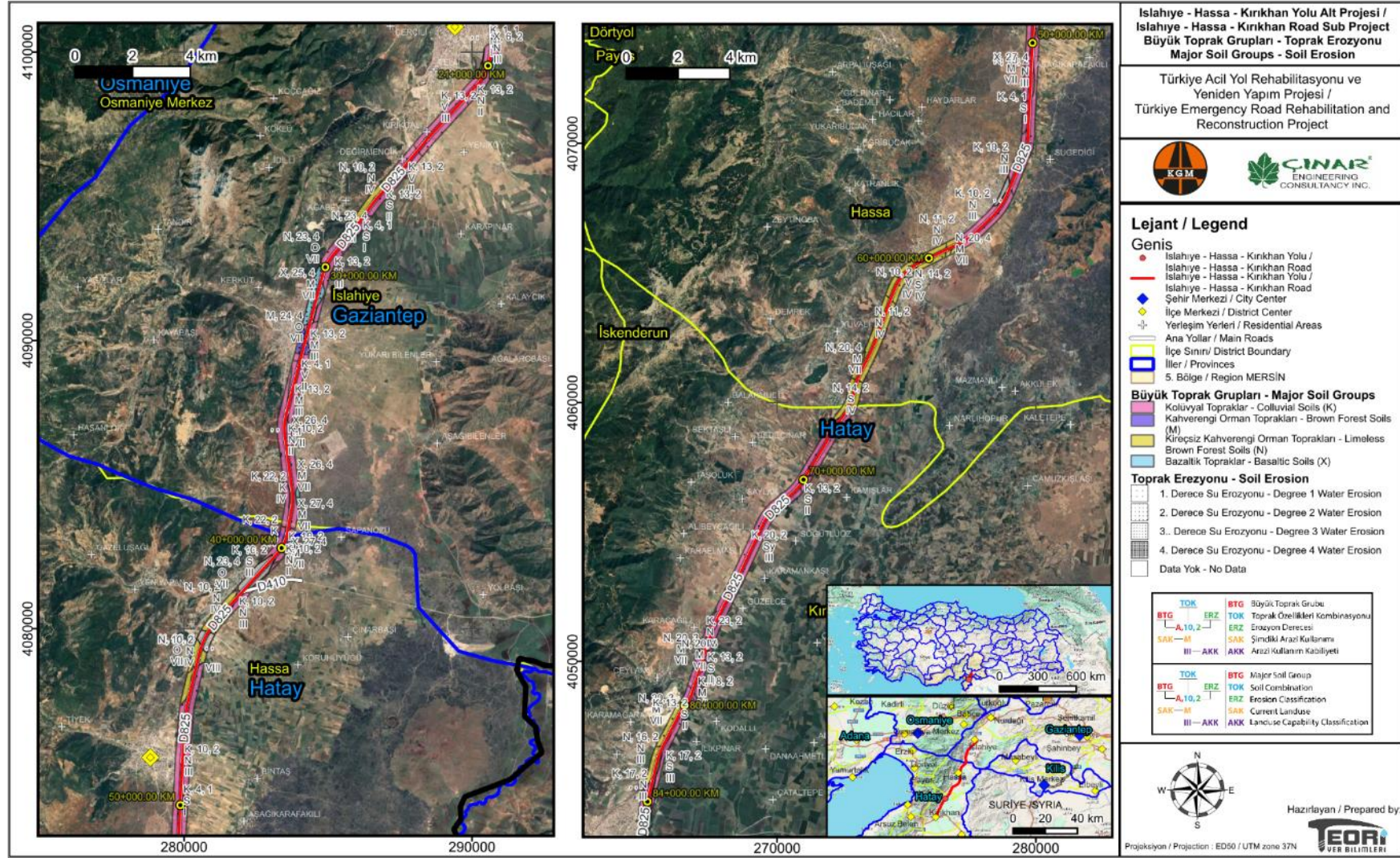


Figure 22. Major Soil Groups and Soil Erosion Map of İslahiye – Hassa – Kırıkhan Road Sub-project

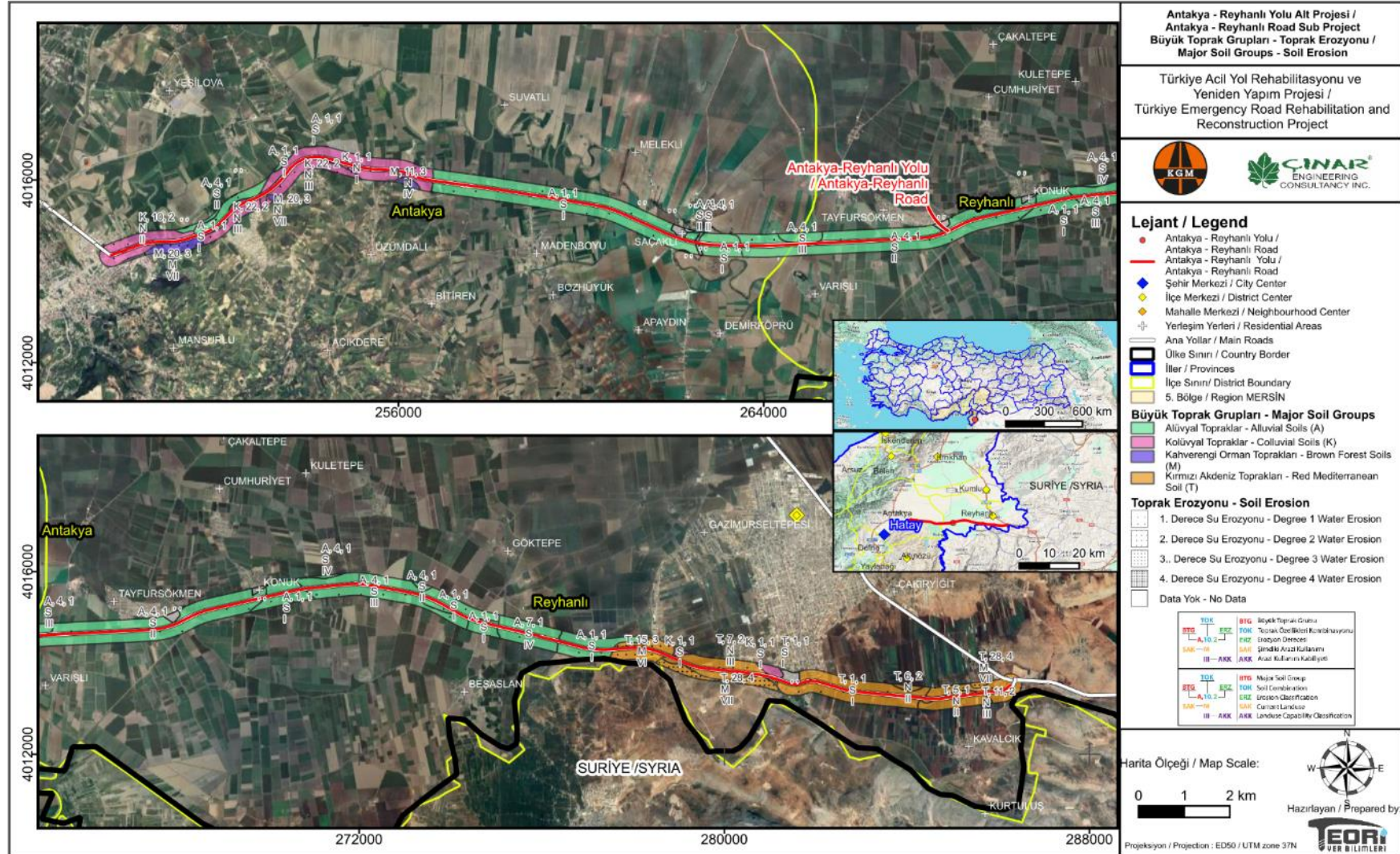


Figure 23. Major Soil Groups and Soil Erosion Map of Antakya – Reyhanlı Road Sub-project

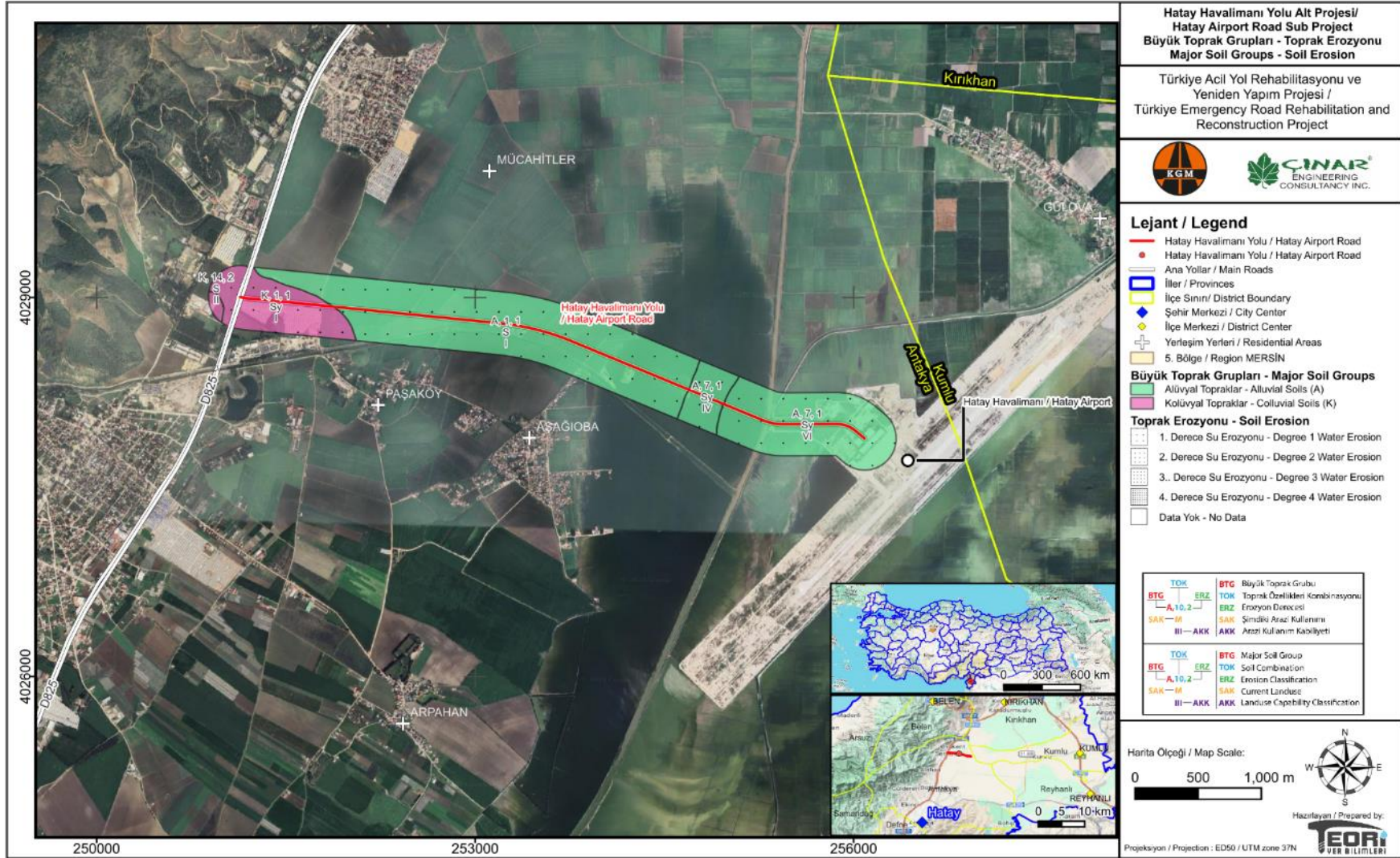


Figure 24. Major Soil Groups and Soil Erosion Map of Hatay Airport Sub-project

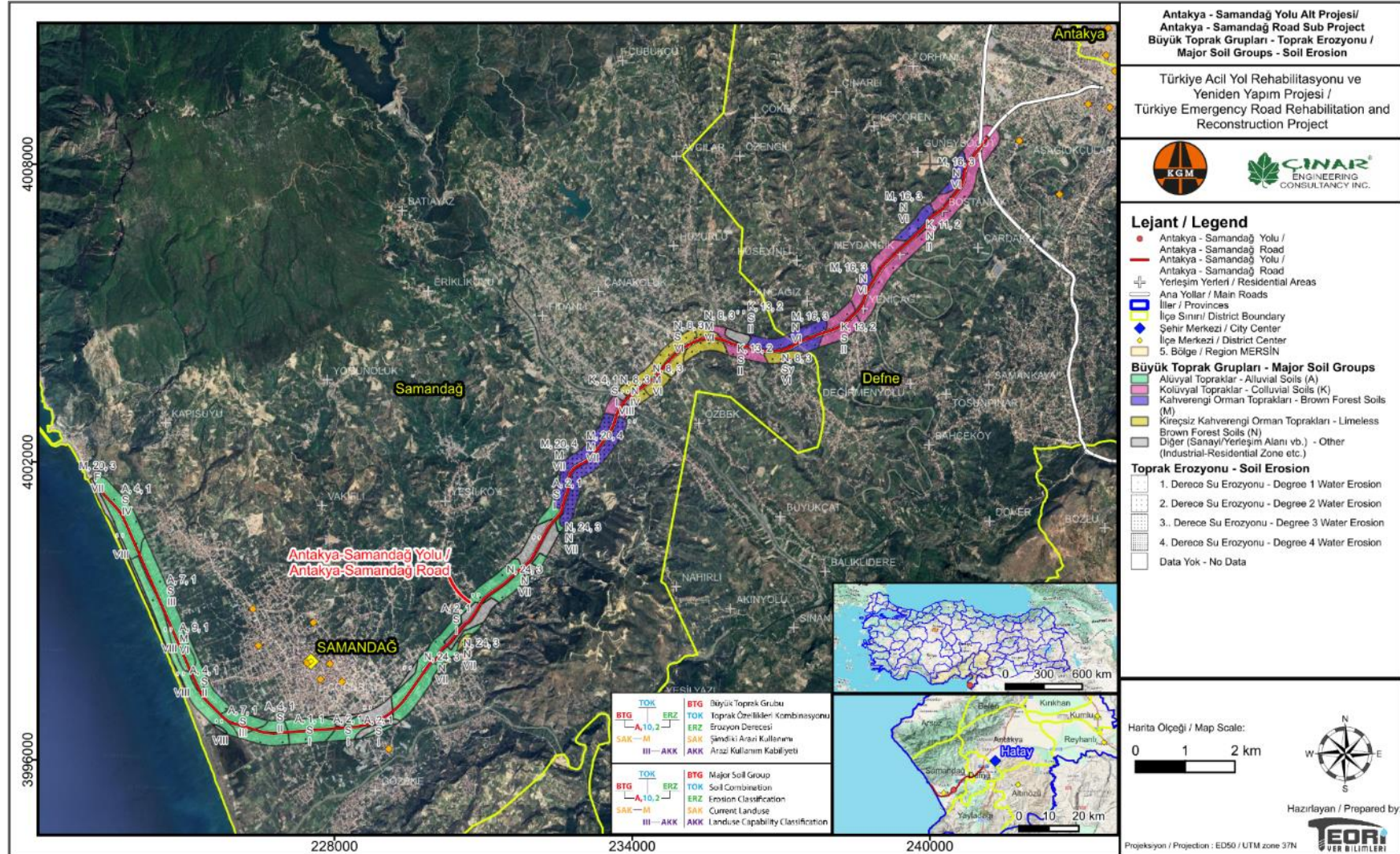


Figure 25. Major Soil Groups and Soil Erosion Map of Antakya – Samandağ Road Sub-project

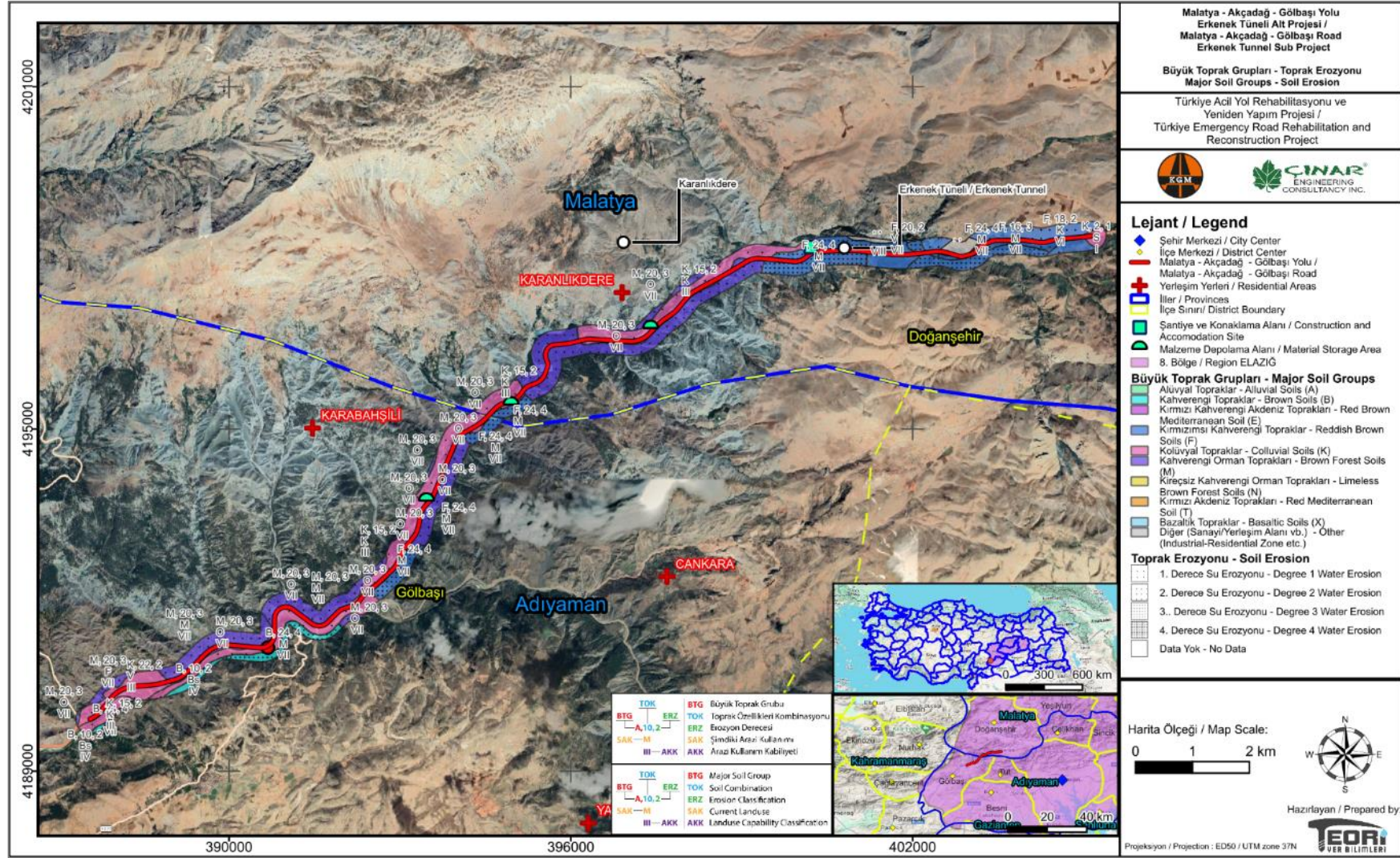


Figure 26. Major Soil Groups and Soil Erosion Map of Malatya – Akçadağ - Gölbaşı Road Sub-project

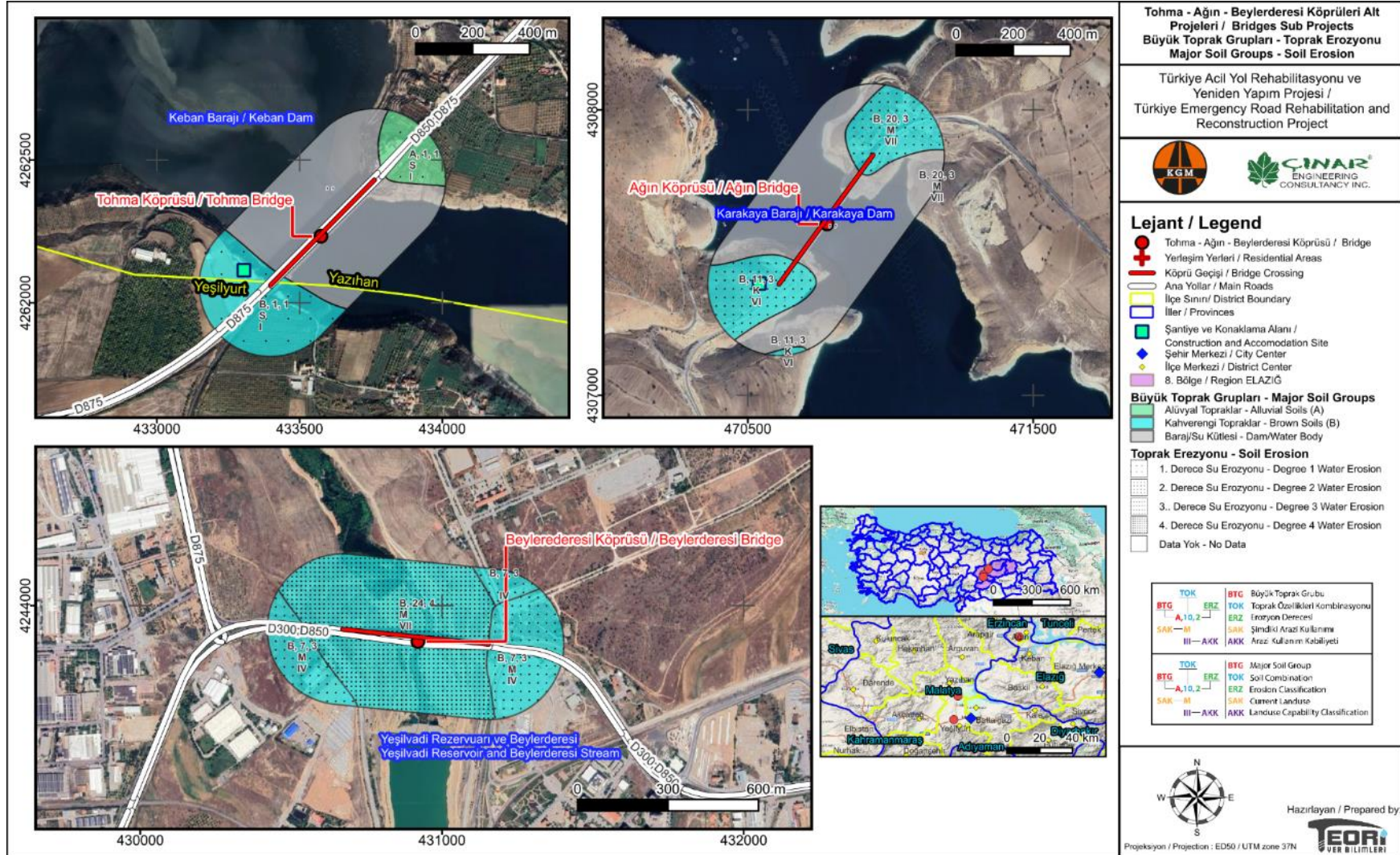


Figure 27. Major Soil Groups and Soil Erosion Map of Tohma – Ağın and Beylerderesi Bridges Sub-project

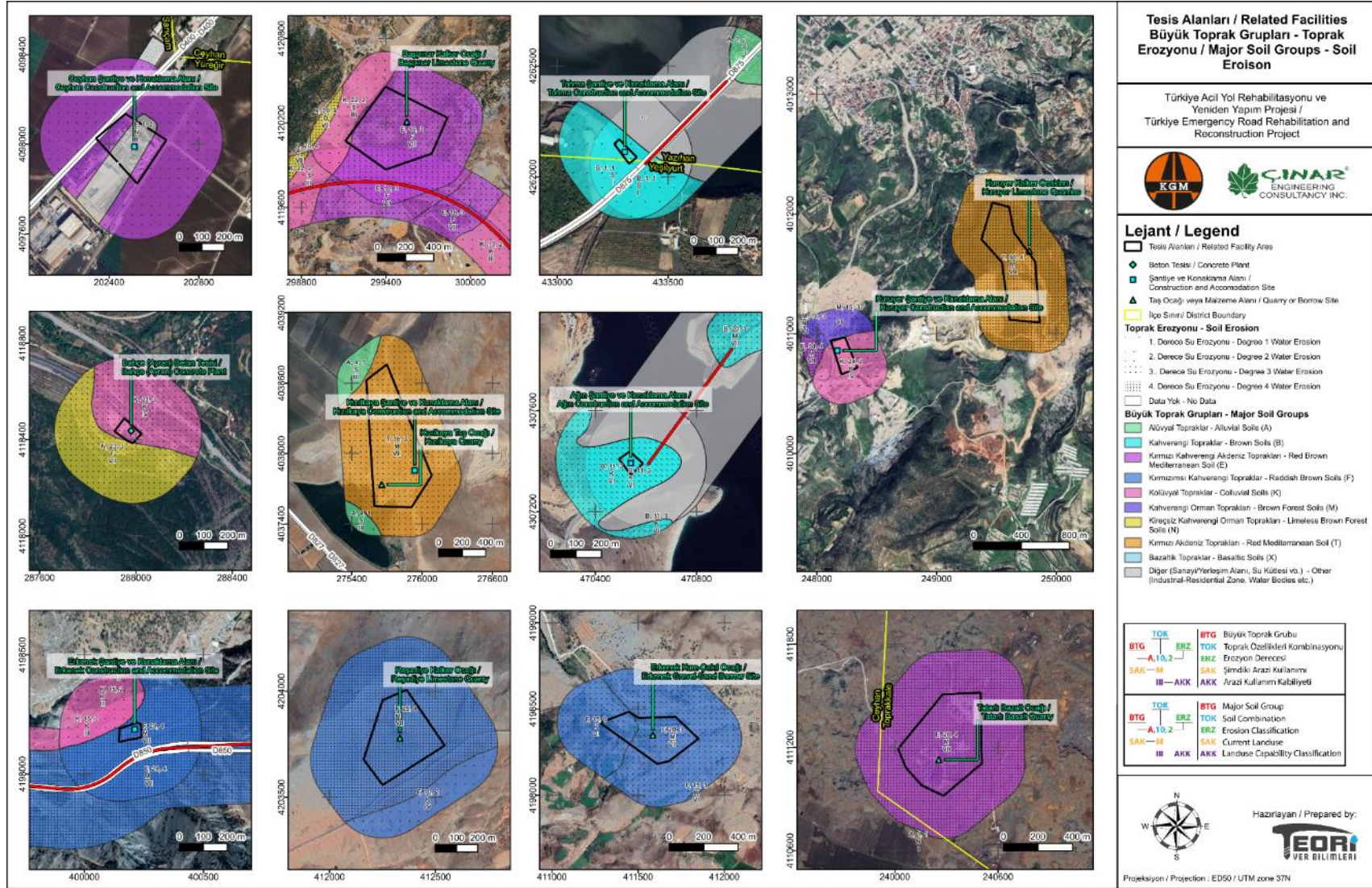


Figure 28. Major Soil Groups and Soil Erosion Map of Related Facilities



4.1.2.2.3 Soil Quality

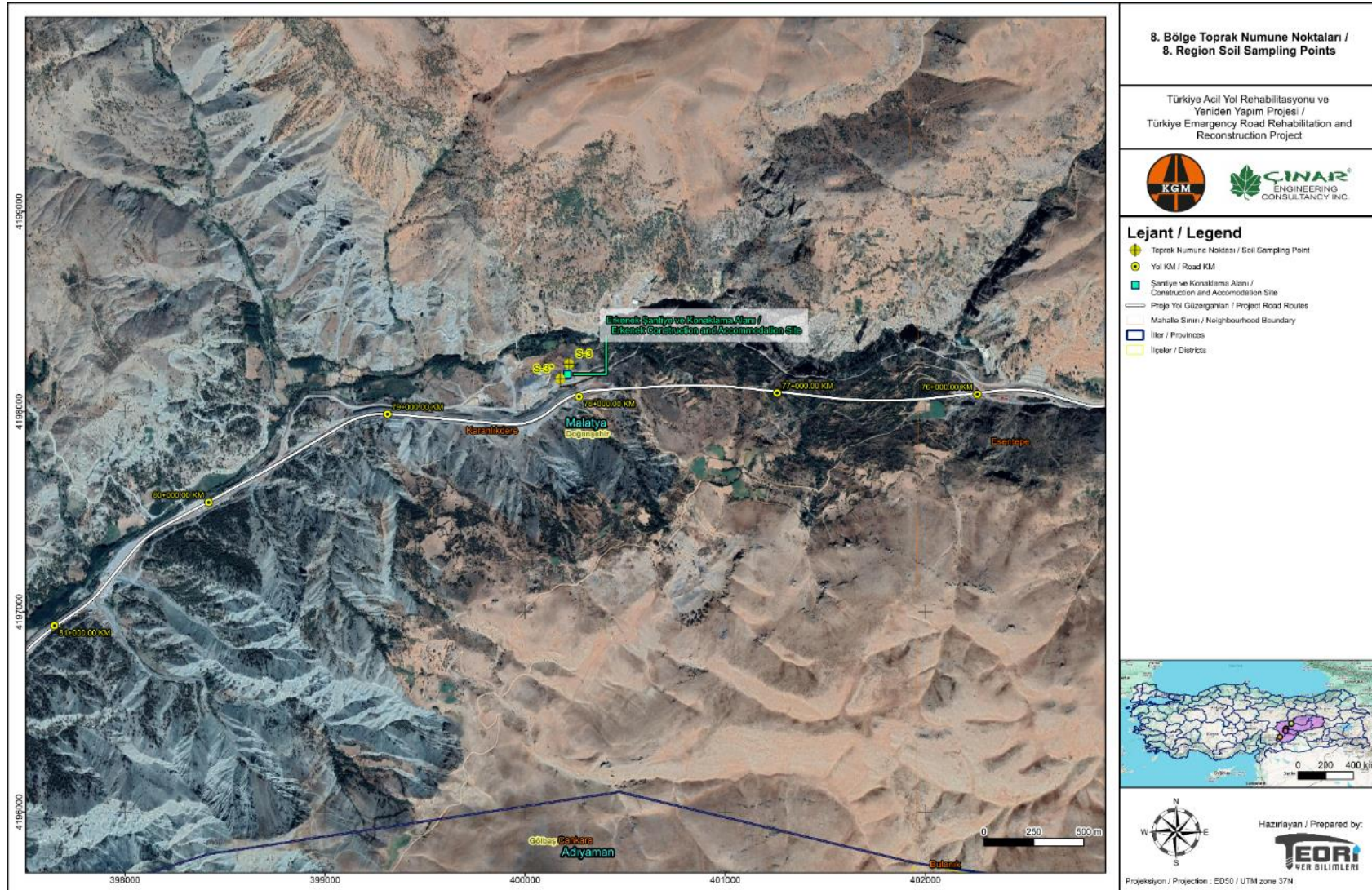
In order to determine the baseline soil quality around the related/auxiliary facilities that have the potential to cause soil contamination due to their active works and the scope of activities carried out by considering surrounding land use status and site visit observations during the ESDD studies, samples have been taken from six (6) points at the selected construction and accommodation sites. The Ceyhan Construction and Accommodation Site used within the scope of the P1 sub-project was not sampled because it has been used for long periods under other projects of KGM and is currently located in an anthropogenically modified area. Additionally, no analysis was conducted at the construction and/or accommodation sites used within the scope of the P5 sub-project, considering the scope/nature of the work carried out and their distance from residential areas. At this point, it should be noted that two samples were taken from the immediate vicinity of the construction and accommodation sites and from areas with relatively less human intervention for comparison purposes.

The soil sampling locations are listed in Table 42 and shown in Figure 29 and Figure 30.

Table 42. Soil Sampling Locations

No	Sub-project No	Sampling Location	Sampling Date	Coordinates		
				Zone	East Direction	North Direction
S-1	P2	Kumlu/Hatay (from Kızılkaya Construction and Accommodation Site)	08.05.2024	37 S	275402.64	4037506.91
S-1*	P2	Kumlu/Hatay (from Kızılkaya Construction and Accommodation Site)	08.05.2024	37 S	275552.70	4037458.71
S-2	P3	Antakya/Hatay (from Kuruyer Construction and Accommodation Site)	07.05.2024	37 S	248272.19	4010642.83
S-2*	P3	Antakya/Hatay (from Kuruyer Construction and Accommodation Site)	07.05.2024	37 S	248113.04	4010744.27
S-3	P4	Doğanşehir/Malatya (from Erkenek Construction and Accommodation Site)	10.05.2024	37 S	400205.27	4198058.21
S-3*	P4	Doğanşehir/Malatya (from Erkenek Construction and Accommodation Site)	10.05.2024	37 S	400160.76	4197983.40

Figure 29. Soil Sampling Locations Map for 5th Regional Directorate of Highways

Figure 30. Soil Sampling Locations Map for 8th Regional Directorate of Highways

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While determining the parameters to be analyzed in the soil samples, the soil pollution indicator parameters listed in the Regulation on Soil Pollution Control and Point Source Contaminated Sites – Annex-2 Table-1 Pollution Indicator Parameters List were taken into consideration. The soil samples collected are reference samples intended to determine the baseline conditions of the soil. In other words, the analysis results of these soil samples will be used as reference values after the construction phase of the project or during the operation phase, if there is a suspicion of soil pollution at the project site.

The analysis results of the soil samples were compared with the limit values defined in Table-1 for the relevant pollutants in Section 15.1 of the Canadian Environmental Protection Act to determine the baseline contamination status in the soil structure. In addition, the limit values from the Regulation on Control of Soil Pollution and Point Source Contaminated Sites are also provided in the table, considering the type of exposure and risks to human health in order to guide in the event of possible pollution.

The analysis results of the soil samples and the related limit values are provided in Table 43 (see also Appendix-4 for the analysis reports). According to the analysis results of S-1 and S-1*, it was observed that Selenium, Nickel and Boron parameters exceed or are close to the limit values determined for agricultural use. For S-2 and S-2*, parameters of Cu, Ni and Cr exceed the limit values determined for agricultural use along with pH for S-2* and Boron for S-2. On the other hand, while point S-3 is relatively clean, the B and Ni values at point S-3* exceed the limit values. This may be due to the commercial facility previously established at the sampling point.

When the analysis results are examined, it cannot be concluded that there is direct pollution caused by the project activities. It can be said that the relative abundance of aforementioned elements is mostly due to agricultural activities around the auxiliary/related facilities. On the other hand, metallic alloys or special construction materials used during the establishment of the construction sites may also contribute some metals to the soil. At this point, it should be noted that since the area for the Erkenek Construction and Accommodation Site was previously used for other projects, anthropogenic effects are likely to be observed.



Table 43. Analysis Results of the Soil Samples

Parameter	Unit	S-1	S-1*	S-2	S-2*	S-3	S-3*	Soil Quality Standards ⁵				National Regulation		
								Agricultural Use	Use for Residential / Parking Areas	Use for Commercial Purposes	Use for Industrial Purposes	Soil ingestion and absorption through skin contact	Inhalation of volatile matter in external environment	Inhalation of fugitive dust in the external environment
pH	-	6.74	7.55	7.48	8.07	7.57	7.05	6 – 8	6 – 8	6 – 8	6 – 8	-	-	-
Antimony (Sb)	mg/kg	0.41	0.43	0.359	0.615	0.19	0.3	20	20	40	40	31	-	-
Arsenic (As)	mg/kg	3.44	4.42	3.81	5.55	1.95	5.5	12	12	12	12	0.4	-	471
Copper (Cu)	mg/kg	13.12	16.22	17.9	70.2	11.62	18.96	63	63	91	91	3129	-	-
Barium (Ba)	mg/kg	97.93	179.24	39.35	43.4	69.27	112.35	750	500	2000	2000	15643	-	433702
Beryllium (Be)	mg/kg	0.46	0.51	0.103	0.159	0.16	0.162	4	4	8	8	0.1	-	843
Boron (B)	mg/kg	5.34	6.6	9.58	< 2	< 2	2.16	2	-	-	-	-	-	-
Mercury (Hg)	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	6.6	6.6	24	50	23	3	-
Zinc (Zn)	mg/kg	37.31	47.67	33.6	41.1	26.72	40.14	250	250	410	410	23464	-	-
Silver (Ag)	mg/kg	< 0.1	< 0.1	< 0.1	0.217	< 0.1	< 0.1	20	20	40	40	391	-	-
Cadmium (Cd)	mg/kg	0.22	0.32	0.624	0.803	0.08	0.32	1.4	10	22	22	70	-	1124
Tin (Sn)	mg/kg	1.07	1.85	0.455	0.952	0.38	0.56	5	50	300	300	46929	-	-
Cobalt (Co)	mg/kg	11.07	15.07	8.95	34.3	6.5	10.81	40	50	300	300	23	-	225
Lead (Pb)	mg/kg	8.54	12.64	8.83	25	4.33	6.83	70	140	260	600	400	-	-
Molybdenum (Mo)	mg/kg	0.39	0.46	0.443	1.04	0.24	0.41	5	10	40	40	391	-	-
Nickel (Ni)	mg/kg	61.92	78.63	164.1	738.9	21.4	62.66	45	45	89	89	1564	-	-
Selenium (Se)	mg/kg	0.99	1.37	0.703	0.721	0.48	0.84	1	1	2.9	2.9	391	-	-
Thallium (Tl)	mg/kg	0.21	0.31	0.115	0.156	0.05	0.15	1	1	1	1	5	-	-
Titanium (Ti)	mg/kg	229	270	154.7	159.3	255	318.6	-	-	-	-	312857	-	-
Uranium (U)	mg/kg	0.48	0.62	0.345	0.822	0.32	0.41	23	23	33	300	-	-	-
Vanadium (V)	mg/kg	26.17	28.89	22.6	25.4	26	28.3	130	130	130	130	548	-	-

⁵ Soil Quality Standards set by the Canadian Council of Environment Ministers for the Protection of the Environment and Human Health



Parameter	Unit	S-1	S-1*	S-2	S-2*	S-3	S-3*	Soil Quality Standards ⁵				National Regulation		
								Agricultural Use	Use for Residential / Parking Areas	Use for Commercial Purposes	Use for Industrial Purposes	Soil ingestion and absorption through skin contact	Inhalation of volatile matter in external environment	Inhalation of fugitive dust in the external environment
Chromium (Cr)	mg/kg	31.1	37.73	74.5	180.1	14.55	23.2	64	64	87	87	235	-	24
Oil and Grease	%	0.041	0.045	< 0.02	< 0.02	< 0.02	0.057	-	-	-	-	-	-	-
BTEX	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	-	-	-	-	12	-	-
TVOCs	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (TPH)	mg/kg	< 100	< 100	< 100	< 100	< 100	< 100	-	-	-	-	-	-	-
Total Organic Halides (TOX)	mg/kg	< 20	43.21	75.8	33.3	56	<20	-	-	-	-	-	-	-
Asbestos	mg/kg	None	None	None	None	None	None	-	-	-	-	-	-	-



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4.1.2.2.4 Regional Geology

Lithologies from Cambrian to Quaternary ages have sedimented along the subprojects. These deposits consist of gravel, sand, clay, and limestone in common and are semi-consolidated to consolidated. Alluvial deposits spread out in wide locations along the East Anatolian Fault zone.

Sub-projects under the responsibility of the 5th Regional Directorate of Highways:

Antakya-Samandağ Road Sub-project:

This road is situated predominantly on Pliocene and Upper Cambrian aged shelf deposits. These lithologies exhibit a high degree of consolidation, indicating a robust structural integrity, which is advantageous for road construction. However, thorough geotechnical investigations are warranted to assess any potential localized weaknesses or zones of instability.

Antakya-Reyhanlı Road Project & Hatay Airport Road Sub-project:

Both projects share similar lithological characteristics, with Hatay Airport Road entirely located on Upper Cambrian shelf deposits. Given the consolidated nature of these deposits, they offer favorable conditions for construction, although variations in lithology and consolidation levels may necessitate site-specific engineering solutions.

TAG Highway-Aslanlı Tunnel-Nurdağı Junction Sub-project:

Situated over the Karadağ Formation, which comprises a diverse range of lithologies including limestone, dolomitic limestone, dolomite, and occasional calcareous mudstone, siltstone, or shale interbeds. The presence of such lithological diversity requires meticulous geological and geotechnical assessments to anticipate potential challenges during construction. Crossing the East Anatolian Fault introduces additional complexity, necessitating comprehensive fault zone characterization and mitigation measures.

İslahiye-Hassa-Kırıkhan Road Project Sub-project:

This project runs parallel to the East Anatolian Fault and overlays primarily tectonic deposits and alluvial deposits. While these deposits are semi-consolidated, their proximity to a fault zone warrants detailed geological mapping and geophysical surveys to identify potential fault-related hazards such as ground ruptures or liquefaction susceptibility.

Sub-projects under the responsibility of the 8th Regional Directorate of Highways:

Malatya-Akçadağ-Gölbaşı Road & Erkenek Tunnel Sub-project:

Located within an allochthonous unit parallel to the fault, comprising basalts, complex deposits, and crystalline limestones. The consolidated and stable nature of these lithologies is conducive to tunneling and road construction, although careful consideration of potential geotechnical challenges such as rock mass quality and stability is essential.

Beylerderesi Bridge Sub-project:

Positioned over Pliocene-Quaternary aged sandstone-conglomerate-mudstone layers, which constitute consolidated continental sedimentary deposits. The robust consolidation of these deposits offers favorable conditions for bridge construction, although detailed geological investigations are necessary to assess potential variations in lithology and structural integrity.

Tohma Bridge Sub-project:

Located on Pliocene-Pleistocene aged sandstone-mudstone-limestone alternation, characterized by good consolidation in shelf sediment deposits. This favorable consolidation facilitates bridge foundation design and construction, although localized geological features



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such as bedding plane orientations and lithological heterogeneities must be considered to optimize structural performance and longevity.

These technical descriptions provide insight into the geological complexities and engineering considerations associated with each subproject, highlighting the importance of comprehensive geological investigations and risk assessments in infrastructure development.

Ağın Bridge Sub-project:

The Ağın Bridge is located on alluvial deposits, which are unconsolidated sediments deposited by streams. These deposits rest upon Neogene-aged sedimentary rocks, which are consolidated and layered. Neogene sediments typically consist of sandstone, siltstone, and mudstone.

Geology map showing all Sub-project Locations is given in Figure 31.



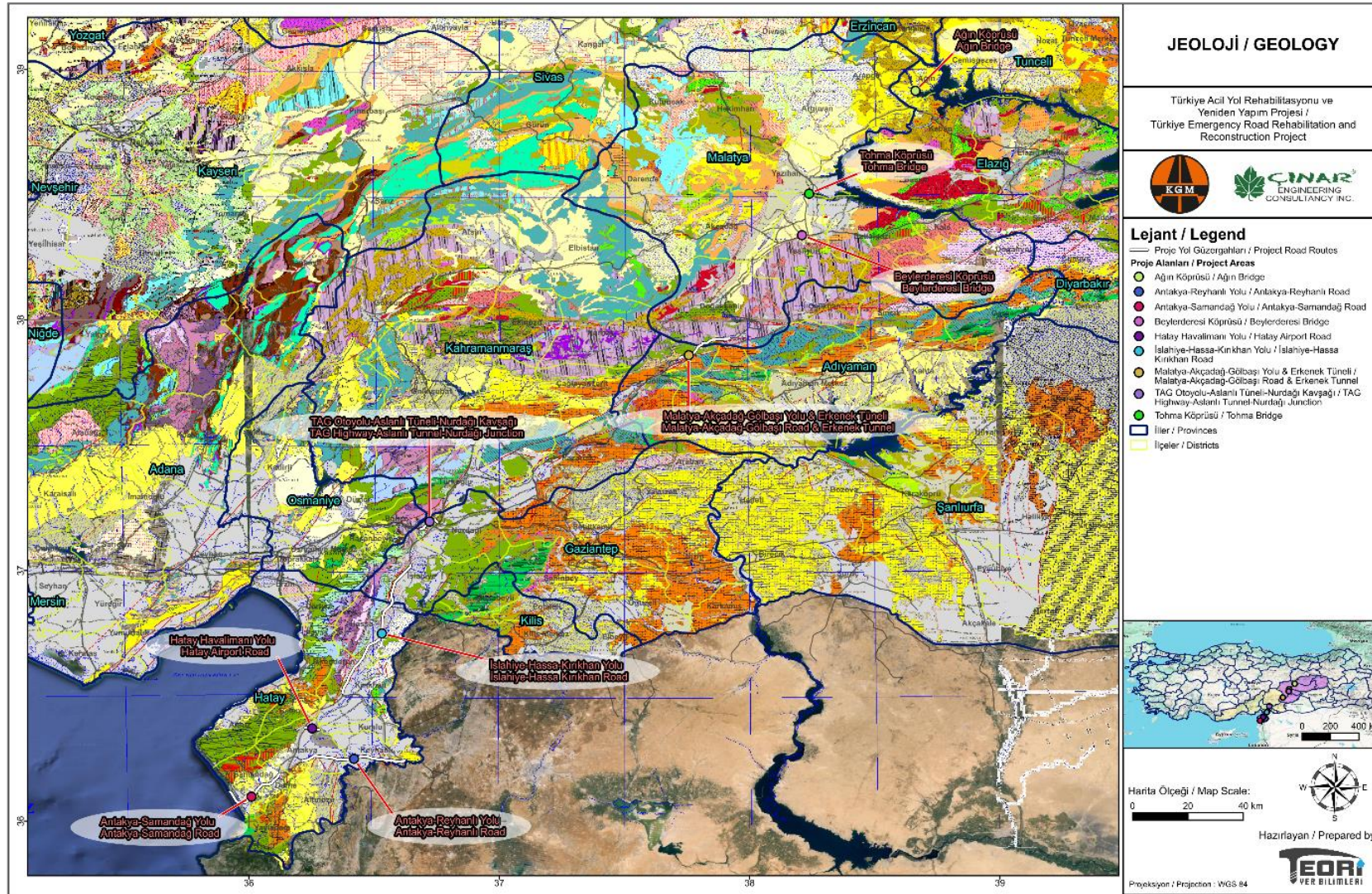


Figure 31. Geology Map Showing All Sub-Project Locations

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4.1.2.2.5 Structural Geology and Seismicity

Structural Geology

Movements within the Eurasian-African-Arabian tectonic plates, considered the primary or major plates, are the primary drivers of seismic activity in East Anatolia and Southeast Anatolia. The interaction zones between these plates and the Anatolian plate delineate seismic hotspots. The Bitlis Thrust Belt in Eastern Anatolia marks the boundary between the Anatolian plate and the Arab and African plates, while the Cyprus Plunge-Submersion belt, extending from the south of İskenderun Bay to Cyprus and reaching the Gulf of Antalya, represents another significant boundary.

The Dead Sea Fault, characterized by left-lateral movement, acts as a demarcation between these distinct seismotectonic regions. Running in a north-south direction, it converges with the Cyprus arc northeast of İskenderun Bay. This entire region encompasses a seismic zone influenced by active tectonic structures such as the Eastern Anatolian Fault System, Ecemiş Fault Zone, and the Helen-Cyprus arc. Consequently, seismic activity within the region is predominantly governed by these before mentioned active structures and their associated branches.

The East Anatolian Fault Zone (EAFZ) is a major left-lateral strike-slip fault system that accommodates the relative motion between the Anatolian Plate and the Arabian Plate. The fault zone plays a significant role in the regional tectonics and seismicity of southeastern Türkiye. Every segment located on the EAFZ, is characterized by left-lateral strike-slip motion. This segment exhibits distinct geomorphological features, including linear valleys, fault scarps, and offset drainage patterns. Morphotectonic indicators such as displaced river channels, alluvial fans, and fault-related topographic variations suggest recent and historical seismic activity. The East Anatolian Fault Zone constitutes significant implications for the tectonics and seismicity of southeastern Türkiye. Its active nature and potential to generate large earthquakes make it an important area of focus for geoscientific research and seismic hazard assessment. Ongoing research and monitoring are essential for improving our understanding of the segment and enhancing earthquake preparedness and risk mitigation strategies in the region.

Seismicity

The seismicity of the Eastern Anatolian Fault Zone (EAFZ) zone has been assessed through historical earthquake records, instrumental data, and field studies. These investigations have identified segments along the EAF zone that rupture independently during seismic events. As ruptures occur, various structural features such as pull-apart basins, push-up structures, restraining bends, and releasing bends emerge along the fault line, influencing the behavior and evolution of fault segments. Each distinct segment, delineated by these structural features, constitutes a component of the fault zone.

However, during historical seismic events, it remains unclear whether the entire fault length ruptured or only specific segments experienced rupture. The delineation of EAFZ segments corresponding to subprojects is outlined in detail, including their geographic extents and probable seismic activity.

İslahiye-Hassa-Kırıkhan Road Sub-project

İslahiye-Hassa-Kırıkhan Road Sub-project is located next to the Kırıkhan-Hassa Segment of the EAFZ. The section of the EAFZ extending between the east of Kozcağız district and Bektaşlı village at north of Kırıkhan is called Hassa segment. The 40 km segment of EAFZ which extends between Kırıkhan and Antakya is called Kırıkhan segment. This segment which lies in 012° direction from Bektaşlı to Ceylanlı extends up to Kırıkhan in the same direction.



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The Hassa Segment is located in the southeastern part of Türkiye, specifically in the Hatay province. It trends predominantly in a northeast-southwest direction, running through the Hassa region, situated between the towns of Hassa and Kırıkhan. The Hassa Segment is seismically active, contributing significantly to the seismicity of the EAFZ. Historical and instrumental seismic records indicate that the segment has experienced significant earthquakes, underscoring its potential to generate major seismic events. Earthquake magnitudes along the Hassa Segment can reach up to the mid-7s on the Richter scale, posing considerable risk to nearby communities and infrastructure.

Due to its active nature, the Hassa Segment poses a significant seismic hazard to the surrounding region, including populated areas in Hatay province.

Antakya-Reyhanlı Road Sub-project

The subproject is located near the Reyhanlı Segment of the EAFZ. Reyhanlı fault forms the northern boundary of the Quaternary alluvium deposits including the Sermada village in Syria and closing westwards. It extends towards northwest up to south of Kavacık village along the valley located in the Bakırhan and Hatip ruins.

In the southeast of the Antakya basin, south of Reyhanlı, faults trending generally in a WNW-ESE direction, most of which extend beyond the country's borders, have been named the Reyhanlı Fault (Saroğlu et al., 1987). Its length within Türkiye is 8 km, with a total length of 17 km, and it trends in a general NW-SE direction. The fault is right-lateral and is also morphologically very distinct. It is located 2.5 km west of the village of Yenişehir, along the boundary between the mountainous area and the plain. Outside the boundary, it extends along a fault valley. South of Yenişehir, many small lakes have formed along the fault. South of Reyhanlı, the fault cuts through Lower Miocene units. Near Yenişehir, it forms a contact between the Lower Miocene units and Quaternary alluvium.

Earthquakes on this segment can reach magnitudes in the mid-7s, posing a considerable risk to nearby settlements and infrastructure. The Reyhanlı Segment is crucial for the westward extrusion of the Anatolian Plate as the Arabian Plate moves northward. The segment's activity is part of the larger tectonic interactions between the Eurasian, Arabian, and African plates, driving the complex deformation patterns observed in the region.

The Reyhanlı Segment has an average slide rate of 0,5-0,7 mm/year, with a highest magnitude of 6,2 Mw.

Hatay Airport Road Sub-project

Hatay Airport Road Sub-project, located near the Kırıkhan Segment. The 40 km segment of EAFZ which extends between Kırıkhan, and Antakya is called Kırıkhan segment. This segment which lies in 012° direction from Bektaşlı to Ceylanlı extends up to Kırıkhan in the same direction. It runs in a northeast-southwest direction, extending through the Kırıkhan region, located in the Hatay province.

Due to its active seismic nature, the Kırıkhan Segment presents a significant seismic hazard to the region, including populated areas in Hatay province.

Understanding the behavior of the Kırıkhan Segment is essential for assessing earthquake risk and developing effective mitigation strategies.

Measures to enhance seismic resilience include enforcing strict building codes, developing early warning systems, and conducting public education campaigns on earthquake preparedness and response.



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TAG Highway-Aslanlı Tunnel- Nurdağı Junction Project

The project is located in the İslahiye Segment. Approximately, 49 km section of the fault is located between Türkoğlu-Gökçedere of the EAF zone which bounds the northern Amanos mountains in the east.

The İslahiye Segment is located in southeastern Türkiye, within the EAFZ. It runs in a northeast-southwest direction, extending through the İslahiye region, which lies between the cities of Gaziantep and Hatay. The İslahiye Segment is a critical component of the East Anatolian Fault Zone, with significant implications for the tectonic and seismic dynamics of southeastern Türkiye. Its active nature and potential to generate large earthquakes make it an important area of study for geologists and seismologists. Ongoing research and monitoring efforts are essential for enhancing our understanding of the segment and improving earthquake preparedness and risk mitigation strategies in the region.

Antakya-Samandağ Road Sub-project

The project passes through the Dead Sea Fault constituting the boundary between the African and Arabian plates, and it takes place between the Red Sea in the south and Kahramanmaraş town in the north.

The Dead Sea Fault (DSF) is a major strike-slip fault system that forms a significant tectonic boundary between the African Plate and the Arabian Plate. Extending over approximately 1,100 kilometers from the northern end of the Red Sea to the Taurus Mountains in southern Türkiye, the DSF is a key feature in the tectonic landscape of the Eastern Mediterranean region. The DSF runs from the Gulf of Aqaba in the south, through the Dead Sea, the Jordan Valley, the Hula Valley, and the Beqaa Valley, reaching as far north as southern Türkiye. It marks the boundary between the African Plate to the west and the Arabian Plate to the east. The DSF is primarily a left-lateral strike-slip fault, meaning the opposite side of the fault moves to the left relative to an observer on one side of the fault. The fault system includes a series of echelon fault segments and pull-apart basins, which are characteristic of strike-slip environments. The Dead Sea Transform is associated with significant vertical displacements, leading to the formation of basins such as the Dead Sea Basin, which is the lowest terrestrial point on Earth's surface.

The DSF is an active fault system with a long history of seismic activity. Notable historical earthquakes have been recorded along its length, indicating significant seismic hazard. Slip rates along the DSF are estimated to be between 4 to 10 millimeters per year, contributing to the overall deformation and seismicity of the region. The fault accommodates the relative motion between the African and Arabian plates, which is a combination of lateral (strike-slip) and vertical (extensional and compressional) movements.

Major historical earthquakes associated with the DSF include events in 1068, 1202, and 1837, which caused widespread damage and loss of life. Seismological studies and paleoseismology have revealed the recurrence intervals of large earthquakes, highlighting the ongoing seismic hazard posed by the fault.

The DSF plays a crucial role in the broader tectonic framework of the Eastern Mediterranean, interacting with other major fault systems such as the East Anatolian Fault and the Red Sea Rift. The fault is part of the larger system of plate boundaries that accommodates the complex interactions between the African, Arabian, and Eurasian plates.

Malatya-Akçadağ-Gölbaşı Road & Erkenek Tunnel Sub-project

These subprojects will be realized next to the Erkenek Segment, the part of the EAFZ lying between east of Çelikhan and Gölbaşı. It is a thorough going, about 65 km long segment trending in 075°. The Erkenek Segment is a notable part of the East Anatolian Fault Zone (EAFZ), which is one of the major fault systems in Türkiye.



This segment is situated in the southeastern part of the EAFZ and plays a significant role in the tectonic and seismic activity of the region. The Erkenek Segment runs in a northeast-southwest direction. It stretches between the towns of Doğanşehir and Erkenek in the Malatya province. The segment is characterized by a right-lateral strike-slip motion. The fault is well-expressed in the landscape, with clear fault scarps and offset streams indicating active movement. The Erkenek Segment is seismically active and has been the site of significant earthquakes. The motion along the Erkenek Segment contributes to the overall deformation and tectonic regime of eastern Türkiye.

The Erkenek Segment has an average slide rate of 6,5-7,0 mm/year, with a highest magnitude of 7,3 Mw.

Technological Bridges

Beylerderesi, Tohma and Ağın Bridges are located near the Şiro Segment. This segment is about 90 km in length and is located between Sivrice and Sincik towns. The 35 km section between Lake Hazar and Doğanyurt (Keferdiz) trends 064° while the other 55 km long section between west of Doğanyol and Sincik trends 055°.

The Siro Segment is located within the broader EAFZ, typically running in a northeast-southwest direction. It is situated in the southeastern part of Türkiye, contributing to the complex fault network in the region. The Siro Segment, like other parts of the EAFZ, is seismically active and has the potential to generate significant earthquakes.

Furthermore, the Project area has been identified on the Earthquake Hazard Map of Türkiye, facilitating earthquake mitigation efforts. Such mitigation strategies necessitate a comprehensive understanding of rock and soil properties. Weak soil types, including swamps, alluvial fans, slope debris, unconsolidated deposits, and areas prone to active and potential landslides, are unsuitable for settlement and require special consideration in land use planning and infrastructure development.

The table presents peak ground acceleration values from Earthquake Hazard Map of Türkiye, including minimum and maximum, for along the roads and values at bridges across the 5th and 8th regions. In the 5th region, notable projects include the İslahiye-Hassa-Kırıkhan Road (0.503g to 0.610g), Antakya-Reyhanlı Road (0.341g to 0.428g), Hatay Airport Road (0.432g to 0.444g), TAG Highway-Aslanlı Tunnel-Nurdağı Junction (0.463g to 0.492g), and Antakya Çevre-Samandağ Road (0.359g to 0.440g). In the 8th region, key projects are the Tohma Bridge (0.302g), Ağın Bridge (0.238g), Beylerderesi Bridge (0.324g), and Malatya-Akçadağ Junction-Gölbaşı Road (0.526g to 0.594g). These values provide crucial insights into seismic risks and infrastructure resilience in the respective regions (see Table 44).

Table 44. Minimum and Maximum Peak Ground Acceleration Values on Sub-projects

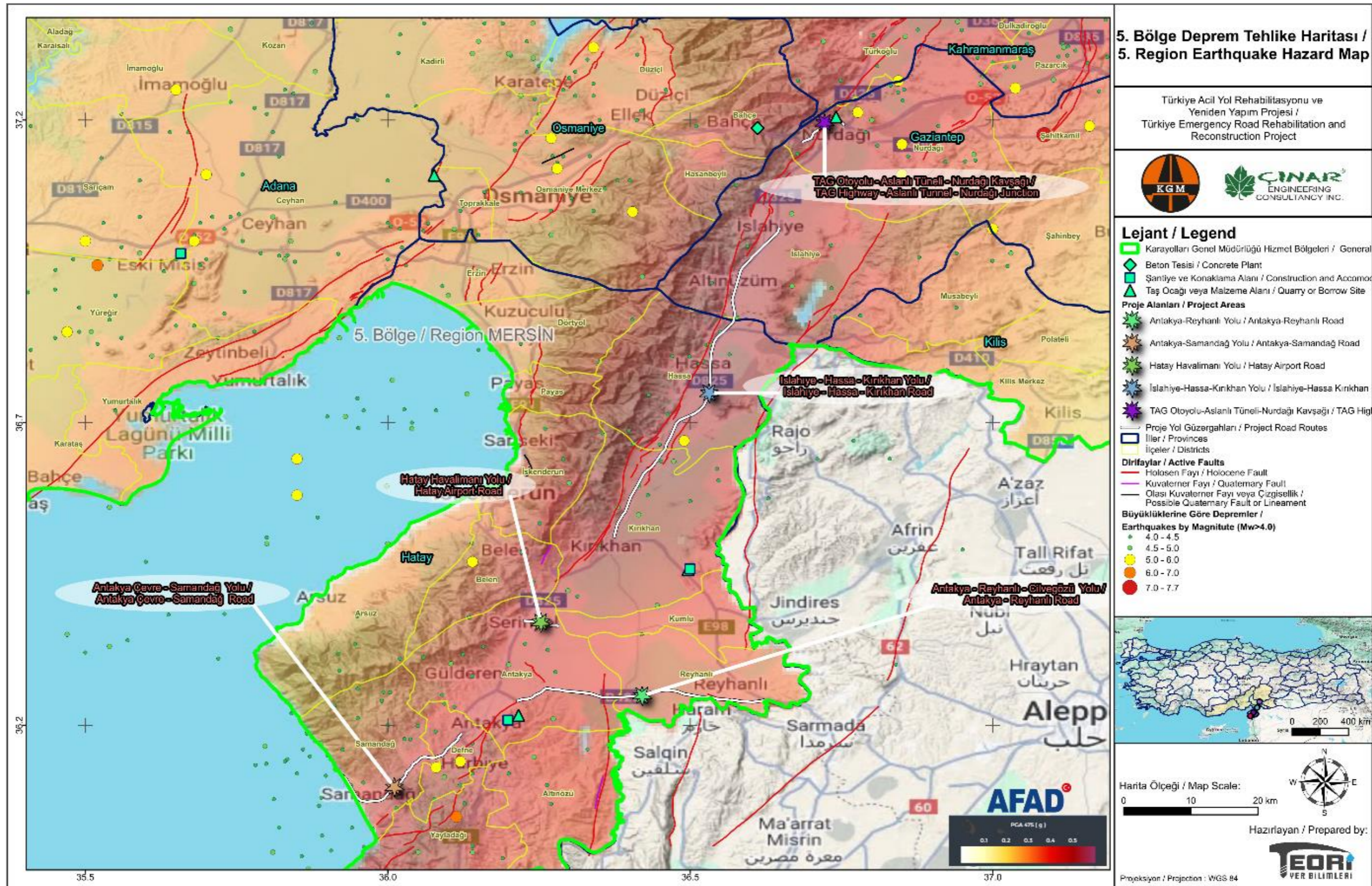
Sub-project Name	Region	Peak Ground Acceleration %10 Probability	
		PGA 475 Min (g)	PGA 475 Max (g)
İslahiye-Hassa-Kırıkhan Road	5 th	0.503	0.61
Antakya - Reyhanlı Road	5 th	0.341	0.428
Hatay Airport Road	5 th	0.432	0.444
TAG Highway-Aslanlı Tunnel- Nurdağı Junction	5 th	0.463	0.492
Antakya- Samandağ Road	5 th	0.359	0.440
Tohma Bridge	8 th	0.302	
Ağın Bridge	8 th	0.238	
Beylerderesi Bridge	8 th	0.324	
Malatya-Akçadağ Junction - Gölbaşı Road	8 th	0.526	0.594

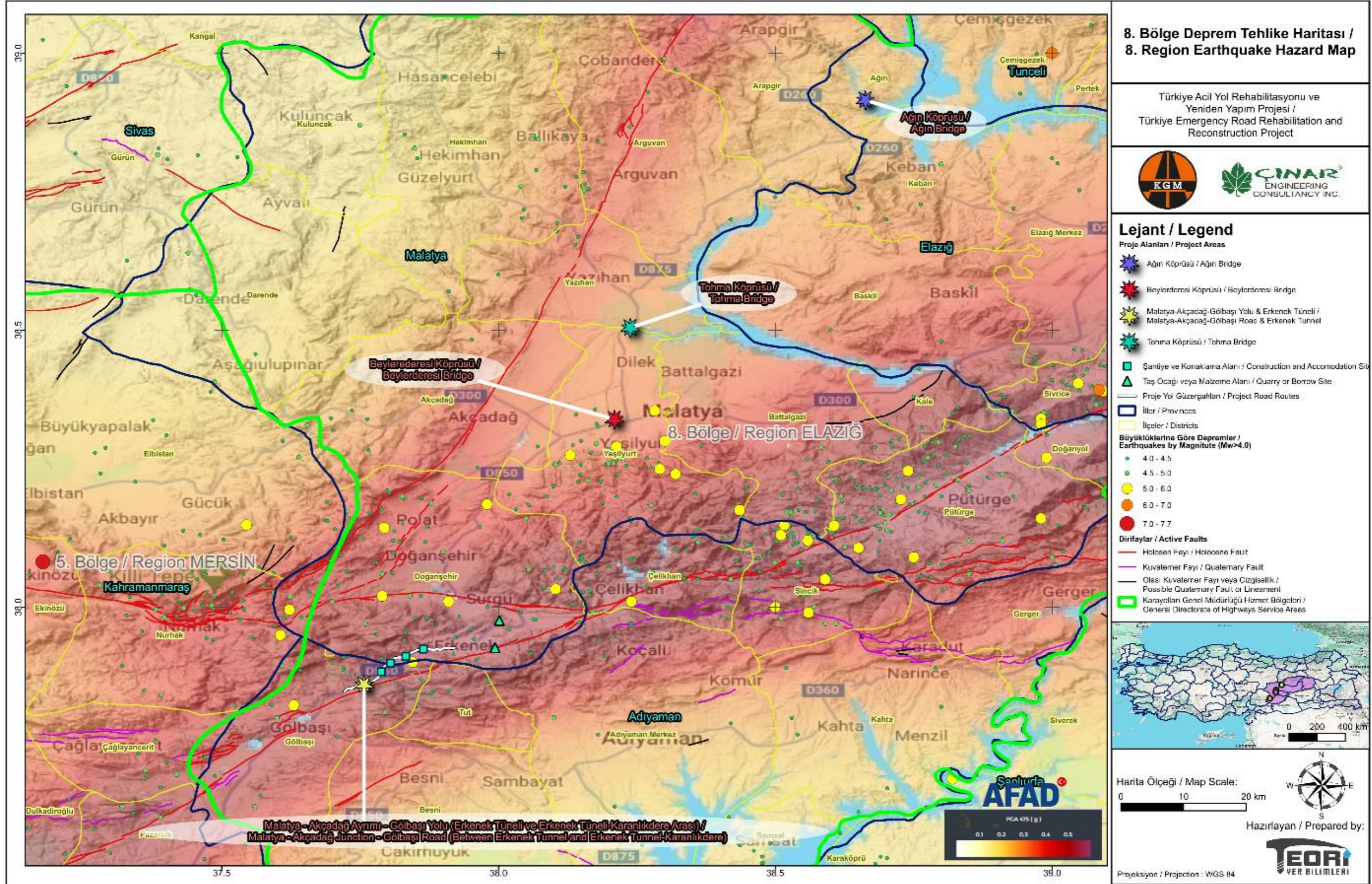


Sub-project Name	Region	Peak Ground Acceleration %10 Probability	
		PGA 475 Min (g)	PGA 475 Max (g)
Related Facilities			
Ceyhan Construction and Accommodation Site	5 th	0.277	
Başpınar Limestone Quarry	5 th	0.449	
Tatarlı Basalt Quarry	5 th	0.296	
Bahçe (Ayran) Concrete Plant	5 th	0.449	
Kızılkaya Construction and Accommodation Site	5 th	0.410	
Kızılkaya Limestone	5 th	0.410	
Kuruyer Construction and Accommodation Site	5 th	0.418	
Erkenek Construction and Accommodation Site	8 th	0.552	
Reşadiye Limestone Quarry	8 th	0.579	
Erkenek Gravel-Sand Borrow Site	8 th	0.575	
Tohma Construction and Accommodation Site	8 th	0.302	
Ağın Construction Site	8 th	0.238	

Seismicity and earthquake hazard maps of 5th and 8th region sub-projects are given in Figure 32 and Figure 33.



Figure 32. Seismicity and Earthquake Hazard Map of 5th Regions Sub-projects

Figure 33. Seismicity and Earthquake Hazard Map of 8th Regions Sub-projects

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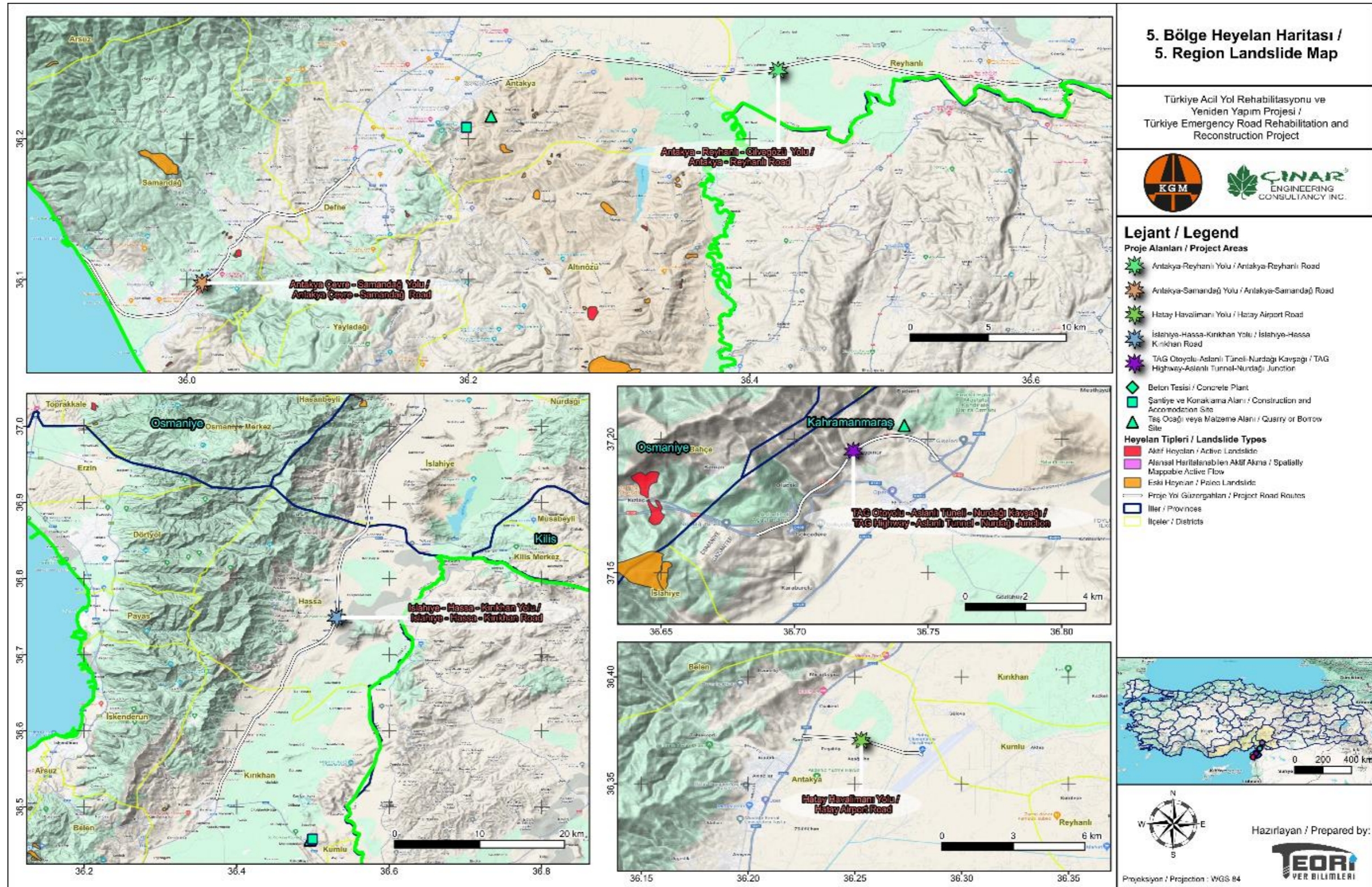
4.1.2.2.6 Landslide

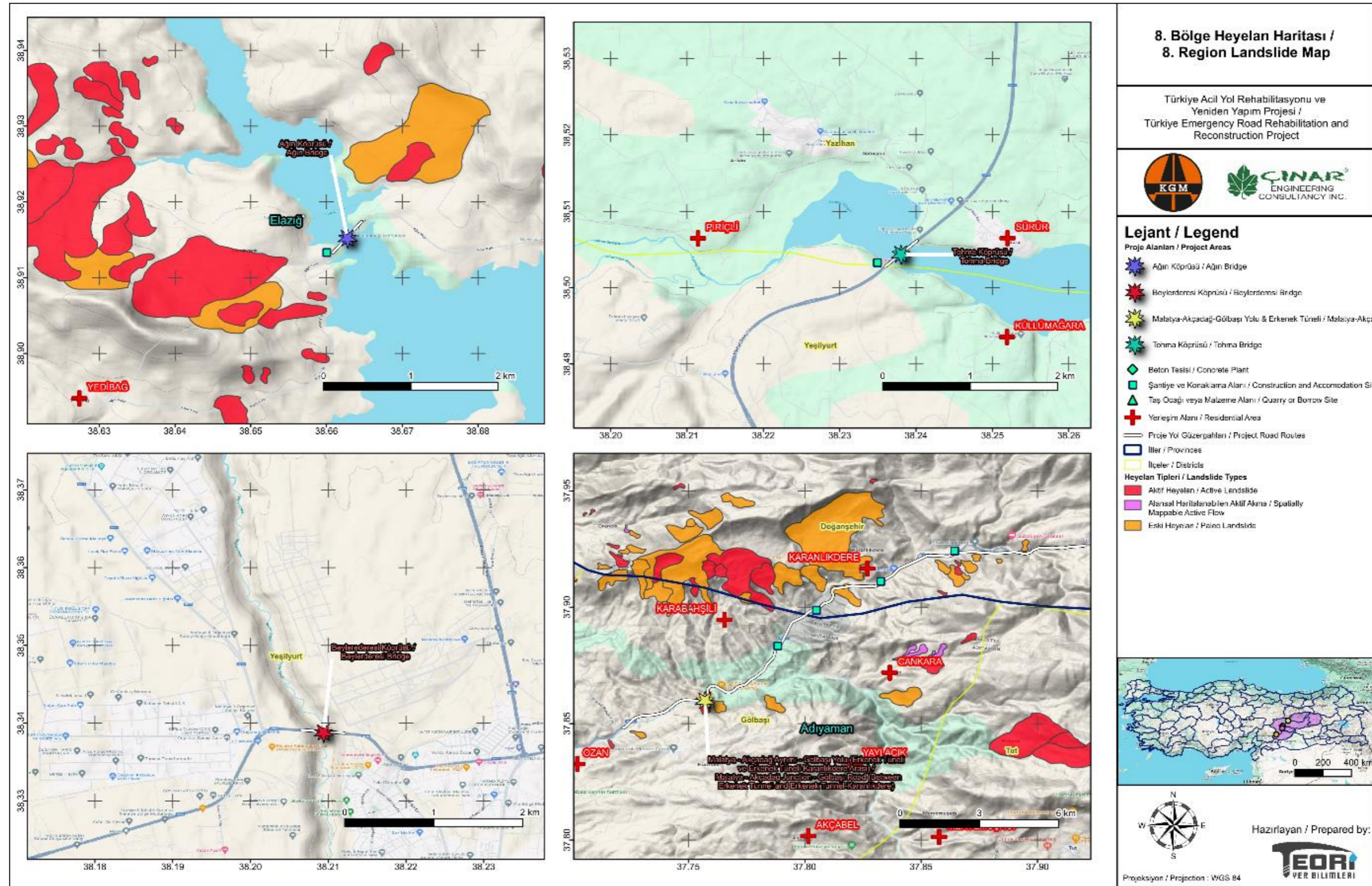
Both detailed geological and geotechnical survey reports and the online Geoscience Map Viewer of MTA was used to scan for active land slide zones around the sub-projects from 5th and 8th region.

When all sub-projects are examined, there are no active or old landslides in the immediate vicinity of the sub-projects, except for the Malatya–Akçadağ–Gölbaşı Road and the Ağın Bridge located in the 8th region. It is noted that there is an old landslide area around the Malatya–Akçadağ–Gölbaşı Road at 83+000 KM. Apart from this, active and old landslides are observed in certain parts of the vicinity of the Malatya–Akçadağ–Gölbaşı Road and on and around the access roads to the Ağın Bridge.

The landslide maps of the project area are given in Figure 34 and Figure 35.



Figure 34. Landslide Map of the 5th Region Sub-projects

Figure 35. Landslide Map of the 8th Region Sub-projects

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4.1.3 Impact Assessment and Mitigation Measures

4.1.3.1 Land Preparation and Construction Phase

Although no significant change is expected in land use since existing roads will be rehabilitated and reconstructed within the scope of the project, it is possible to observe changes in land use (stripping of vegetative/topsoil, earthworks resulting in changes in land cover/topography) depending on the establishment of associated and auxiliary facilities. Additionally, there is a risk of fragmentation of agricultural and pasture lands due to activities carried out in these areas or within the impact area. These activities may also cause direct or indirect damage to adjacent properties, whether state-owned or private.

As mentioned in the WBG General EHS Guidelines for Construction and Decommissioning, soil erosion may result from soils being exposed to rain and wind during initial fieldwork (root removal, fragmentation, off-site transfer, etc.) and earthworks (topsoil stripping, excavation and fill works, soil leveling, soil compaction, soil stabilization, etc.). Soil erosion can trigger the transport of soil through surface drainage networks, which can affect the quality of surface water resources. Based on the erosion degree maps provided in Figure 21 to Figure 28, exposed work areas will be immediately rehabilitated following the completion of construction works.

Soil contamination during the land preparation and construction phase of the project may occur as a result of accidental spills and releases of hazardous materials and wastes. These accidental amounts cannot be estimated before the incident actually takes place. Management and mitigation strategies to be implemented in the event of soil contamination will vary depending on the level and extent of contamination. However, developing an understanding of the source-pathway-receptor relationship in case of an accidental spill or leakage, and managing the contaminated media in a timely manner, is important for the effective management of soil contamination.

There are some landslide-prone areas, as shown in Figure 34 and Figure 35. Without proper mitigation (e.g., design-based mitigation) in place, such areas may present risks to construction personnel during the construction phase and to road users and local communities during the operation phase. Additionally, since the project area is located in an earthquake zone (see Figure 32 and Figure 33, earthquake-related risks are considered a major issue for the project. Therefore, earthquake-resistant design and structural protection from potential seismic activity are among the highest priority design considerations for projects that utilize a large number and variety of engineering structures, such as viaducts and bridges.

The potential adverse impacts and/or risks on land use and soil during the construction phase, which are required to be managed within the scope of the project, are listed below.

- Change in land use due to the establishment of associated and auxiliary facilities,
- Fragmentation of agricultural and pasture lands due to the sub-project activities regarding associated and auxiliary facilities to be established along with corresponding potential impacts on restrictions to access to the lands,
- Loss of vegetative soil (in terms of quantity and/or vegetative quality),
- Soil disturbance and erosion, due to earthworks: excavation and filling operations,
- Soil erosion risk in the absence of proper erosion control measures and sedimentation,
- Soil contamination risk originated from accidental spill/leakage and improper management of hazardous materials and waste,
- Landslide and seismicity related risks.



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4.1.3.2 Operation Phase

Operation phase of the Project will not cause any direct impacts on land use change. However, operation-phase mitigation measures will be in place to minimize the risk of erosion and soil contamination. On the other hand, geological and geotechnical risks (i.e., geotechnical risks such as stability and settlement problems, landslide and seismicity related risks) described above for land preparation and construction phase will persist during operation phase.

The potential adverse impacts and/or risks on land use and soil during the operation phase, which are required to be managed within the scope of the project, are listed below.

- Landslide, seismicity and geotechnic related risks,
- Soil contamination risk due to spill/leakage resulting from traffic accidents and during the repair/maintenance works and housekeeping of the road pavement and other highway components,
- Soil disturbance and erosion risk due to extreme weather conditions and improperly functioning erosion and sediment control structures.

Impact significance and mitigation measures corresponding to relevant E&S impacts and risks are provided in Table 45.



Table 45. Impact Significances, Proposed Mitigation Measures and Value of Residual Impacts - Land Use, Soils and Geology

Potential Impact Description	Project Phase	Receptor	Impact Magnitude					Sensitivity/ Value of Resource/ Receptor	Impact Significance (prior to mitigation or with existing mitigation)	Proposed Mitigation Measures	Residual Impact Significance
			Extent	Reversibility	Duration	Frequency	Overall Magnitude				
Land Use	Land Preparation and Construction	Arable lands Pastures Local Communities	Local	Short-term reversible	Short-term	One-off	Medium	Medium	Moderate	<ul style="list-style-type: none"> Land preparation and construction works will be conducted at designated sites that will be visibly and appropriately marked. Accordingly, training will be provided to the construction personnel to ensure they maintain the pre-established construction boundaries. Sub-project-based activities will aim to reduce/minimize the fragmentation of agricultural and pasture lands. The Grievance Redress Mechanism will be implemented to ensure that any complaints or comments regarding the Project are received and responded to in a timely manner, with solutions provided and corrective measures taken as appropriate. KGM will ensure that necessary corrective measures are taken by the Contractor from its own budget, in case of direct or indirect damage to adjacent properties that are state-owned or private property due to project-related activities. Regular information sharing will be conducted with community members using pasture and/or arable land during the land preparation phase before construction by considering all associated and auxiliary facilities. 	Minor
Loss of Vegetative Soil	Land Preparation and Construction	Topsoil	Restricted	Long-term reversible/ Irreversible	Short-term	One-off	Medium	High	Major	<ul style="list-style-type: none"> Contractor's ESMP (C-ESMP) will be prepared and implemented by the Contractor by covering relevant E&S issues. Strip fertile topsoil from the Project area at a sufficient depth suitable for local soil conditions prior to construction activities. Store topsoil separately from subsoil at designated topsoil storage areas at suitable conditions to preserve its vegetative properties. Do not carry out stripping when soil is wet, so that soil compaction is avoided. Provide drainage at topsoil storage areas by open channels. If storage of topsoil will last longer than three months, plant upper part of fertile soil temporarily so that the organic content is conserved. Select proper species and seed mixture ratios. Apply organic or inorganic materials on the topsoil to improve quality and avoid erosion, desiccation or invasion of wild species. Reuse topsoil stored at suitable conditions for the rehabilitation of temporary construction sites after the completion of construction activities, and in landscape activities. Loosen topsoil to a depth of 15 cm before reinstatement (Increase depth of loosening up to 40-50 cm for compact heavy clay soils) It will be ensured that the place where the topsoil will be stored does not have a slope of more than 5%. Average height of topsoil stacks should be 1.5 meters. Keep depth of topsoil for areas to be planted suitable for side slopes, shrub plantation areas, tree roots etc. Conduct grading operation in line with the natural slope and drainage conditions following the reinstatement of topsoil. 	Minor
Soil Disturbance and Erosion	Land Preparation and Construction	Soil/land	Local	Short-term reversible	Short-term	Intermittent	Medium	High to Low (depending on erosion degree)	Major	<ul style="list-style-type: none"> Before the onset of land preparation and construction works, erosion control measures like drainage channels, settling structures, etc. will be implemented. To eliminate the risk of erosion in periods of excessive rainfall, the waters from the project surroundings and slopes will be separated from surface run-off by directing through temporary channels and soil embankments. Erosion control measures will be implemented following the completion of excavation works, also at the culvert outlets, and slopes will be improved. Around the excavated material stored at designated storage sites, dikes will be established to prevent loss of soil. All the disturbed sites will be restored to the most possible extent in a timely manner following the completion of stripping and excavation works. 	Minor
	Operation	Soil/land	Local	Long-term reversible/ Irreversible	Long-term	Intermittent	High	Low	Moderate	<ul style="list-style-type: none"> The road structure will be periodically maintained and strengthened, particularly after extreme weather conditions. Erosion control structures will be regularly monitored and maintained to ensure proper functioning. The embankment and cutting slopes will undergo regular inspections to identify and address any risks associated with erosion, landslides, etc. 	Minor



Potential Impact Description	Project Phase	Receptor	Impact Magnitude					Sensitivity/ Value of Resource/ Receptor	Impact Significance (prior to mitigation or with existing mitigation)	Proposed Mitigation Measures	Residual Impact Significance
			Extent	Reversibility	Duration	Frequency	Overall Magnitude				
Soil Contamination	Land Preparation and Construction	Lands Project Personnel Local Communities	Local	Short-term reversible	Short-term	One-off	Low	High	Moderate	<ul style="list-style-type: none"> Discharge of materials into soil that would cause contamination will be prohibited. After each construction site is decommissioned, all debris and waste shall be cleared. Employees will be trained regarding spills and leaks. Accidental spills and leakages will be managed through implementation of the Emergency Preparedness and Response Plan. Maintenance and repairs will be carried out on the impermeable grounds with secondary containment structure/drip trays. Solid wastes, hazardous wastes and wastewater to be generated as a result of project activities and hazardous and chemical materials to be used in construction and repair works will be further managed through C-ESMP and WBG EHS Guidelines. In case of a location to be suspected of contamination before or during construction works, a sampling and analysis study will be carried out. 	Minor
	Operation	Lands Project Personnel Local Communities	Local	Medium-term reversible	Long-term	One-off	Medium	Medium	Moderate	<ul style="list-style-type: none"> If road accidents occur that may result in spills and leakages, the Emergency Preparedness and Response Plan will be implemented to effectively manage any potential contamination. For de-icing of the road structures, more environmentally friendly products will be preferred to prevent any potential contamination to soils. 	Minor
General Geotechnical Risks Seismicity Related Risks Landslide Risk	Land Preparation and Construction	Project personnel	Restricted	Long-term reversible/ Irreversible	Short-term	One-off	Low	High	Moderate	<ul style="list-style-type: none"> All engineering structures to be established within the scope of the project will be designed and constructed taking into account the earthquake resistant design parameters and criteria. Slopes will be designed with gentle gradients to reduce the risk of landslides. Retaining walls, rock bolts, and anchors will be used to stabilize steep slopes, when necessary. Rockfall protection systems like catch fences, netting, and barriers will be utilized where there is a risk of falling rocks. In the structures to be constructed within the scope of the project, provisions of "Regulations for the Structures to be Built in Disaster Areas" published in the Official Gazette No. 26582 dated 14.07.2007 and "Türkiye Building Earthquake Code" of Disaster and Emergency Management Administration published in the Official Gazette No.30364 and dated 18.03.2018 that came into force in 01.01.2019 will be strictly followed. Emergency Preparedness and Response Plan prepared for the project will be implemented in the event of an earthquake. 	Minor
	Operation	Users of the highways Infrastructure	Local	Long-term reversible/ Irreversible	Long-term	One-off	Medium	High	Major	<ul style="list-style-type: none"> Periodic checks and maintenance will be conducted and as required, additional stability and structural measures (e.g. in case potential of settlement, cracks or structural unconformities after an earthquake, etc. is observed) will be developed and implemented. Emergency Preparedness and Response Plan will be implemented. 	Minor



4.2 Noise and Vibration

4.2.1 Methodology and Project Standards

Methodology

The noise assessments carried out as part of the ESIA study consists of the following steps:

- Baseline characterization
- Current status identification
- Assessment of impact significance

Background noise level measurements were conducted for 48-hours (including weekday and weekend) to assess hourly noise levels. Methods specified in ISO 1996-1 and ISO 1996-2 Standards were followed.

Environmental vibration measurements were carried out in accordance with the TS 10354 Mining-Air Shock and Vibration Measurement Standard, which includes the measurement of ground vibrations caused by blasting. The vibration measurements were taken instantaneously.

Project Standards

The project is assessed according to the following national and international standards for the impacts of noise and vibration:

- Environmental Noise Control Regulation (ENCR)
- WBG General EHS Guidelines – 1.7: Noise Management

ENCR sets different limits for specific noise sources such as industrial facilities, workplaces that broadcast music etc. The limit values stated in ENCR are given in Table 46. The noise sources of the construction and operation activities within the scope of the project can be assessed under the first line of Table 46 “Industrial facilities, sources of transport”.

Table 46. Environmental Noise Limit Values in ENCR ⁶

Noise Sources	Measured Parameters	Environmental Noise Levels		
		Daytime (07.00-19.00)	Evening (19.00-23.00)	Night (23.00-07.00)
Industrial facilities, sources of transport	LA _{eq,5min.}	65 dB(A)	60 dB(A)	55 dB(A)
Workplaces that broadcast music	LA _{eq,63-250 Hz}	60 dB(A)	55 dB(A)	50 dB(A)
Workplaces	LA _{eq,5min.}	Background + 5 dB(A)		Background + 3 dB(A)
In case of more than one workplace	LA _{eq,5min.}	Background + 7 dB(A)		Background + 5 dB(A)
All sources	LC _{max}	100 dB(C)		

While the ENCR establishes noise limits according to the noise sources, the WBG General EHS Guidelines on Environmental Noise Management determine noise limits based on the receptors of the noise. WBG General EHS Guidelines divides receptors into two categories as residential areas and industrial/commercial areas and divides the time periods into two as day and night-time. Limit values stated in the guideline is given in Table 47.

⁶ ENCR, Annex-2, Table 1



Besides, noise impacts should not result in a maximum increase in background levels of 3 dB at the nearest receptor location off-site. It should be noted that there are no defined limits for the construction activities within the scope of WBG General EHS Guidelines.

Table 47. Noise Limits in WBG General EHS Guidelines

Receptor	One Hour LAeq (dBA)	
	Daytime (07:00-22:00)	Nighttime (22:00-07:00)
Residential; institutional; educational	55	45
Industrial; commercial	70	70

Since the WBG EHS Guideline noise limit values established for residential areas are stricter than ENCR noise limits, the WBG EHS Guideline limit values were adopted as project standards.

Vibration

The limit values of ground vibrations that will occur due to blasting in mines, quarries and similar areas are given in Table 48.

Table 48. The highest allowable values of ground vibrations that will be created in the nearest structure by the vibrations that will occur due to blasting in mines, quarries and similar areas⁷

Building Type	Highest Vibration Speed in the Foundations of Buildings, (mm/s) (according to frequency, f=Hz)			In the base of the top floor for all frequencies ⁽²⁾
	f= 1-10	f= 10-50	f= 50-100 ⁽¹⁾	
1 Industrial buildings	20	40	50	40
2 Durable structures such as houses, brick and concrete	5	15	20	15
3 Buildings, historical and natural structures that are sensitive to vibration and excluded from Articles 1 and 2 ⁽³⁾	2	8	10	8

(1) For frequencies greater than 100 cycles/sec, large vibration levels are permissible.
(2) For buildings with multiple floors, measurements must be taken at both the foundation of the buildings and the slab of the top floor.
(3) These limit values determined for historical and natural structures can be limited by precise, comprehensive vibration measurements and scientific studies to be carried out on site.

Limit values of ground vibrations caused by pile driving and similar vibration-creating operations and construction machines outside the nearest structure in construction are listed in Table 49.

Table 49. The highest allowable values of ground vibrations caused by pile driving and similar vibration-creating operations and construction machines outside the nearest structure in construction⁸

Structure Type	Highest Allowed Vibration Rate (Peak Value-mm/s)	
	Continuous vibration	Intermittent vibration
Residential Areas	5	10
Commercial Areas	15	30
Historical and Natural Structures ⁽¹⁾	2	5

⁷ ENCR, Annex-2, Table 3

⁸ ENCR, Annex-2, Table 5



Structure Type	Highest Allowed Vibration Rate (Peak Value-mm/s)	
	Continuous vibration	Intermittent vibration
<p>(1) These limit values determined for historical and natural structures can be limited by precise, comprehensive vibration measurements and scientific studies to be carried out on site.</p> <p>(2) These limit values determined for historical and natural structures can be limited by precise, comprehensive vibration measurements and related scientific studies to be carried out on site.</p>		

Limit values of ground vibrations caused by railway and road transportation vehicles, workplaces, and industrial facilities in the nearest structures, as well as ground vibrations created by machinery and equipment inside the building, are given in Table 50.

Table 50. The highest allowable values of the ground vibrations to be created by railway and road transportation vehicles, workplaces and industrial facilities in the nearest structure, and the ground vibrations to be created by the machinery and equipment inside the building⁹

Structure Type	Vibration Frequency (Hz)	Highest Allowed Vibration Speed (rms value (mm/s))
Residential structures	1 ⁽¹⁾	1.5
	8-100	0.3
Offices	1 ⁽¹⁾	3.5
	8-100	0.6
Historical and natural structures⁽²⁾	1 ⁽¹⁾	0.8
	8-100	0.1
<p>(1) The highest allowed vibration speed is determined according to the vibration frequency in the logarithmic graph with the specified values.</p> <p>(2) These limit values determined for historical and natural structures can be limited by precise, comprehensive vibration measurements and related scientific studies to be carried out on site.</p>		

4.2.2 Baseline Conditions

To be able to assess the noise and vibration levels arise from the project activities, noise measurements were conducted at eight (8) points for 48 hours, and vibration measurements were conducted at two (2) points, in May 2024.

The noise and vibration measurement points were selected based on their proximity to sensitive receptors, considering both construction and mining activities. At the current status of the project, construction work is ongoing at sub-projects P1, P2, P3 and P5, meaning several noise measurement points were carried out in locations where work was already in progress.

The information on the selected measurement points is provided in Table 51, the noise and vibration measurement results were listed in Table 52 and Table 53, respectively.

It can be seen from Table 52 and Table 53 that both noise and vibration measurement results are all below the limits set forth by WBG EHS Guidelines and ENCR.

Noise measurement locations are shown in Figure 36 and Figure 37 whereas vibration measurement locations are indicated in Figure 38. The acoustic report covering both noise and vibration measurements is given in Appendix-4.

⁹ ENCR, Annex-2, Table 4



Table 51. Information on Noise Level Measurement Points

No*	Sub-project No.	Province	District/Neighborhood	Receptor	Noise/Vibration Source	Distance between receptor and source (km)	Activity Status
N-1	P3	Hatay	Antakya/Mansurlu	Nearest settlement	Kuruyer Limestone Quarries**,**	0.7	-
N-2	P3	Hatay	Antakya /Narlıca	Nearest settlement	Kuruyer Limestone Quarries**,**	0.8	-
N-3	P2	Hatay	Antakya /Demirköprü	High school	Demirköprü construction (Antakya Reyhanlı road)	0.1	Ongoing
N-4	P2	Hatay	Antakya /Osmanağa	Earthquake victim camp	Hatay airport road construction activities	0.04	Ongoing
N-5	P2	Hatay	Antakya /Aşağıoba	Nearest settlement	Hatay airport road construction activities	0.2	Ongoing
V-5					DSM stations – drilling activities	0.5	Ongoing
N-6	P2	Hatay	Kırıkhan /Başpınar	Nearest settlement	Kızılkaya construction site activities	2.2	Ongoing
V-6					Kızılkaya Quarry – blasting activities	1.8	Ongoing
N-7	P1	Gaziantep	Nurdağı/ Bademli	Nearest settlement	Başpınar Limestone Quarry	0.7	Not started yet
N-8	P4	Malatya	Doğanşehir /Reşadiye	Nearest settlement	Reşadiye Limestone Quarry	1.1	Not started yet

*N: Noise, V: Vibration

** Kuruyer Limestone Quarries are divided into four parts and three of which are currently operated by different contractors working with KGM on other projects. One part of the quarry was allocated to the Contractor (DEHA) by 5th Regional Directorate of Highways. In the current situation, DEHA is not planning to operate the quarry. Instead, aggregates will be purchased from the other operators.

*** To assess the cumulative effect of the limestone quarries, measurements have been conducted in the nearest settlements in the north and northeast.

Table 52. Noise Level Measurement Results

Measurement Location				Date	Results (dBA)*				
No	Coordinates (WGS 84 – UTM)	Receptor	Receptor Type		Turkish Regulation (ENCR)			WBG EHS Guidelines	
					Day (07:00-19:00)	Evening (19:00-23:00)	Night (23:00-07:00)	Day (07:00-22:00)	Night (22:00-07:00)
N-1	37S 250269 D 4011793 K	Settlement	Residential	10.05.2024	55.6	48.6	41.3	54.8	41.8
				11.05.2024	54.9	48.6	39.4	54.2	40.3
				12.05.2024	51.3			51.3	
N-2	37S 249296 D 4012193 K	Settlement	Residential	10.05.2024	51.5	45.5	42.9	50.8	42.8
				11.05.2024	53.1	44.4	41.3	52.3	41.7
				12.05.2024	46.3			46.3	
N-3	37S 262415 D 4014516 K	School	Educational	10.05.2024	54.6	46.1	42.6	53.7	42.6
				11.05.2024	54.8	46.0	40.2	54.0	40.9
				12.05.2024	51.1			51.1	
N-4	37S 251503 D 4028756 K	Settlement	Residential	10.05.2024	50.4	46.4	44.7	49.8	44.6
				11.05.2024	46.2	45.6	44.1	46.0	44.4
				12.05.2024	45.0			45.0	
N-5	37S 253827 D 4028246 K	Settlement	Residential	12.05.2024	51.2	46.2	42.8	50.6	42.5
				13.05.2024	51.2	43.5	43.4	50.4	43.4
				14.05.2024	50.5			50.5	
N-6	37S 275604 D 4039654 K	Settlement	Residential	12.05.2024	51.0	47.5	39.8	50.5	39.8
				13.05.2024	50.7	44.3	42.2	50.0	42.0
				14.05.2024	45.5			45.5	
N-7	37S 299183 D 4120432 K	Settlement	Residential	12.05.2024	54.3	48.3	44.5	53.4	44.2
				13.05.2024	50.0	47.0	42.7	49.6	43.1
				14.05.2024	49.9			49.9	
N-8	37S 413062 D 4204450 K	Settlement	Residential	12.05.2024	49.3	47.5	44.0	48.9	44.2
				13.05.2024	53.0	45.6	44.1	52.2	43.8
				14.05.2024	45.5	48.6	41.3	45.5	
Turkish Regulation (ENCR) Noise Limit Values					65	60	55	-	-
World Bank Group EHS Guidelines Environmental Noise Limit Values – Residential, institutional, educational					-	-	-	55	45

* Considering the starting times of the measurements and the uninterrupted 48-hour measurement period, the measurements in empty cells have concluded.

Table 53. Vibration Measurement Results

Measurement Location				Date	X Direction (mm/s)	Y Direction (mm/s)	Z Direction (mm/s)	Limit value ¹⁰ mm/s
No	Coordinates (WGS 84 – UTM)	Receptor	Receptor Type					
V-5 ¹¹	37S 253833 D 4028250 K	Settlement	Residential	11.05.2024	0.590	0.798	0.289	5
V-6 ¹²	37S 275602 D 4039645 K	Settlement	Residential	12.05.2024	0.541	0.625	0.344	5

¹⁰ ENCR, Annex-2, Table-3

¹¹ The vibration measurement at V-5 has been conducted while DSM machines were operated in the Hatay Airport Road.

¹² The vibration measurement at V-6 has been conducted simultaneously with the blasting in Kızılkaya Quarry.





Figure 36. Noise Measurement Locations – 5th Region

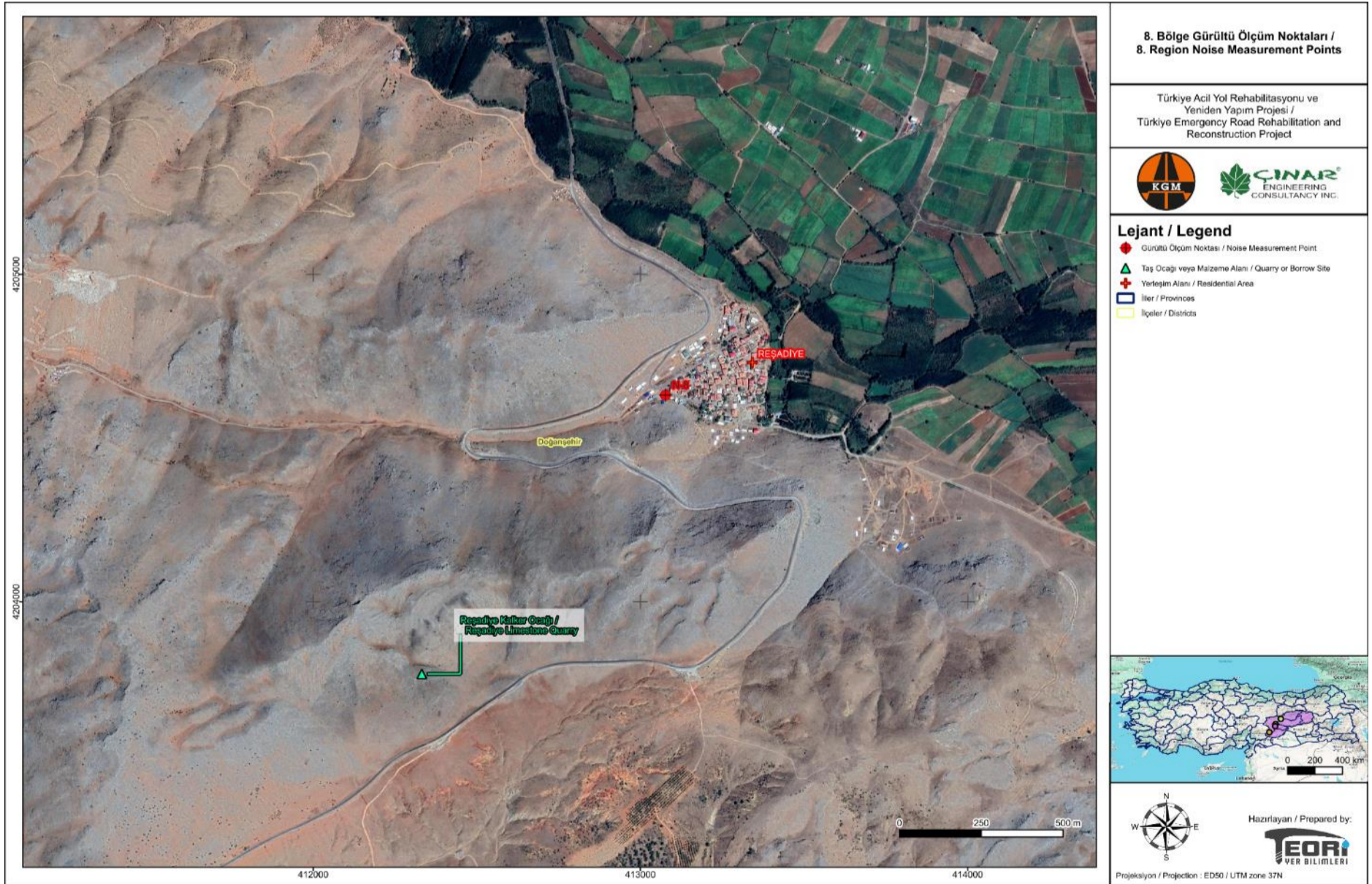


Figure 37. Noise Measurement Locations – 8th Region

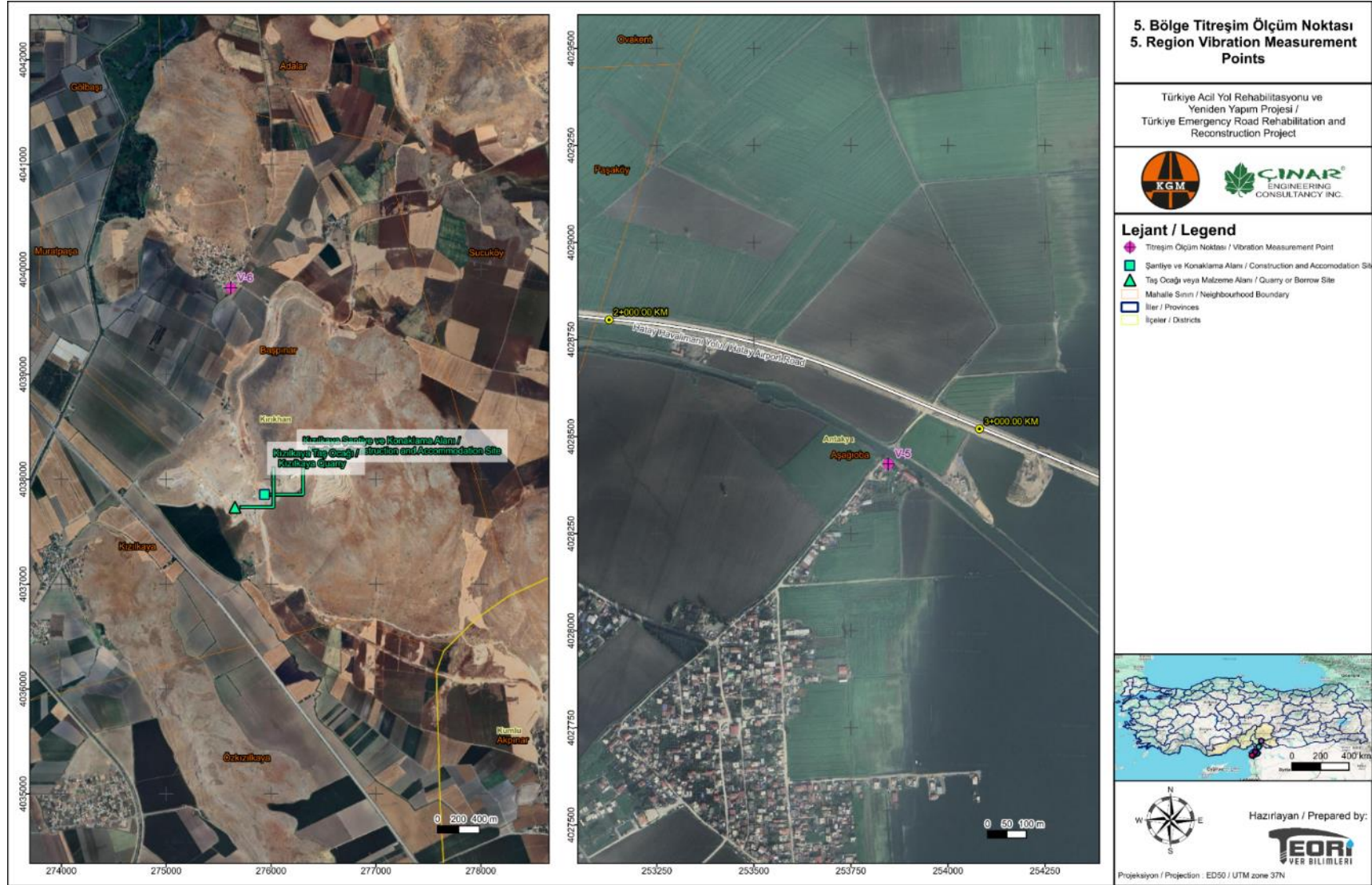


Figure 38. Vibration Measurement Locations



4.2.3 Impact Assessment and Mitigation Measures

The project is more likely to have notable impacts on noise and vibration levels during both construction and operational phases. During the construction phase, the use of heavy machinery and equipment, such as excavators, bulldozers, etc., may generate significant noise. These activities are likely to exceed ambient noise levels, causing disturbances to nearby residents and wildlife. Construction noise can lead to various negative effects, including stress, sleep disturbances, and hearing impairment for those living close to the construction sites. Moreover, the presence of construction vehicles and the movement of materials can further contribute to the elevated noise levels, disrupting the daily lives of the affected communities. On the other hand, although it was not observed that the limit values were exceeded according to project standards, it was inferred that measurement results approached the limit values at some measurement points. Due to the risk of exceeding the limit values depending on the work pace and speed, it is important to implement the mitigation measures specified in Table 55 throughout the project lifecycle.

Vibration during the construction phase mainly originates from two primary sources: blasting activities at the quarries, and machinery and equipment operation necessary for the construction. These vibrations can be felt by residents and businesses in close proximity to the construction sites, potentially causing structural damage to buildings, especially those that are already weakened by the earthquakes. Vibrations can also affect the comfort and well-being of individuals, leading to disturbances and potential health issues, such as headaches and fatigue. Sensitive structures, such as hospitals, schools, and historical buildings, may be particularly vulnerable to vibration-induced damage.

The noise and vibration impacts arising from sub-project activities (emphasizing mostly quarries where blasting activities are also conducted) were assessed based on both EIA process of the facilities (if available) and the measurement results carried out within the scope of this ESIA along with expert judgement. The summary of the assessments is given in Table 54.

Table 54. Noise and Vibration Assessments for Project Components that May Cause Impact

Facility	Nearest Receptor	Receptor distance	Reference Document	Assessment Result
Tatarlı Basalt Quarry	Sayhüyük village Tatarlı neighborhood Mustafabeyli neighborhood	3.3 km 2.3 km 2.8 km	Facility activities was evaluated as 'out of scope' in accordance with (repealed) Provisional Article 3 of the EIA Regulation No. 29186 dated 25.11.2014, as per the official letter from the Adana Provincial Directorate, dated 13.07.2020, numbered 90438820-220.03-E.19946.	Since the quarry is located far enough from the settlements, no significant impact is expected in terms of both noise and vibration.
Kızılkaya Limestone Quarry	Başpınar neighborhood	1.1 km (1.8 km away from the blasting area)	Project Introduction File (2024) For 31/2006-11 (ER:3119679) Numbered Limestone Quarry, Addition of Crushing and Screening Facilities to the Asphalt Plant Facility	According to the PIF, the noise level in Başpınar Neighborhood will be felt at below 48.26 dBA at a distance of 1,100 meters. Therefore, the noise generated during the operation phase of the quarry will have no negative impact on this residential area. Consequently, it remains below the acceptable values specified in the



Facility	Nearest Receptor	Receptor distance	Reference Document	Assessment Result
				<p>"Environmental Noise Control Regulation," which came into effect upon publication in the Official Gazette dated 30.11.2022 and numbered 32029. Similarly, as per the noise measurement results conducted within the scope of the ESIA for N-6 monitoring point in Başpınar neighborhood, limit values specified in both WBG EHS Guidelines and Environmental Noise Control Regulation have been complied with.</p> <p>On the other hand, according to the PIF, with the blasting to be carried out, the vibration velocity at a distance of 200 meters has been calculated as 5.79 mm/s. It is understood that beyond 200 meters, the vibration velocity will fall below the regulatory limit value of 5 mm/s. In this case, it is evident that the vibrations resulting from the blasting with the maximum instantaneous charge will not have a negative impact on the residences located in the Başpınar Neighborhood, which is approximately 1,100 meters away. Similarly, as per the vibration measurement results conducted within the scope of the ESIA for V-6 monitoring point in Başpınar neighborhood, the regulatory limit value has been complied with.</p>
Başpınar Limestone Quarry	Bademli neighborhood	700 m	<p>Facility activities was evaluated as 'out of scope' in accordance with (repealed) Article 24 (Extraordinary Situations and Special Provisions) and Provisional Article 2 of the EIA Regulation No. 31907 dated 29.07.2022, as per the official letter from the MoEUCC, dated 08.02.2024 and numbered E-14108550-220.01-8709304.</p>	<p>It has been reported that work will be conducted at the quarry for a period of 24 months, with an annual production of 1,200,000 tons of limestone, 96 blasts per year, and 155 holes drilled per blast, using 37.3 kg of explosive material (ANFO) per hole.</p> <p>It should be noted that since the usage of the quarry has not been initiated within the scope of this project, noise measurement result (N-7) was below the limits set forth by WBG EHS Guidelines and ENCR. Besides, no significant noise and/or vibration impact is expected due to operation of the quarry at the nearest settlement due to its distance to the settlement and considering that the necessary mitigation measures specified in Table 55 will be taken. Nevertheless, it is important to make quarterly measurements from that monitoring point during the operation period of the quarry and in case of any grievances.</p>

Facility	Nearest Receptor	Receptor distance	Reference Document	Assessment Result
Kuruyer Limestone Quarries	Narlica neighborhood	700 m	Project Introduction File (2023) for 31/2023-09 (ER: 3480631) Numbered Limestone Quarry and Crushing Screening Facilities	According to the PIF, the noise level in the Narlica neighborhood will be felt at below 59.79 dBA. Therefore, the noise generated during the operation phase will have no negative impact on this residential area. Consequently, it remains below the acceptable values specified in the "Environmental Noise Control Regulation," which came into effect upon publication in the Official Gazette dated 30.11.2022 and numbered 32029. Similarly, as per the noise measurement results conducted within the scope of the ESIA for N-1 and N-2 monitoring points in Mansurlu and Narlica neighborhoods, respectively; limit values specified in both WBG EHS Guidelines and Environmental Noise Control Regulation have been complied with.
	Mansurlu neighborhood	800 m		On the other hand, according to the PIF, with the blasting to be carried out, the vibration velocity at a distance of 200 meters has been calculated as 5.79 mm/s. It is understood that beyond 200 meters, the vibration velocity will fall below the regulatory limit value of 5 mm/s. In this case, it is evident that the vibrations resulting from the blasting with the maximum instantaneous charge will not have a negative impact on the residences located in the Narlica Neighborhood, which is approximately 500 meters away. It should be noted that vibration measurements were not taken within the scope of the ESIA studies, although air quality measurements were conducted, since the contractor decided to purchase aggregate from existing facilities instead of operating its allocated part of the quarry.
Erkenek Gravel-sand Borrow Site	Gedikağzı neighborhood	650 m	-	<p>There will be no blasting.</p> <p>Since it was still in the tender stage and the contractor has not yet been appointed, during the ESIA preparation the EIA process has not been initiated.</p> <p>The activities to be carried out are not expected to have a significant impact on the settlement in terms of noise and vibration due to its distance to the nearest settlement, the lack of blasting and considering that the necessary mitigation measures specified in Table 55 will be taken.</p>

Facility	Nearest Receptor	Receptor distance	Reference Document	Assessment Result
Reşadiye Limestone Quarry	Reşadiye neighborhood	1.1 km	-	<p>It is foreseen that the natural topography will block potential impacts in terms of noise and vibration. The noise measurements taken at the monitoring point of N-8 were below the project standards' limit values. Thus, no significant noise and/or vibration impact is expected due to operation of the quarry at the nearest settlement due to its distance to the settlement and natural topography and considering that the necessary mitigation measures specified in Table 55 will be taken.</p> <p>Since it was still in the tender stage and the contractor has not yet been appointed, during the ESIA preparation the EIA process has not been initiated</p>
Deep Soil Mixing Machines and Road Reconstruction Activities	Aşağıoba neighborhood Osmanağa neighborhood	500 m to the nearest DSM machine Near the road to be reconstructed	-	<p>Within the scope of the ESIA study, it was observed that the measurement results in the area (N-4, N-5 and V-5) where road reconstruction works were carried out were below the regulatory limit values for noise and vibration. Nevertheless, since temporary living areas/prefabricated containers for earthquake victims are present in the Osmanağa neighborhood, the works should be carried out with the necessary sensitivity by taking the relevant mitigation measures specified in Table 55.</p>
Reconstruction of Demirköprü Bridge	High School at the Demirköprü neighborhood	100 m	-	<p>According to the noise measurement performed at this monitoring point (N-3) during the active work, limit values specified in both WBG EHS Guidelines and Environmental Noise Control Regulation have been complied with. Therefore, it is not expected to have a significant impact in terms of noise and vibration considering that the mitigation measures specified in Table 55 are taken.</p>
Repair and Reinforcement of the Technological Bridges	No sensitive receptors identified	-	-	<p>Considering the scope of the works carried out, the sensitive receptors in the surrounding area and considering that the mitigation measures specified in Table 55 will be taken, the activities are not expected to have a significant impact in terms of noise and vibration. Therefore, no environmental measurements were made within the scope of the ESIA study.</p>

In the operational phase, the improved road conditions and increased traffic volumes could lead to sustained higher noise levels. While smoother road surfaces might reduce some noise from vehicle interactions with the road, the anticipated increase in traffic, including heavy trucks



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and buses, will likely result in higher overall noise levels. This increase in noise pollution can impact the quality of life for residents living near the roads, potentially leading to long-term health effects, such as cardiovascular issues and elevated stress levels. There is no new road construction within the scope of the Project. Already existing roads will be utilized after the renewal works are completed. Expanding existing roads or building additional roads are out of scope.

To mitigate these impacts, several measures can be implemented. The potential impacts and their significances, project-specific mitigation measures and value of residual impacts regarding noise and vibration are given in Table 55.



Table 55. Impact Significances, Mitigation Measures and Value of Residual Impacts – Noise and Vibration

Impact Description	Project Phase	Receptor	Impact Magnitude					Sensitivity/ Value of Resource/ Receptor	Impact Significance (prior to mitigation or with existing mitigation)	Proposed Mitigation Measures	Residual Impact Significance
			Extent	Reversibility	Duration	Frequency	Overall Magnitude				
Increase in noise levels	Land Preparation and Construction	Nearby settlements Ecological receptors	Local	Short-term reversible	Short-term	Intermittent	Medium	Low	Minor	<p>During the construction phase:</p> <ul style="list-style-type: none"> The ESMPs prepared specifically for each sub-project will be implemented. EIA opinions and relevant environmental permits will be obtained for all associated and auxiliary facilities including the quarry, borrow sites, asphalt plant, concrete plant, crusher and mechanical plant. All construction activities will be carried out in compliance with the noise limit values specified in the ENCR and WBG EHS Guidelines. Construction activities will be carried out between 10.00-22.00 in line with the requirements specified in Regulation on Environmental Noise Control (see Annex-2, Table 2 of the regulation). In addition, it should be taken into consideration that the working hours of projects such as dams, bridges, tunnels, highways, urban highways, and mass housing that require public benefit, as well as construction activities that will prevent daytime traffic in the city, will be determined by the decision of the Provincial Local Environmental Board by taking noise reduction measures for high noise propagating equipment. C-ESMP will be developed and implemented by the Contractor by covering relevant E&S issues. and all personnel will receive the necessary training on noise management. Project Grievance Redress Mechanism will be implemented. If any complaint related with noise or vibration is received through the Grievance Redress Mechanism, the complaint will be evaluated, and the necessary corrective preventive actions will be implemented. Portable barriers and acoustic enclosures will be established around equipment where necessary. Natural topography will be utilized to create barriers against noise during construction activities as much as possible. Ancillary components at camp sites and other stationary plants will be positioned with consideration for noise-sensitive receptors. Machinery, equipment and vehicles with lower sound power levels and sound reduced models will be preferred, using newer and electrically driven models. Maintenance of construction vehicles will be conducted regularly by means of a regular vehicle maintenance and repair program which is also recommended by the manufacturer. Speed limitations for construction vehicles will be defined and obeyed. Relevant trainings will be conducted and instructions on the driving speed limits will be provided to drivers/operators of construction vehicles. Driving of construction vehicles through settlements will be avoided where possible. Keeping the vehicles running will be prohibited while waiting on the construction site. Noise and/or vibration monitoring will be carried out by means of noise measurements in accordance with both national legislation and the WBG EHS Guidelines (quarterly for the construction phase at the nearby settlements and upon grievance). Site personnel with necessary environmental training will be provided that aims at reducing noise caused by Project activities. When necessary, to protect the employees from the noise and vibration caused by machinery and equipment; work will be carried out in accordance with the provisions of the "Occupational Health and Safety Law No. 6331" and necessary measures (such as providing ear protection PPE) will be taken to protect workers from risks that may arise from health and safety, especially hearing risks, as a result of exposure to noise/vibration. Engagement with local communities will be performed to understand their concerns and gather feedback on noise and vibration related issues. Collaboration will be made with regulatory authorities to address noise and vibration related concerns and seek approval for noise and vibration mitigation measures. Notification of communities/settlements about the noise and vibration levels that may be created during construction phase due to heavy machinery use and blasting operations at the quarries/borrow sites. Sensitivity of nearby settlements/buildings will be assessed against vibration prior to blasting operations. Construction and blasting activities will be scheduled by aiming to minimize potential vibration-related impacts. The number of holes to be blasted in one shot and the total charge amounts per shot will be optimized by applying modern blasting techniques. Blasting with millisecond delays and low charge weight will be carried out by considering the geological formation and characteristics of the area. Relevant records should be kept during blasting operations, and blasting-related impacts should be monitored. Vibrometers should be placed at suitable locations, and records should be kept of charge amounts, delays, and other relevant parameters. In order to mitigate the specific impacts resulting from the auxiliary facilities including quarry/borrow sites, asphalt plant, concrete plant, crusher and mechanical plant, following items will be considered: <ul style="list-style-type: none"> Design adequately foundations for the facilities to sufficiently limit vibrations. Erecting barriers such as walls or fences around the perimeter of the auxiliary facilities to reduce the propagation of noise towards surrounding areas. Placing noisy machines within soundproof enclosures or buildings to control noise emissions. Use of rubber-lined or soundproof surfaces on processing equipment (e.g. screens, chutes, transfer points, and buckets). Use of rubber-belt transport and conveyors. Regularly maintaining and lubricating machinery to minimize mechanical noise and vibration. 	Negligible
	Operation	Nearby settlements Ecological receptors	Local	Medium-term reversible	Medium-term	Recurrent	High	Low	Moderate		Minor
Increase in vibration	Land Preparation and Construction	Nearby settlements Ecological receptors	Local	Short-term reversible	Short-term	Intermittent	Medium	Low	Minor	Negligible	



Impact Description	Project Phase	Receptor	Impact Magnitude				Sensitivity/ Value of Resource/ Receptor	Impact Significance (prior to mitigation or with existing mitigation)	Proposed Mitigation Measures	Residual Impact Significance
			Extent	Reversibility	Duration	Frequency				
								<ul style="list-style-type: none"> - Installing silencers and mufflers on exhaust systems to reduce noise generated by equipment. - Using vibration isolation mounts or pads to reduce the transmission of vibration from machinery to nearby structures. <p>During the operation phase:</p> <ul style="list-style-type: none"> ▪ The effectiveness of low-noise surface will be maintained by cleaning the surface to avoid clogging. ▪ Appropriate vegetation with suitable plant species should be planted between the highway and settlements to ensure a decrease in noise levels and associated impacts to acceptable levels. ▪ Project Grievance Redress Mechanism will be implemented. If any comment related with noise or vibration is received through the Grievance Redress Mechanism, the complaint will be evaluated and where necessary corrective preventive actions will be implemented. ▪ Engagement with local communities will be performed to understand their concerns and gather feedback on noise/vibration-related issues. ▪ Collaboration will be made with regulatory authorities to address noise/vibration-related concerns and seek approval for noise/vibration mitigation measures. 		



4.3 Air Quality and Greenhouse Gas Emissions

4.3.1 Methodology and Project Standards

In accordance with the methodology given in Section 1.4, generic criteria for determining the sensitivity of a receptor have been established, and the sensitivity of receptors has been classified based on the importance or rarity of the concerned receptor.

In this context, the air quality measurement sampling points were selected based on the receptors identified within the scope of the project. Additionally, the information provided in the project introduction files was combined with expert judgments based on baseline measurements and scope/nature of the works carried out to assess the impacts of the project activities covering all sub-projects together with the all related/auxiliary facilities.

National Legislation and Air Quality Standards

With the implementation of the Integrated Environmental Strategy, aligned with EU regulations, Türkiye has made significant advancements in air management policy. Consequently, Turkish law now conforms to the EU Air Quality Framework Directive and its associated directives, including the Directive on Large Combustion Plants and other climate change-related regulations. The Regulation on the Control of Industrial Air Pollution, published in Official Gazette No. 27277 on 03 July 2009 (Amended: OG-20/12/2014-29211), currently governs air quality and emissions from incinerators in Türkiye.

The primary objective of the Regulation on the Control of Industrial Air Pollution (RCIAP) is to mitigate the adverse effects of industrial activities on air quality through the establishment of stringent guidelines and standards for the emission of pollutants. This regulation aims to protect public health by reducing harmful emissions that contribute to respiratory diseases, cardiovascular problems, and other health issues. Furthermore, it seeks to minimize the environmental impact of industrial air pollution, thereby safeguarding ecosystems, wildlife, and natural resources. The RCIAP mandates specific limits on various pollutants and requires industries to implement robust monitoring and reporting mechanisms to ensure compliance, thereby maintaining transparency and accountability. It also promotes the adoption of cleaner, more efficient technologies and practices within industries to reduce their emissions and environmental footprint. By providing a legal framework for enforcing air quality standards and penalizing non-compliance, the regulation ensures that industries adhere to the established norms. Ultimately, the RCIAP supports the broader goal of sustainable development by balancing industrial growth with the imperative to protect the environment and public health.

Limit values to be followed between 2024 according to this regulation are given in Table 56.

Table 56. Air Quality Limit Values¹³

Parameter	Time	Unit	Limit Value
SO ₂	Hour (cannot exceed more than 24 times annually)	µg/m ³	350
	LTV*		60
	Annual and winter season		20
NO ₂	Hour (cannot exceed more than 18 times annually)	µg/m ³	200
	Annual		40
PM ₁₀	24 hour (cannot exceed more than 35 times annually)	µg/m ³	50
	Annual		40

¹³ Regulation on the Control of Industrial Air Pollution Annex-2 Table 2.2



Parameter	Time	Unit	Limit Value
Settled Dust	STV**	mg/m ² day	390
	LTV		210
CO	Maximum daily 8 hours average	mg/m ³	10
VOC	Hourly	µg/m ³	280
	STV		70
Pb	Annual	µg/m ³	0,5
Cd	LTV	µg/m ³	0,02
HCl	STV	µg/m ³	150
	LTV		60
HF	Hour	µg/m ³	30
	STV		5
H ₂ S	Hour	µg/m ³	100
	STV		20
Total Organic Compounds (In terms of carbon)	Hour	µg/m ³	280
	STV		70

*LTV: Long Term Limit Value

**STV: Short Term Limit Value

International Requirements

Asian Infrastructure Investment Bank (AIIB) refers to the World Bank Group's Environmental, Health, and Safety (EHS) guidelines and criteria for the Project. According to the World Bank Group's General EHS Guidelines for Environmental Air Emissions and Ambient Air Quality, projects that emit significant amounts of air pollutants and have the potential to substantially impact air quality should strive to prevent or minimize these effects. This can be accomplished by ensuring that emissions remain within the limits established by applicable national regulations. In the absence of such regulations, adherence to the WHO Ambient Air Quality Guidelines is recommended.

Therefore, in compliance with relevant national legislation, the WBG General EHS Guidelines for Environmental Air Emissions and Ambient Air Quality refer to the WHO Ambient Air Quality Guidelines. Ambient air quality guideline values recommended by the World Bank Group EHS Guidelines are presented in Table 57.

Table 57. WBG– WHO – Ambient Air Quality Guideline Values

Parameter	Duration	Guideline Value (µg/m ³)
SO ₂	10-minute	500
	24-hour	20
NO ₂	1-hour	200
	1-year	40
Particulate Matter (PM ₁₀)	24-hour	50
	1-year	20
Particulate Matter (PM _{2.5})	24-hour	25
	1-year	10
O ₃	8-hour daily maximum	100



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4.3.2 Baseline Conditions

4.3.2.1 Air Quality

To assess the impacts of air pollutant emissions caused by construction activities of the project, baseline air quality measurements were conducted.

Eight (8) sampling points for particulate matter (PM₁₀ and PM_{2.5}) and five (5) sampling points for settled dust were selected for measurement. These points were strategically chosen to represent areas most likely to be affected by air emissions during the construction and operation phases of the Project. Comprehensive sampling studies were conducted at these points to monitor particulate matter levels. The analyses of these samples were carried out by an accredited laboratory, Çınar Laboratories Group, and the analyses reports were provided in Appendix-4.

The ambient air quality sampling points for PM₁₀, PM_{2.5} and settled dust are shown in Figure 39 and Figure 40.

The analysis results of particulate matter and settled dust are presented in Table 58 and Table 59, respectively.





Figure 39. Ambient Air Quality Sampling Locations – 5th Region

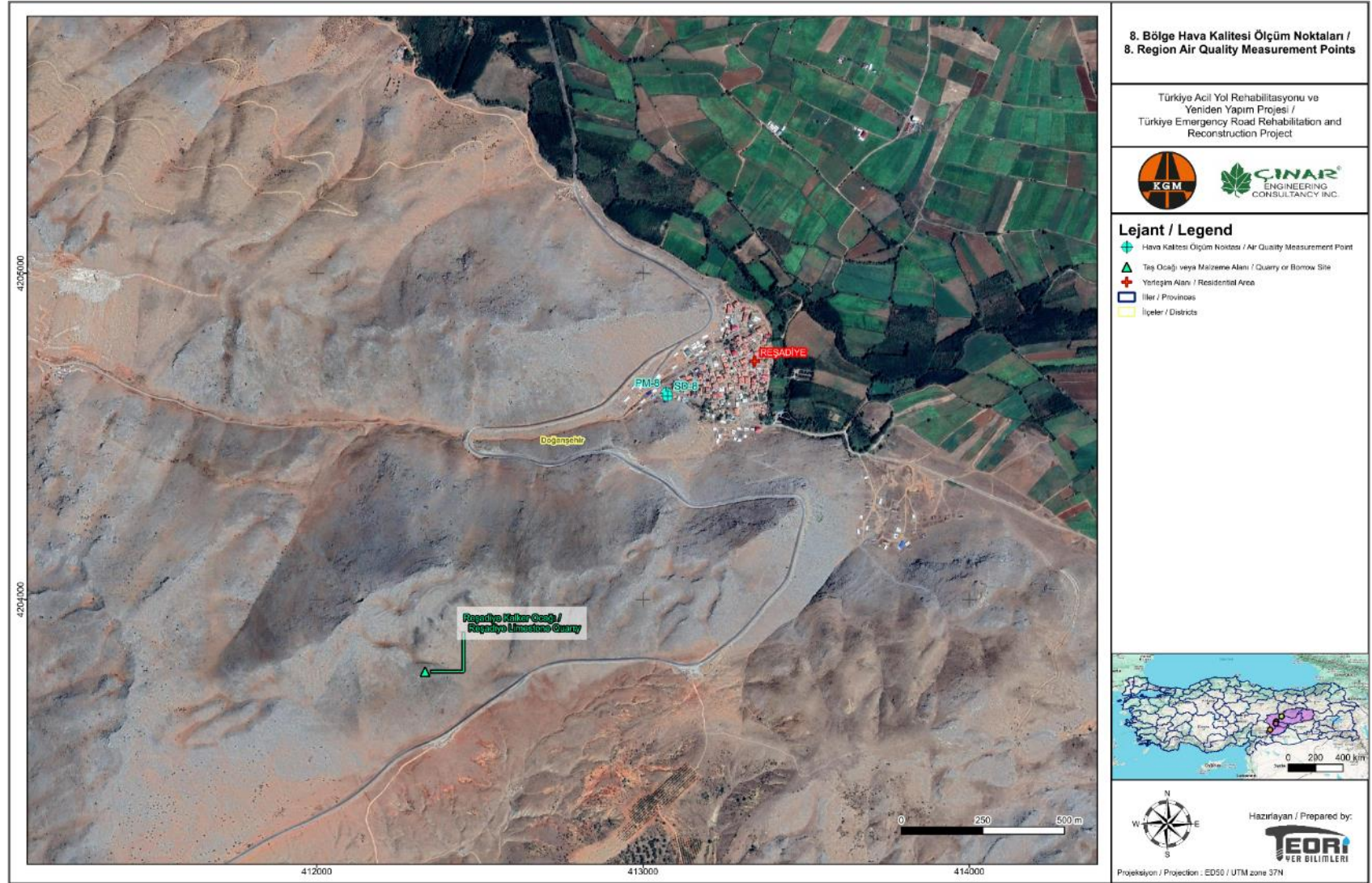


Figure 40. Ambient Air Quality Sampling Locations – 8th Region



Table 58. PM₁₀ and PM_{2.5} Measurement Results (Particulate Matter)

Measurement Location						Air Pollution Source	Distance between receptor and source (km)	Activity Status	Date	Measurement Results (µg/Nm ³)	
No	Sub-project No	Province	District	Neighborhood	Receptor					PM ₁₀	PM _{2.5}
PM-1	P3	Hatay	Antakya	Mansurlu	Nearest settlement	Kuruyer limestone quarries***	0.7	-	07.05.2024	44.8	26.9
PM-2	P3	Hatay	Antakya	Narlıca	Nearest settlement	Kuruyer limestone quarries***	0.8	-		42.5	24.2
PM-3	P2	Hatay	Antakya	Demirköprü	High school	Demirköprü construction (Antakya Reyhanlı road)	0.2	Ongoing		28.7	18.3
PM-4	P2	Hatay	Antakya	Osmanağa	Earthquake victim camp	Hatay airport road construction activities	0.04	Ongoing	08.05.2024	20.0	9.46
PM-5	P2	Hatay	Antakya	Aşağıoba	Nearest settlement	Hatay airport road construction activities	0.2	Ongoing		41.6	23.2
PM-6	P2	Hatay	Kırıkhan	Başpınar	Nearest settlement	Kızılkaya construction site activities	2.2	Ongoing		30.7	12.4
						Kızılkaya quarry	1.8	Ongoing			
PM-7	P1	Gaziantep	Nurdağı	Bademli	Nearest settlement	Başpınar limestone quarry	0.7	Not started yet	09.05.2024	24.7	11.6
PM-8	P4	Malatya	Doğanşehir	Reşadiye	Nearest settlement	Reşadiye limestone quarry	1.1	Not started yet		30.1	13.9
Turkish Air Quality Standards										50	-
WBG EHS Guidelines-WHO Ambient Air Quality Standards										50	25

*Kuruyer Limestone Quarries are divided into four parts and three of which are currently operated by different contractors working with KGM on other projects. One part of the quarry was allocated to the Contractor (DEHA) by 5th Regional Directorate of Highways. In the current situation, DEHA is not planning to operate the quarry. Instead, aggregates will be purchased from the other operators.

** To assess the cumulative effect of the limestone quarries, measurements have been conducted in the nearest settlements in the north and northeast.

Table 59. Settled Dust Measurement Results

Measurement Location						Air Pollution Source	Distance between receptor and source (km)	Activity Status	Date	Measurement Results (mg/m ² day)
No	Sub-project No.	Province	District	Neighborhood	Receptor					
SD-1	P3	Hatay	Antakya	Mansurlu	Nearest settlement	Kuruyer limestone quarries***	0.7	-	07.05.2024- 06.06.2024	51
SD-2	P3	Hatay	Antakya	Narlıca	Nearest settlement	Kuruyer limestone quarries***	0.8	-		73
SD-6	P2	Hatay	Kırıkhan	Başpınar	Nearest settlement	Kızılkaya construction site activities	2.2	Ongoing		45



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Measurement Location						Air Pollution Source	Distance between receptor and source (km)	Activity Status	Date	Measurement Results (mg/m ² day)
No	Sub-project No.	Province	District	Neighborhood	Receptor					
						Kızılkaya quarry	1.8	Ongoing		
SD-7	P1	Gaziantep	Nurdağı	Bademli	Nearest settlement	Başpınar limestone quarry	0.7	Not started yet		51
SD-8	P4	Malatya	Doğanşehir	Reşadiye	Nearest settlement	Reşadiye limestone quarry	1.1	Not started yet		35
Turkish Air Quality Standards										390

*Kuryer Limestone Quarries are divided into four parts and three of which are currently operated by different contractors working with KGM on other projects. One part of the quarry was allocated to the Contractor (DEHA) by 5th Regional Directorate of Highways. In the current situation, DEHA is not planning to operate the quarry. Instead, aggregates will be purchased from the other operators.

** To assess the cumulative effect of the limestone quarries, measurements have been conducted in the nearest settlements in the north and northeast.



The measurement results for particulate matter (PM₁₀ and PM_{2.5}) from the selected sampling points indicate varying levels of air quality in comparison to the established standards. The Turkish Air Quality Standards and the World Bank Group Environmental, Health, and Safety (WBG EHS) Guidelines-WHO Ambient Air Quality Standards set the limit for PM₁₀ at 50 µg/Nm³, and for PM_{2.5}, the WBG EHS Guidelines-WHO Ambient Air Quality Standards set a limit of 25 µg/Nm³. Overall, most of the locations recorded particulate matter levels within the acceptable limits, with the exception of PM-1 point, where the PM_{2.5} concentration slightly exceeded the WHO standard. Also, PM-2 point is very close to the limit value.

PM-1 and PM-2 points were chosen as the closest settlements to Kuruyer limestone quarries. Kuruyer limestone quarries are divided into four parts (see Figure 41) and three of them are currently operated by different contractors working with KGM on other projects. One part was allocated to the main contractor (DEHA) of sub-project P3 by 5th Regional Directorate of Highways. PM-1 and PM-2 points were selected as sampling points by considering this quarry will be utilized by DEHA during the construction phase. However, DEHA is not planning to operate this quarry, which means they will not perform blasting activities or establish a crushing and screening facility here. If this quarry is decided to be utilized instead of purchasing raw materials from the third-party quarry operators, air quality monitoring should also be performed at Mansurlu and Narlıca neighborhoods.

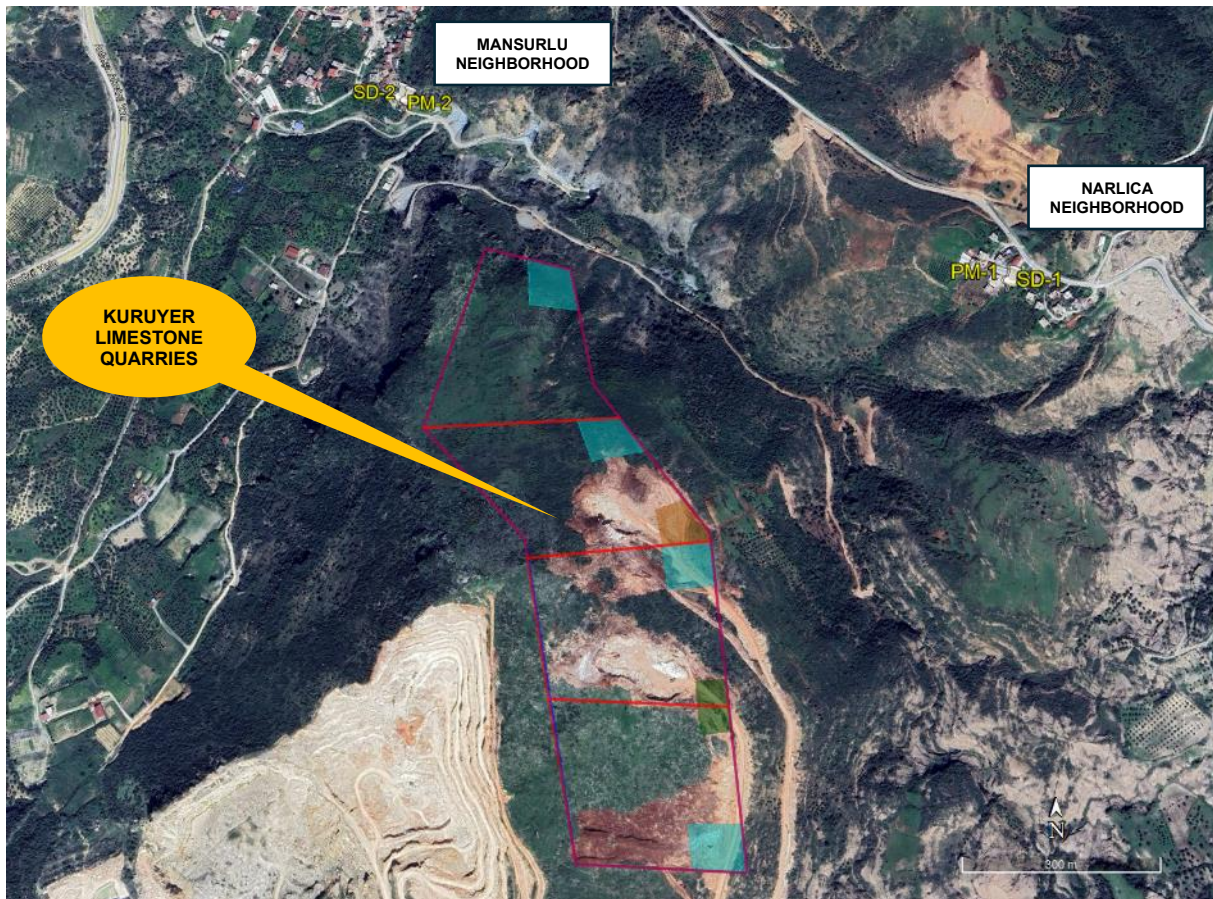


Figure 41. Kuruyer Limestone Quarries

As it can be seen from Table 59, the settled dust measurement results are below the limits set forth by RCIAP. It should be noted that, the project covers the areas affected from the devastating earthquakes occurred in February 2022. Debris removal, demolition of damaged buildings, new building constructions, building and road renovation works are still continuing at the region actively.

Within the scope of the sub-projects, the air quality information belongs to the closest air quality monitoring stations (see Figure 42) to the sub-project areas also obtained from official website of continuous monitoring center by taking the average annual concentration values into account. Relevant parameters measured are PM₁₀, SO₂, and NO₂. RCIAP Limit values and the measurement results are given in Table 60.

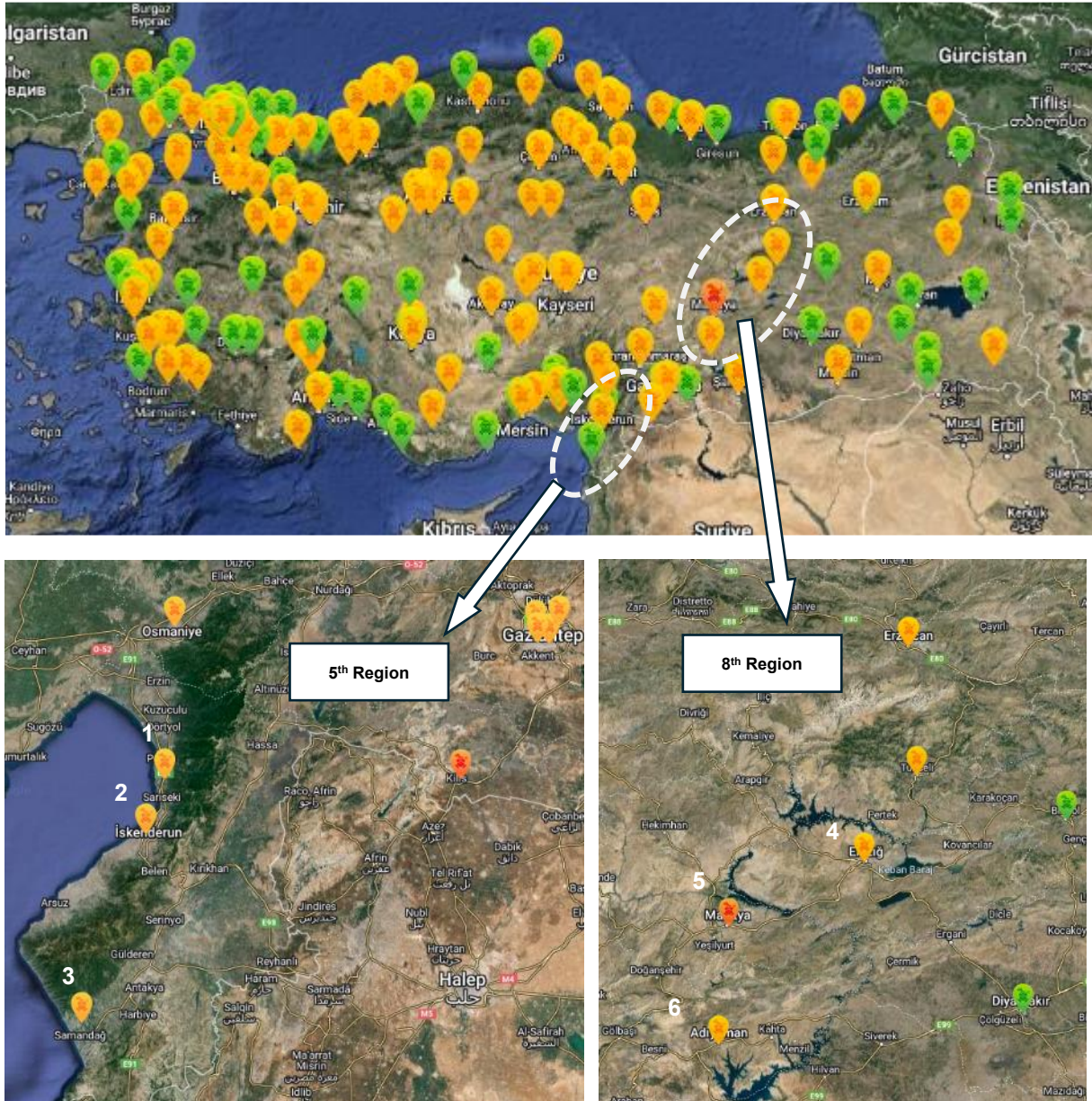


Figure 42. Closest Air Monitoring Stations to the Project Area

Table 60. Ambient Air Quality Between 15.04.2023-15.05.2024

Station No*	Station	Parameters		
		PM ₁₀ (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (µg/m ³)
1	Hatay İskenderun	25.52	8.05	-
2	Hatay İskenderun (Center)	82.02	7.12	38.29
3	Samandağ (mobile)**	65	20	11
4	Elazığ	32.21	9.94	-

Station No*	Station	Parameters		
		PM ₁₀ (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (µg/m ³)
5	Malatya	77.90	9.96	-
6	Adiyaman	22.87	6.71	-
RCIAP Limit Values		40 (1-year limit value)	20 (1-year limit value)	40 (1-year limit value)
WBG EHS Guidelines-WHO Ambient Air Quality Standards		20 (1-year limit value)	20 (24-hour limit value)	40 (1-year limit value)

*The station locations were shown in Figure 42.

**There is no long-term average data for this point. These values are the instantaneous air quality measurements from the mobile monitoring station at Samandağ on 14.06.2024.

Source: <https://sim.csb.gov.tr/Services/AirQuality>

SO₂ and NO₂ measurement results are below the annual limit values defined in the RCIAP, while PM₁₀ results in İskenderun, Samandağ, and Malatya exceed national annual standards along with the exceedance of all monitoring points as per the limit values specified in the WBG EHS Guidelines. This exceedance can be attributed to urban characteristics, the extraordinary status of the region after the earthquake, and meteorological conditions.

4.3.2.2 Greenhouse Gases

Greenhouse gases (GHGs) are natural and anthropogenic (human origin) gases that cause the greenhouse effect by absorbing and spreading the thermal infrared radiation emitted from the surface of the earth to the atmosphere and by increasing the temperature above the temperature that would be possible without the atmosphere. Hence, increase in GHGs will contribute to global warming. Major greenhouse gases according to United Nations Framework Convention on Climate Change (UNFCCC), include:

Natural greenhouse gases:

- Carbon dioxide (CO₂)
- Nitrous oxide (N₂O)
- Methane (CH₄)
- Ozone (O₃)

Anthropogenic greenhouse gases (fluorinated gases):

- Sulphur hexafluoride (SF₆)
- Hydrofluorocarbons (HFCs)
- Perfluorocarbons (PFCs)

The transportation sector typically represents a significant portion of greenhouse gas (GHG) emissions in many countries, including Türkiye. According to data from reputable sources like the International Energy Agency (IEA) and national greenhouse gas inventories, the proportion of GHG emissions attributed to transportation can fluctuate based on factors such as a country's urbanization level, transportation infrastructure, fuel composition, and regulatory frameworks.

Presently, road transport heavily relies on fossil fuels, predominantly gasoline and diesel, with the majority of passenger and freight vehicles operating on these resources. This reliance on oil renders road transport a major contributor to global CO₂ emissions within the transportation sector. However, there has been a notable increase in the adoption of electric vehicles (EVs) worldwide. Governments, automakers, and consumers are increasingly acknowledging the environmental advantages of EVs, aided by technological advancements enhancing driving range, charging infrastructure, and cost-effectiveness. This shift is likely expediting the move away from fossil fuel-dependent vehicles (IEA,2024).

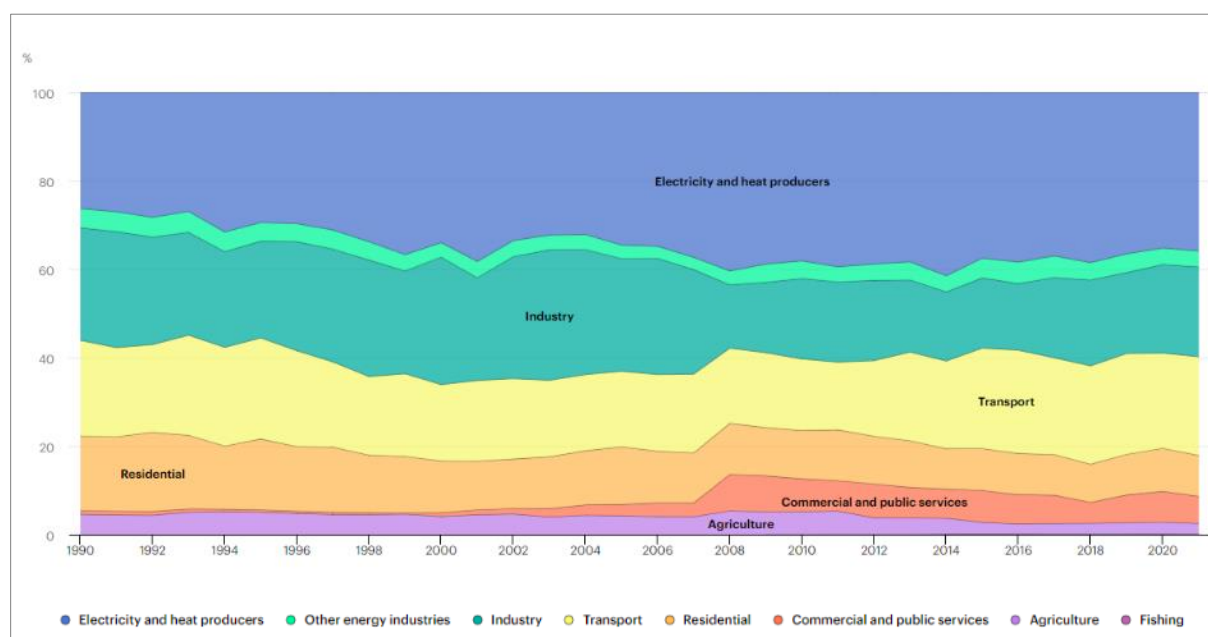


The convenience and adaptability provided by personal vehicles, buses, and motorcycles continue to drive their popularity, particularly in urban and rural areas. Ongoing efforts to tackle challenges related to energy consumption and emissions persist, with a continued emphasis on transitioning to more energy-efficient vehicles, promoting public transportation, and expanding infrastructure to accommodate electric vehicles.

Roadways remain a primary conduit for freight transport, with trucks accounting for approximately 70% of global ton-kilometers. The flexibility and speed of road transport, especially for high-value and time-sensitive goods, are advantageous. Nevertheless, this preference contributes to elevated energy consumption and CO₂ emissions compared to alternative modes such as rail and maritime transport. Strategies aimed at enhancing freight transport efficiency through improved logistics, adoption of fuel-efficient trucks, and exploration of alternative fuels remain crucial in mitigating the environmental impact of freight transportation.

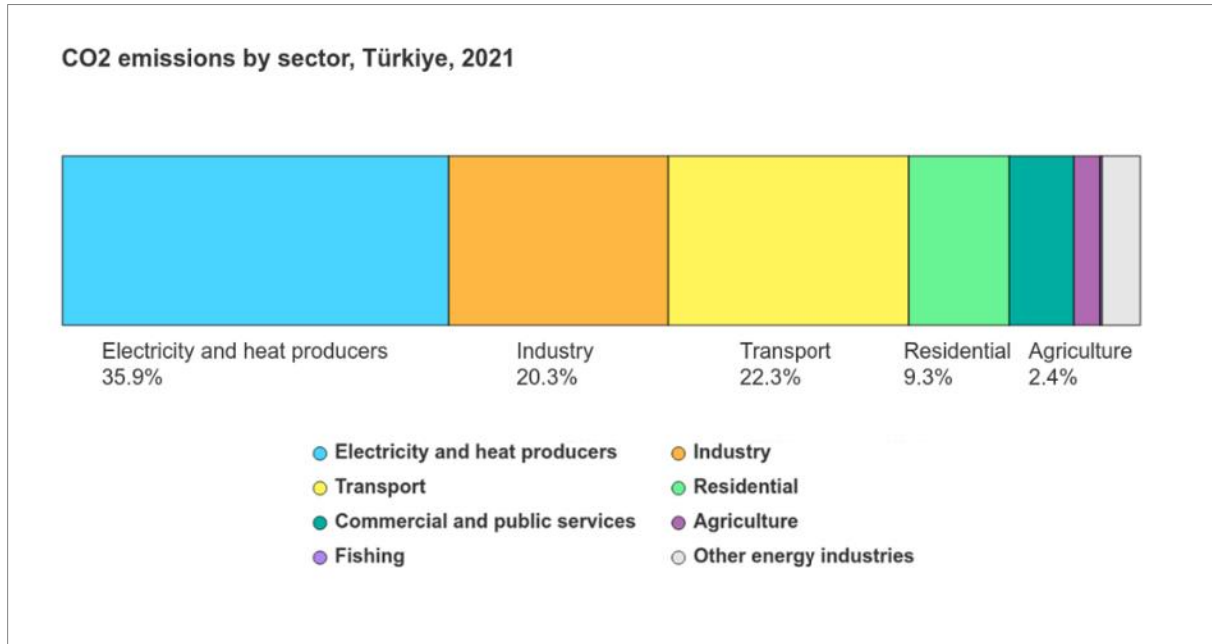
In summary, while road transport continues to play a pivotal role in both passenger and freight mobility due to its flexibility and convenience, ongoing efforts to mitigate its environmental footprint through technological innovations, policy interventions, and infrastructure enhancements are evident in the year 2024.

The graph showing the distribution of sector-based CO₂ emissions between 1990-2021 in Türkiye is presented in Figure 43, and CO₂ emissions by sector as percentage distribution for 2021 is given in Figure 44.



Source: International Energy Agency, <https://www.iea.org/data-and-statistics>

Figure 43. Sector Based CO₂ Emissions in Türkiye, 1990-2021



Source: International Energy Agency, <https://www.iea.org/countries/turkiye/emissions>

Figure 44. CO₂ Emissions by Sector in Türkiye, 2021

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4.3.3 Impact Assessment and Mitigation Measures

Türkiye Emergency Road Rehabilitation and Reconstruction Project, targeting regions affected by recent earthquakes, will have impacts on air quality and greenhouse gas (GHG) emissions. During construction, activities such as excavation, demolition, and transportation of materials will generate dust, increasing particulate matter (PM₁₀ and PM_{2.5}) levels, which can affect respiratory health and visibility. Emissions from diesel-powered construction machinery will release nitrogen oxides (NO_x), sulfur oxides (SO_x), carbon monoxide (CO), volatile organic compounds (VOCs), and particulate matter (PM), leading to localized air quality deterioration. Traffic disruptions caused by temporary road closures and detours may result in increased emissions from idling vehicles and stop-and-go traffic patterns. In the operational phase, improved road conditions will enhance fuel efficiency, potentially reducing vehicle emissions, but increased traffic volume due to better connectivity could lead to higher emissions of NO_x, SO_x, CO, VOCs, and PM.

GHG emissions during construction will primarily come from diesel-powered machinery, producing carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O), and from the production and transportation of construction materials like asphalt, concrete, and steel. In the operational phase, while improved road surfaces may reduce CO₂ emissions per vehicle-kilometer due to better fuel efficiency, increased traffic volume could lead to higher overall emissions of CO₂, CH₄, and N₂O.

The air quality impacts arising from sub-project activities (emphasizing mostly quarries where blasting activities are also conducted) were assessed based on both EIA process of the facilities (if available) and the measurement results carried out within the scope of this ESIA along with expert judgement. The summary of the assessments is given in Table 61.



Table 61. Air Quality Assessments for Project Components that May Cause Impact

Facility	Nearest Receptor	Receptor distance	Reference Document	Assessment Result
Tatarlı Basalt Quarry	Sayhüyük village Tatarlı neighborhood Mustafabeyli neighborhood	3.3 km 2.3 km 2.8 km	Facility activities was evaluated as 'out of scope' in accordance with (repealed) Provisional Article 3 of the EIA Regulation No. 29186 dated 25.11.2014, as per the official letter from the Adana Provincial Directorate, dated 13.07.2020, numbered 90438820-220.03-E.19946.	Since the quarry is located far enough from the settlements, no significant impact is expected in terms of air quality.
Kızılkaya Limestone Quarry	Başpınar neighborhood	1.1 km (1.8 km away from the blasting area)	Project Introduction File (2024) For 31/2006-11 (ER:3119679) Numbered Limestone Quarry, Addition of Crushing and Screening Facilities to the Asphalt Plant Facility	<p>Within the scope of the PIF, an Air Quality Dispersion Modeling (AERMOD view dispersion model) was conducted. The maximum daily (24-hour) average Ground-Level Concentration values were compared with the limit values provided in the Regulation on Control of Industrial Air Pollution. According to the modeling results, the short-term and long-term PM₁₀ values comply with the limit values specified in the regulation. It was observed that the model results did not exceed the limit value more than 35 times in one year. Additionally, the limit values for the settled dust parameter were also met.</p> <p>On the other hand, within the scope of the ESIA study, as per the measurements conducted for PM-6/SD-6 monitoring point, PM₁₀, PM_{2.5} and settled dust values have been complied with the project standards. Therefore, no significant impact is expected in terms of air quality due to operation of the quarry at the nearest settlement due to its distance to the settlement and considering that the necessary mitigation measures specified in Table 62 will be taken .</p>
Başpınar Limestone Quarry	Bademli neighborhood	700 m	Facility activities was evaluated as 'out of scope' in accordance with (repealed) Article 24 (Extraordinary Situations and Special Provisions) and Provisional Article 2 of the EIA Regulation No. 31907 dated 29.07.2022, as per the official letter from the MoEUCC, dated	<p>It has been reported that work will be conducted at the quarry for a period of 24 months, with an annual production of 1,200,000 tons of limestone, 96 blasts per year, and 155 holes drilled per blast, using 37.3 kg of explosive material (ANFO) per hole.</p> <p>It should be noted that since the usage of the quarry has not been initiated within the scope of this project, air quality measurement results (PM₁₀, PM_{2.5} and settled dust) for PM-7/SD-7 monitoring point were below the limits set forth by WBG EHS Guidelines and ENCR.</p>

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Facility	Nearest Receptor	Receptor distance	Reference Document	Assessment Result
			08.02.2024 and numbered E-14108550-220.01-8709304.	Therefore, no significant air quality (dust, etc.) impact is expected due to operation of the quarry at the nearest settlement due to its distance to the settlement and considering that the necessary mitigation measures specified in Table 62 will be taken. Nevertheless, it is important to make quarterly measurements from that monitoring point during the operation period of the quarry and in case of any grievances.
Kuruyer Limestone Quarries	Narlıca neighborhood	700 m	Project Introduction File (2023) for 31/2023-09 (ER: 3480631) Numbered Limestone Quarry and Crushing Screening Facilities	According to the Air Quality Dispersion Modelling conducted as part of the PIF, the Air Pollution Contribution Values obtained for PM ₁₀ and settled dust emissions remain below the limit values specified in the Regulation on Control of Industrial Air Pollution. The cumulative maximum daily average Air Pollution Contribution Value calculated for PM ₁₀ does not exceed the short-term target limit value specified in the regulation more than 35 times.
	Mansurlu neighborhood	800 m		On the other hand, within the scope of the ESIA study, as per the measurements conducted for PM-1/SD-1 and PM-2/SD-2 (Mansurlu and Narlıca neighborhoods, respectively) monitoring points, PM ₁₀ and settled dust values have been complied with the project standards whereas limit value of PM _{2.5} slightly exceeded at the PM-1 point as per WBG EHS Guidelines. It should be noted that the contractor decided to purchase aggregate from existing facilities instead of operating its allocated part of the quarry. It is important to implement the necessary mitigation measures (see Table 62) in the event of any activity being carried out at the quarries.
Erkenek Gravel-sand Borrow Site	Gedikağzı neighborhood	650 m	-	There will be no blasting. Since it was still in the tender stage and the contractor has not yet been appointed, during the ESIA preparation the EIA process has not been initiated. The activities to be carried out are not expected to have a significant impact on the settlement in terms of air quality due to its distance to the nearest settlement, the lack of blasting and considering that the necessary mitigation measures specified in Table 62 will be taken.



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Facility	Nearest Receptor	Receptor distance	Reference Document	Assessment Result
Reşadiye Limestone Quarry	Reşadiye neighborhood	1.1 km	-	<p>Within the scope of the ESIA study, as per the measurements conducted for PM-8/SD-8 monitoring point, PM₁₀, PM_{2.5} and settled dust values have been complied with the project standards.</p> <p>The activities to be carried out are not expected to have a significant impact on the settlement in terms of air quality due to its distance to the nearest settlement and considering that the necessary mitigation measures specified in Table 62 will be taken.</p> <p>Since it was still in the tender stage and the contractor has not yet been appointed, during the ESIA preparation the EIA process has not been initiated</p>
Deep Soil Mixing Machines and Road Reconstruction Activities	Aşağıoba neighborhood Osmanağa neighborhood	500 m to the nearest DSM machine Near the road to be reconstructed	-	<p>Within the scope of the ESIA study, it was observed that the measurement results of PM₁₀ and PM_{2.5} in the area (for PM-4 and PM-5 monitoring points) where road reconstruction works were carried out were below the regulatory limit values. Nevertheless, since temporary living areas/prefabricated containers for earthquake victims are present in the Osmanağa neighborhood, the works should be carried out with the necessary sensitivity by taking the relevant mitigation measures specified in Table 62.</p>
Reconstruction of Demirköprü Bridge	High School at the Demirköprü neighborhood	100 m	-	<p>According to the air quality measurement (PM₁₀ and PM_{2.5}) performed at PM-3 monitoring point during the active work, limit values specified in both WBG EHS Guidelines and Regulation on Control of Industrial Air Pollution have been complied with. Therefore, it is not expected to have a significant impact in terms of air quality considering that the mitigation measures specified in Table 62 are taken..</p>
Repair and Reinforcement of the Technological Bridges	No sensitive receptors identified	-	-	<p>Considering the scope of the works carried out, the sensitive receptors in the surrounding area and that the mitigation measures specified in Table 62 will be taken, the activities are not expected to have a significant impact in terms of air quality. Therefore, no environmental measurements were made within the scope of the ESIA study.</p>

Mitigation measures include dust control through regular watering, covering stockpiles, and installing windbreaks, alongside the use of modern, fuel-efficient machinery and anti-idling policies to control emissions. Traffic management strategies in line with good practices will minimize disruptions and congestion. In the operational phase, promoting public transportation, carpooling, and non-motorized transport, along with regular



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road maintenance, will help sustain fuel efficiency benefits. An air quality and GHG monitoring program will track emissions and air quality before, during, and after construction, ensuring that corrective actions can be implemented as needed to maintain environmental health and support global climate change mitigation efforts.

The potential impacts and their significances, project-specific mitigation measures and value of residual impacts regarding air quality and GHG Emissions are given in Table 62.



Table 62. Impact Significances, Mitigation Measures and Value of Residual Impacts – Air Quality and GHG Emissions

Impact Description	Project Phase	Receptor	Impact Magnitude					Sensitivity/ Value of Resource/ Receptor	Impact Significance (prior to mitigation or with existing mitigation)	Proposed Mitigation Measures	Residual Impact Significance
			Extent	Reversibility	Duration	Frequency	Overall Magnitude				
Decrease in Air Quality	Land preparation and Construction	Nearby settlements Ecological Receptors Project Personnel	Local	Short-term reversible	Short-term	Continuous	Low	High	Moderate	<ul style="list-style-type: none"> ▪ EIA opinions and relevant environmental permits will be obtained for all associated and auxiliary facilities including the quarries/borrow sites, asphalt plant, concrete plant, crusher and mechanical plant. ▪ C-ESMP will be developed and implemented by the Contractor by covering relevant E&S issues and all personnel will receive the necessary training on air quality management. ▪ In accordance with the “Exhaust Gas Emission Control and Gasoline and Diesel Quality Regulation” published in the Official Gazette No. 28837 dated 30.11.2013; vehicles undergoing traffic inspections will have exhaust gas emission measurements conducted. Vehicles requiring maintenance will be serviced after routine checks, while others will remain in use until maintenance is completed. ▪ Procedures to limit the drop height of falling materials will be adopted. ▪ Dust suppression methods will be applied such as watering with water trucks; applying non-toxic anti-dust chemicals etc. at construction sites, service roads, quarries/material borrow sites and material storage sites. ▪ Incineration of construction waste at worksite will be prohibited. ▪ Access roads for the construction and accommodation site, quarries/material borrow sites, and other associated/auxiliary facilities will be maintained and upgraded as necessary. ▪ Water suppression, pressurized distribution or spraying systems will be applied to minimize dust where and when necessary, on paved or unpaved road surfaces. ▪ Loading and unloading of materials are carried out without throwing and scattering. ▪ Excavated materials will be covered with nylon canvas or with materials with grain size larger than 10 mm during transportation. ▪ Dust generation from open areas, such as material storage sites, will be minimized through control measures such as installing covers over materials, using particles of appropriate grain size as cover, increasing moisture content, and maintaining a humidity level of around 10% in the upper layers of materials along with using wind shields or barriers around material storage sites. ▪ Driving of construction vehicles through settlements will be avoided where possible. ▪ Employees will be ensured to work in accordance with the Traffic Law, and special attention will be paid to make loading according to loading standards. ▪ The Project Grievance Redress Mechanism will be implemented. If any comment related with dust and air quality is received through the Grievance Redress Mechanism, the complaints will be evaluated, and necessary corrective preventive actions will be taken. ▪ Air quality monitoring will be carried out in accordance with both national legislation and the WBG EHS Guidelines (quarterly for the construction phase at the nearby settlements, where baseline measurements were conducted in the ESIA process and upon grievance). ▪ Blasting operations will be carried out in quarries/material borrow sites in line with relevant legislation and good international industry practices. ▪ Alternatives to blasting such as hydraulic hammers or mechanical methods should be considered. ▪ Blasting operations will be planned in terms of diameter, depth and direction of blast holes in order to reduce potential emissions. ▪ Control of dust emissions from equipment such as crushers, grinders, screens will be ensured through dust collectors and filters. ▪ Within the scope of the Environmental Permit and License Regulation, the relevant environmental permits will be taken. Emission measurements of facilities (such as concrete plant, asphalt plant, crusher, mechanical facilities etc.) subject to environmental permits on air emissions will be carried out regularly and work will be carried out as long as the environmental permits are valid. ▪ In order to mitigate the specific impacts resulting from the auxiliary facilities including quarry/borrow site, asphalt plant, concrete plant, crusher and mechanical plant, following items will be considered: <ul style="list-style-type: none"> - Implement dust suppression system (pulverization) to suppress dust on roads, stockpiles, and during material handling. - Enclose conveyors/bunkers/screens, dust generation units and transfer points to reduce dust emissions. - Store materials in covered areas or use windbreaks to minimize wind-blown dust. - Plant trees and shrubs around the facility to act as a natural barrier for dust and to improve local air quality. - Regularly inspect and maintain control equipment to ensure optimal performance. - Equip plants with air pollution control devices, such as scrubbers, filters, and electrostatic precipitators, to capture particulate matter and other pollutant, whenever necessary. 	Minor

Impact Description	Project Phase	Receptor	Impact Magnitude					Sensitivity/ Value of Resource/ Receptor	Impact Significance (prior to mitigation or with existing mitigation)	Proposed Mitigation Measures	Residual Impact Significance
			Extent	Reversibility	Duration	Frequency	Overall Magnitude				
Decrease in Air Quality due to the Emission of Gaseous Pollutants (NO _x , SO _x , CO, unburned hydrocarbons etc.) Resulting from Highway Traffic	Operation	Ecological Receptors Nearby settlements Community health and safety	Local	Long-term reversible	Long-term	Continuous	High	Medium	Major	<ul style="list-style-type: none"> Vegetation with proper plant species can be applied between the motorway and settlements to absorb the air pollution. Project Grievance Redress Mechanism will be implemented. If any comment related with air quality is received through the Grievance Redress Mechanism, the complaint will be evaluated and where necessary corrective preventive actions will be implemented. Engagement with local communities will be performed to understand their concerns and gather feedback on air quality-related issues. Collaboration will be made with regulatory authorities to address air quality-related concerns and seek approval for the mitigation measures. 	Minor
Greenhouse gas emissions due to construction traffic and operation of the facilities including concrete plant, asphalt plant, crusher and mechanical plant	Land preparation and Construction	Atmosphere Regional Community Ecological Receptors	Wide	Long-term reversible	Short-term	Continuous	Medium	Medium	Moderate	<ul style="list-style-type: none"> Construction activities will be carried out in line with good international industrial practices (GIIP). Periodic trainings will be provided to operators and drivers, covering practices to reduce unnecessary equipment idling time, raising awareness on energy efficiency and best practices and avoid behaviors that increase fuel consumption, such as shifting hydraulic levers unnecessarily and using excess horsepower. Fuel efficiency of construction vehicles will be optimized by means of applications such as speed restrictions and avoidance of uphill movements as much as possible. Proper maintenance of machinery/equipment including systematic equipment inspection, detection of potential failure and prompt correction to ensure fuel savings will be ensured. Energy/fuel consumption of construction machinery, equipment and vehicles will be monitored. In order to mitigate the specific impacts resulting from the auxiliary facilities including quarry/borrow site, concrete plant, crusher and mechanical plant, following items will be considered: <ul style="list-style-type: none"> Optimize production processes to reduce energy consumption. Implement on-site recycling of waste materials to reduce the need for new raw materials. Optimize logistics and transportation routes to reduce fuel consumption and emissions from transporting raw materials and finished products. For asphalt plant, use lower-temperature asphalt production techniques and recycled materials in the production process, such as reclaimed asphalt pavement in asphalt plants and recycled concrete aggregates. 	Minor
Greenhouse Gas Emissions due to Highway Traffic	Operation	Atmosphere Regional Community Ecological Receptors	Wide	Long-term reversible	Long-term	Continuous	High	Medium	Major	Annual greenhouse gas (GHG) calculations, based on actual records of annual traffic volumes, should be conducted. Subsequently, GHG management strategies should be developed and implemented in collaboration with relevant authorities and stakeholders as needed.	Moderate



4.4 Water Resources, Water Quality and Wastewater Management

4.4.1 Methodology and Project Standards

This chapter identifies the water resources found in the river basins where the project is located and presents the existing water quality of the surface water resources to be crossed by the highways/bridges, based on the results of the measurements and analyses conducted as part of the ESIA study. It also covers assessments of the potential impacts of the project on the identified water resources including both surface water and groundwater during the land preparation, construction, and operation phases. Descriptions of the mitigation measures to be taken and assessments of the residual impacts are also covered in this chapter.

The national legislation and international standards that will be considered for the impacts/risks related with the water resources and water quality during the project activities and will be complied are as follows:

- Turkish Water Pollution Control Regulation (WPCR)
- Regulation on Water Intended for Human Consumption (RWIHC)
- Regulation on Pits to be Built in Places where Sewer Pipeline Construction is not Possible
- Regulation on the Protection of Groundwater against Pollution and Deterioration
- Surface Water Quality Regulation (SWQR)
- Guidelines for Drinking-Water Quality – WHO, 2017
- AIIB ESF – ESS1: Environmental and Social Assessment and Management
- WBG General EHS Guidelines – 1. Environment – 1.3 Wastewater & Ambient Water Quality
- WBG General EHS Guidelines – 1. Environment – 1.4 Water Conservation
- WBG EHS Guidelines for Construction Materials Extraction

The limit values considered for the evaluation of the baseline conditions for potable and non-potable water (water for human consumption) are the limit values specified in RWIHC and in IFC/WHO Drinking Water Guidelines (see Table 63).

Table 63. National and International Limit Values for Water Resources

Parameter	Unit	Limit Values in RWIHC	Limit Values of WHO
Antimony	mg/L	0.005	0.020
Arsenic	mg/L	0.01	0.01
Barium	mg/L	-	0.7
Benzene	mg/L	0.001	0.01
Boron	mg/L	1	2.4
Cadmium	mg/L	0.005	0.003
Chromium	mg/L	0.05	0.05
Copper	mg/L	2	2
Cyanide	mg/L	0.05	-
Fluoride	mg/L	1.5	1.5
Lead	mg/L	0.01	0.01
Mercury	mg/L	0.001	0.006
Nickel	mg/L	0.02	0.07
Nitrate	mg/L	50	50
Nitrite	mg/L	0.5	3

Parameter	Unit	Limit Values in RWIHC	Limit Values of WHO
Selenium	mg/L	0.01	0.04
Aluminum	mg/L	0.2	-
Ammonium	mg/L	0.5	-
Chloride	mg/L	250	-
Conductivity	µS/cm	2500	-
pH	-	6.5<pH<9.5	-
Iron	mg/L	0.2	-
Manganese	mg/L	0.05	-
Sulphate as SO4	mg/L	250	-
Sodium	mg/L	200	-
Uranium	mg/L	-	0.03

The quality of surface water resources is evaluated according to the principles of the Surface Water Quality Regulation (SWQR). The purpose of this regulation is to determine and classify the biological, chemical, physicochemical and hydro morphological qualities of surface waters, coastal and transitional waters, to monitor and maintain the balance of using water in accordance with sustainable development objectives.

SWQR evaluates surface waters in three different classes in terms of general chemical and physicochemical parameters. This classification is made by comparing the analysis result with the relevant limit value for each parameter analyzed in the sample. The water quality classes, and limit values of the parameters defined in Table-2 in SWQR Annex-5 are given in Table 64.

Table 64. Surface Water Classification and Limit Values According to the SWQR

Parameter	Unit	Water Quality*		
		Class I (High)	Class II (Good)	Class III (Medium)
Color (436 nm)	m ⁻¹	RES 436 nm: ≤ 1.5 RES 525 nm: ≤ 1.2 RES 620 nm: ≤ 0.8	RES 436 nm: 3 RES 525 nm: 2.4 RES 620 nm: 1.7	RES 436 nm: > 4.3 RES 525 nm: > 3.7 RES 620 nm: 2.5
Color (525 nm)	m ⁻¹			
Color (620 nm)	m ⁻¹			
pH	-	6-9	6-9	6-9
Conductivity	µS/cm	<400	1000	>1000
Oil and Grease**	mg/L	<0.2	0.3	>0.3
Dissolved Oxygen	mg/L	>8	6	<6
Chemical Oxygen Demand	mg/L	<25	50	>50
Biological Oxygen Demand	mg/L	<4	8	>8
Ammonium Nitrogen	mg/L	<0.2	1	>1
Nitrate Nitrogen	mg/L	<3	10	>10
Total Kjeldahl Nitrogen	mg/L	<0.5	1.5	>1.5
Total Nitrogen	mg/L	<3.5	11.5	>11.5
Ortho Phosphate Phosphorus	mg/L	<0.05	0.16	>0.16
Total Phosphorus	mg/L	<0.08	0.2	>0.2
Fluoride	µg/L	≤1000	1500	>1500
Manganese	µg/L	≤100	500	>500
Selenium	µg/L	≤10	15	>15
Sulfur	µg/L	≤2	5	>5

In case the wastewater is discharged to the receiving environment after treatment, the limit values specified in the Turkish Water Pollution Control Regulation (WPCR) and WBG General EHS Guidelines for Wastewater Quality given in Table 65 will be complied.

Table 65. National and International Limit Values for Treated Wastewater Discharge to Receiving Body

Parameter	WPCR Limit Values for Domestic Wastewater (2 hours composite sample)	WBG General EHS Guidelines for Wastewater Quality
BOD (mg/L)	50	30
COD (mg/L)	160	125
Total Suspended Solids (mg/L)	60	50
pH	6-9	6-9
Total Nitrogen (mg/L)	-	10
Total Phosphorus (mg/L)	-	2
Oil and Grease (mg/L)	-	10
Total Coliform Bacteria (Most Probable Number/100mL)	-	400

Data sources used to identify the water resources that are to be managed in the scope of the Project to avoid significant impacts have been determined by using the following data sources:

- TurkStat Database
- Results of the surface water quality samplings, measurements and analyses conducted as part of the ESIA process
- Database of the Turkish State Hydraulic Works (DSI)
- International Hydrogeological Map of Europe, scale 1:1,500,000 (IHME1500)

4.4.2 Baseline Conditions

4.4.2.1 Surface Water Resources

The Projects is located in Asi, Ceyhan and Fırat and Dicle Basins which are part of the 25 main water basins in Türkiye (see Figure 45).

Sub-projects Under the Responsibility of 5th Regional Directorate of Highways are mainly located in Asi Basin. In the Asi Basin, there are streams with continuous flow and numerous dry streams with seasonal flow that feed them, and these streams discharge directly into the Mediterranean. In addition, there are many natural lakes, ponds, dams, wetlands and lagoons, water structures and irrigation project sites in this water basin.

The Asi River, the primary river in the Asi Basin, is fed by the springs rising in the Bekaa Valley between the Lebanon Mountains and the Anti-Lebanon Mountains. The total length of the Asi River is 386 km and a great part of the river is within the Syrian territory. Its length in Türkiye is 88 km. Based on the “Annual Average Surface Water Potential by Basin” data prepared by State Hydraulic Works (DSI), the total catchment area of the Asi Basin is 7,886.0 km² in 2022 and its annual average flow rate is 1.6 km³.

A great part of the Asi Basin covers Hatay province and its districts. While 46.1% of Hatay provincial territory consist of mountains, plains account for 33.5% and plateaus account for 20.4% in the province. Nur Mountains extending along the north-south orientation is the primary mountain range in the province. The highest point of the mountain range is the Mıgırtepe (2,240 m) Mountain. The height of the other main peaks is less than 2,000 m. Amanos Mountains, which are high, steep and not easily crossed, are cut by the Asi Valley within the borders of Samandağ District.



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The same mountain range continues within the borders of Yayladağı district immediately after the Asi Valley. In this area, the Ziyaret Mountain with a height of 1,235 m and the Keldağ Mountain with a height of 1,739 m appear to be the two main mountains.

Additionally, the Ceyhan Construction and Accommodation Site, Bahçe (Ayran) Concrete Plant and Tatarlı Basalt Quarry are located in the Ceyhan Basin.

The Ceyhan River is the primary river in Ceyhan basin. The Ceyhan Basin has a catchment area of 26,875 km². Extending from the İskenderun Gulf into the interior of Central Anatolia, the Ceyhan Basin consists of rugged mountainous terrains and extensive alluvial plains. Almost the entire areas of Kahramanmaraş and Osmaniye Provinces, parts of Ceyhan and Yumurtalık Districts of Adana Province, and sections of the central district and Kozan District fall within the boundaries of the Ceyhan Basin. The Ceyhan River originates from the Pınarbaşı region of Elbistan District. Flowing southward, the Ceyhan River is joined by Söğütlü Stream from the northeast of Elbistan, Sarsap Stream from the north, Hurman Stream, and Göksun Stream from the southwest. After this point, the river turns eastward, incorporating Nergile Stream, then flows south and empties into the Menzelet Dam Lake. Streams such as Çemrengeç and Okkayası from the north, Fırnız and Tekir Streams from the west, and Bertiz Stream from the east flow into Menzelet Dam. Flowing southward, the Ceyhan River then empties into the Sır Dam Lake. Incorporating Andırın River and Kesis Stream, the Ceyhan River leaves the borders of Kahramanmaraş Province from the west of Karanlık Mountain. Continuing to flow southwestward, the Ceyhan River first empties into Aslantaş Dam Lake, then flows south and discharges into the Mediterranean Sea. The total length of the Ceyhan River is 425 km, with an annual discharge of 82.9 m³/s. Sub-projects Under the Responsibility of 8th Regional Directorate of Highways are located in Fırat and Dicle Basin.

The most important river within the basin is the Euphrates (Fırat) River. The Euphrates River is Türkiye's most fertile and water-rich river. Its sources are the Murat River, which originates from Diyadin in Ağrı, and the Karasu River, which originates from Dumludağ in Erzurum. The Euphrates River defines the borders of the provinces of Erzincan, Tunceli, Elazığ, Malatya, Diyarbakır, Adıyaman, and Gaziantep before entering Syria and then Iraq. In Iraq, it merges with the Tigris (Dicle) River at a point not far from the sea to form the Shatt al-Arab, which flows into the Persian Gulf. The river's main tributaries are the Murat River, Karasu River, Tohma Stream, Peri Stream, Çaltı Stream, and Munzur Stream. Based on the "Annual Average Surface Water Potential by Basin" data prepared by DSI, the total catchment area of the Asi Basin is 176,143.0 km² in 2022 and its annual average flow rate is 54.5 km³.

The Murat River receives the Banşan stream to the west of Malazgirt, the Hınıs creek in the Bulanık plain, and the Liz creek at the end of the Liz plain. Flowing westward, it passes through the narrow Manahik gorge. Near Tepeköy, close to the Varto district, it merges with the Bingöl (Çarbuher) stream and flows north to south into the Muş plain. In the Muş plain, the Murat River receives the Karasu branch and enters the narrow Palu gorge. The river, drawing the northern border of the Elazığ plain, flows westward and receives the Munzur water formed by the combination of the Mercan, Kalan, Pülümür, and Peri streams, reaching the Keban area. North of Keban, it receives the Karasu stream. The Karasu stream, originating from the mountains near Erzurum, merges with the Tuzla stream within the borders of Tercan district in Erzincan province. Later, the Karasu stream is formed by the Çaltı water, which it receives west of Divriği district in Sivas province.



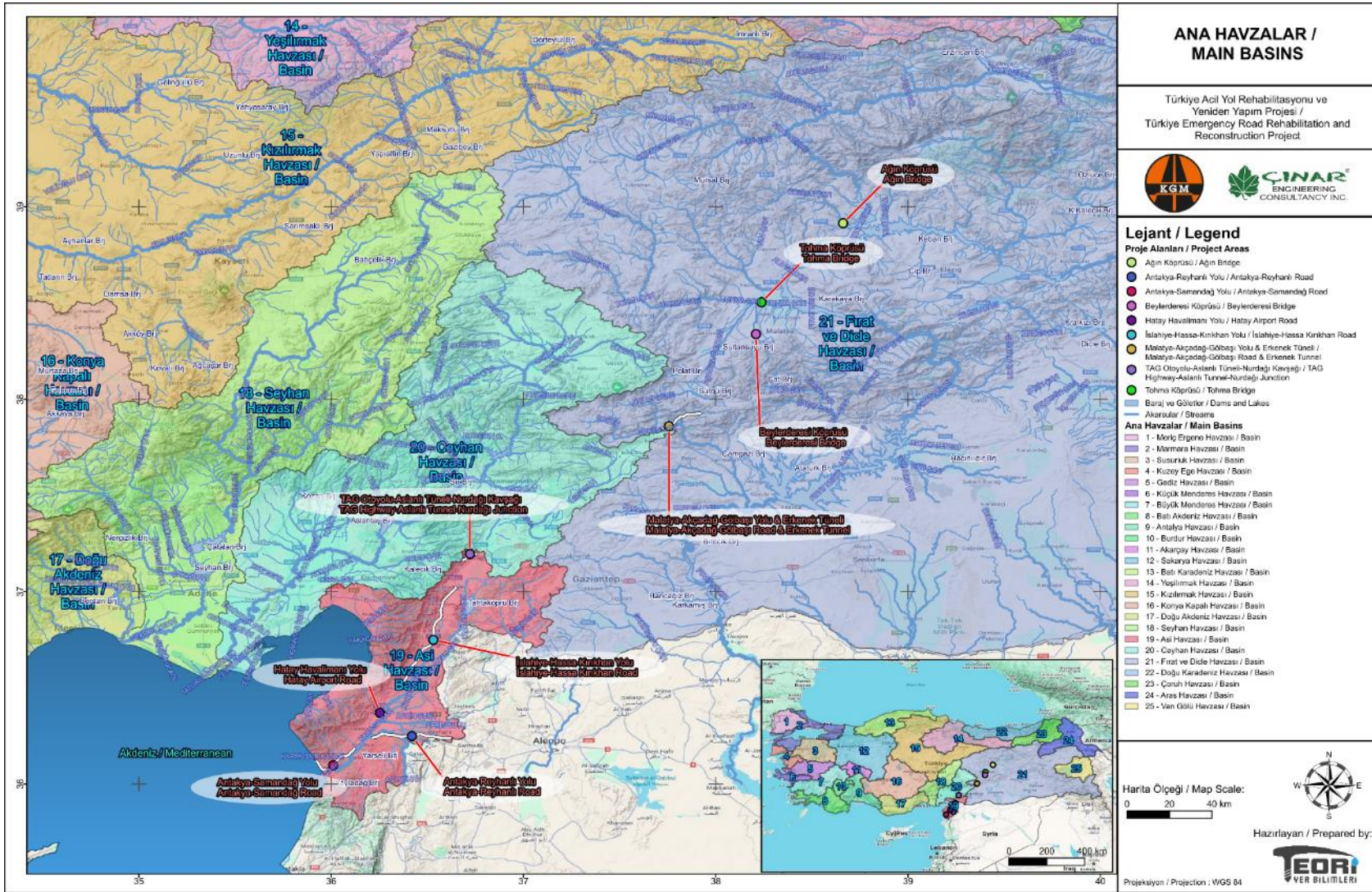


Figure 45. Water Basins in Türkiye and Project Locations



Rivers, Streams, Water body Crossing

Within a 10 km distance to the sub-projects, key rivers and streams include the Asi River (Orontes) in Hatay and 5th region, situated 800 meters from the Antakya-Reyhanlı Road; the Göksu Stream in Adıyaman and 8th region, positioned 50 meters from the Malatya-Akçadağ-Gölbaşı Road and Erkenek Tunnel; and the Karasu Stream, also in Hatay and 5th region, located 2209 meters from the İslahiye-Hassa Kırıkhan Road (see Table 66).

Table 66. Important Streams 10 km Vicinity of Sub-projects

River Name	Province	Resp.	Distance to Nearest Project (m)	Nearest Project
Asi River (Orontes)	Hatay	5 th Region	800	Antakya-Reyhanlı Road
Göksu Stream	Adıyaman	8 th Region	50	Malatya-Akçadağ-Gölbaşı Road & Erkenek Tunnel
Karasu Stream	Hatay	5 th Region	2209	İslahiye-Hassa Kırıkhan Road

Source: General Directorate of State Hydraulic Works

The significant water crossings where road projects and bridges pass through have been determined. Table 67 lists key projects, including the Antakya-Samandağ Road crossings (SAM1, SAM2, SAM3) over unnamed rivers, the Antakya-Reyhanlı Road crossing (REY1) over the Asi Stream, and three bridges: Ağın Bridge (AG1) over Keban Dam, Tohma Bridge (TOH1) over Karakaya Dam, and Beylerderesi Bridge (BEY1) over Yeşilvadi Reservoir and Beylerderesi Stream.

Table 67. Rivers & Streams Crosses around the Roads

Code	Project Name	Cross River/ Road Location	River / Water Body Name
SAM1	Antakya-Samandağ Road	17+800.00 KM	River*
SAM2	Antakya-Samandağ Road	9+800.00 KM	River*
SAM3	Antakya-Samandağ Road	7+050.00 KM	River*
REY1	Antakya-Reyhanlı Road	20+000.00 KM	Asi Stream
AG1	Ağın Bridge	Bridge	Keban Dam
TOH1	Tohma Bridge	Bridge	Karakaya Dam
BEY1	Beylerderesi Bridge	Bridge	Yeşilvadi Reservoir and Beylerderesi Stream

*Specific names are not available.

Dams and Ponds

Natural lakes, dams and ponds located within a 10 km distance of the project routes have been identified. Table 68 lists various dams and ponds in the 5th and 8th regions, their locations, intended uses, and proximity to the nearest projects. In the 5th region, there are several dams including B. Karaçay, Karamanlı, Reyhanlı, Tahtaköprü, Yarseli, and Yayladağ, primarily used for irrigation and flood control. Additionally, there are natural ponds such as Yenişehir, Cüdeyde, and Balıklı. These water bodies are located near projects such as the Antakya-Samandağ Road, Antakya-Reyhanlı Road, and İslahiye-Hassa Kırıkhan Road, with distances ranging from 0.2 km to 9.4 km. In the 8th region, the dams include Keban, Karakaya, and Sürgü, mainly for power and flood control, located near projects like the Ağın Bridge, Tohma Bridge,



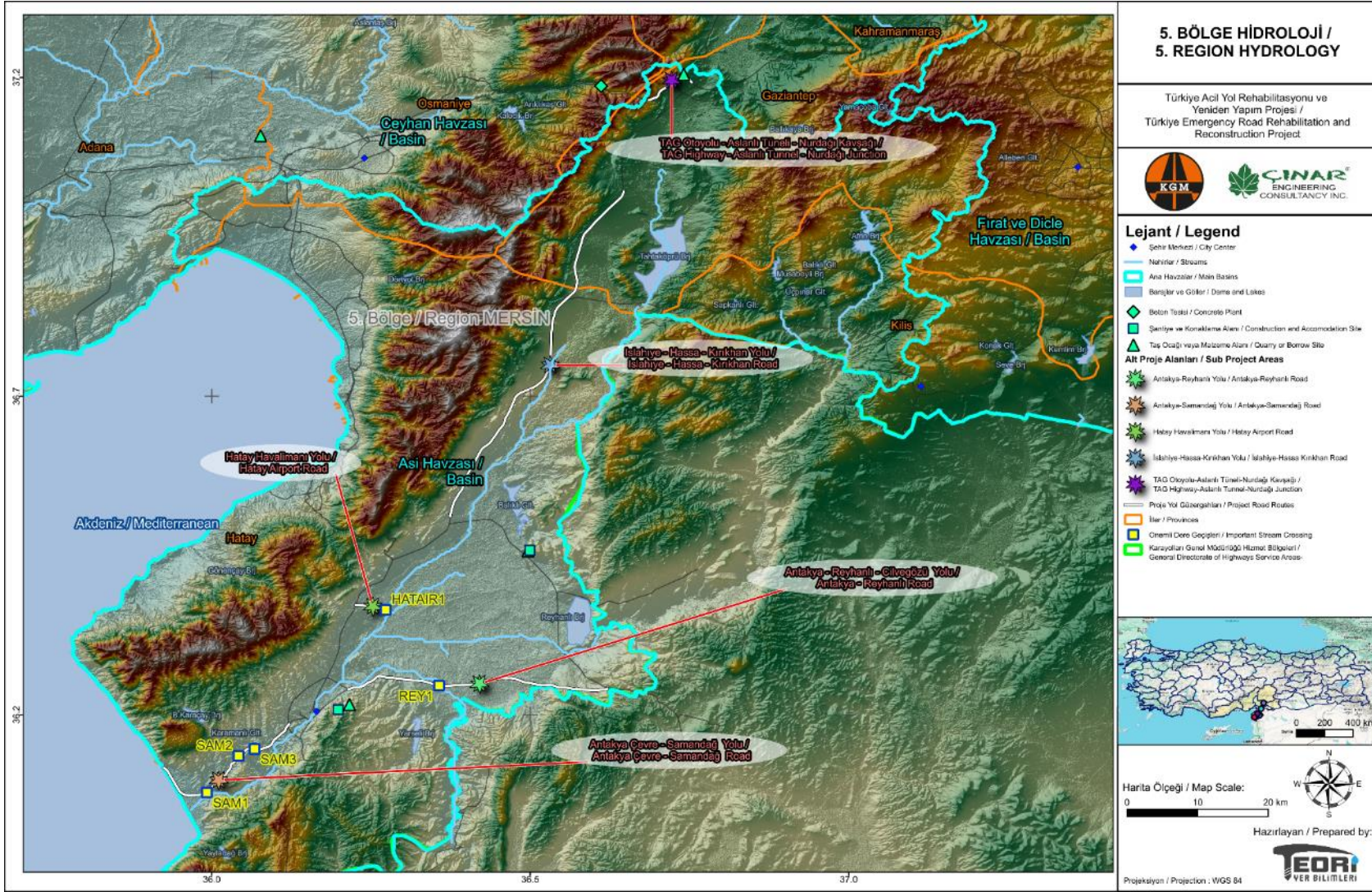
and Malatya-Akçadağ-Gölbaşı Road, with distances ranging from on top to 8.4 km from the nearest projects.

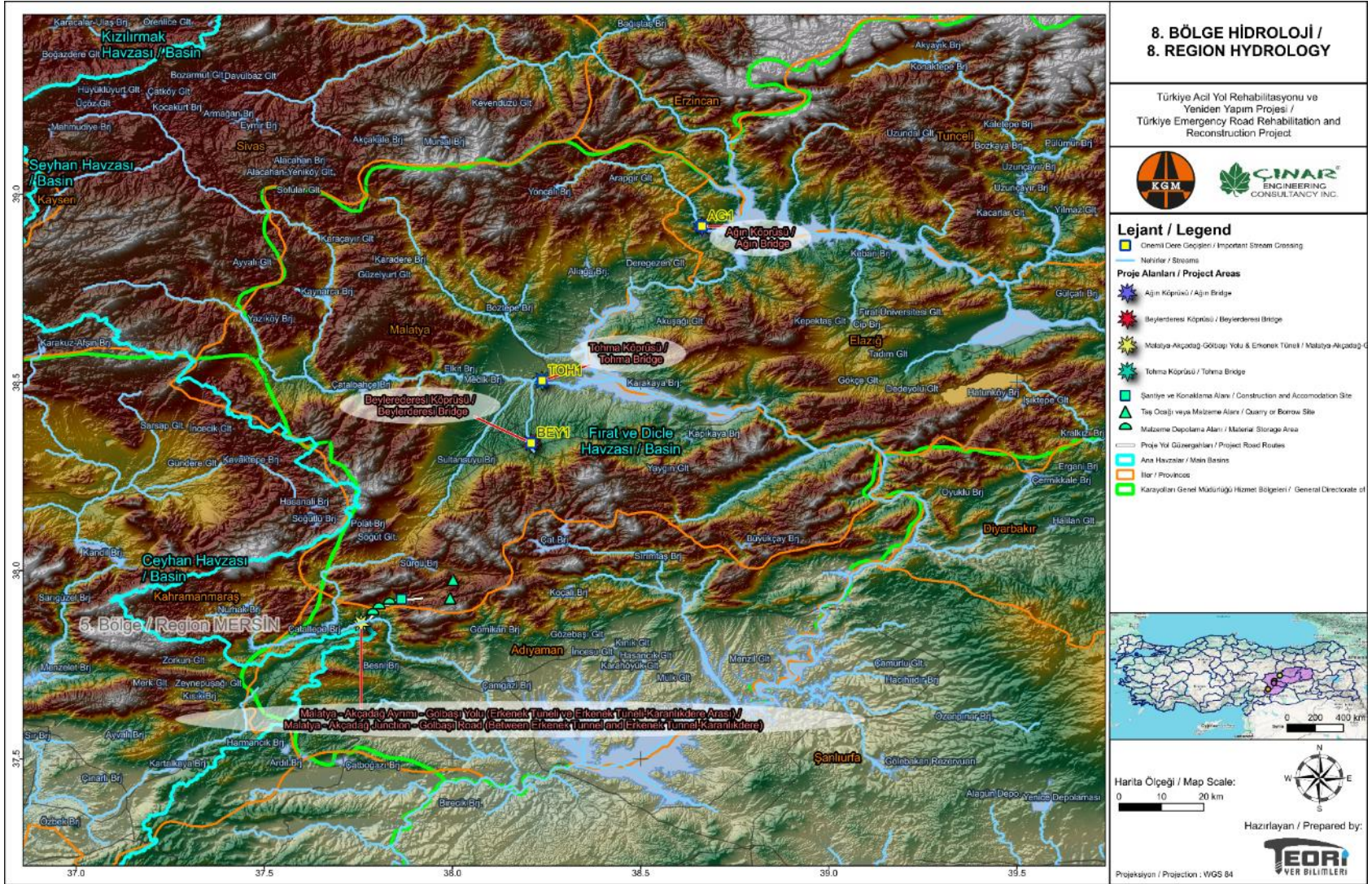
A map displaying the water crossings, lakes, ponds, and dams is provided for all sub-projects for both regions in Figure 46 and Figure 47.

Table 68. Dams and Ponds in the 10 km Vicinity of the Project Area

Name	Type	Province	Intended Use	Resp.	Nearest Project	Distance to Nearest Project (km)
B.Karaçay Dam	Dam	Hatay	Irrigation, Flood control, Power, Drinking	5th Region	Antakya-Samandağ Road	7.6
Karamanlı Dam	Dam	Hatay	Irrigation,	5th Region	Antakya-Samandağ Road	2.8
Reyhanlı Dam	Dam	Hatay	Irrigation	5th Region	Antakya-Reyhanlı Road	7.5
Tahtaköprü Dam	Dam	Gaziantep	Irrigation	5th Region	İslahiye-Hassa Kırıkhan Road	7.1
Yarseli Dam	Dam	Hatay	Irrigation	5th Region	Antakya-Reyhanlı Road	6.2
Yayladağ Dam	Dam	Hatay	Irrigation / Drinking	5th Region	Antakya-Samandağ Road	9.4
Keban Dam	Dam	Elazığ / Malatya	Power	8th Region	Ağın Bridge	Bridge on Top
Karakaya Dam.	Dam	Elazığ / Malatya / Diyarbakır	Power	8th Region	Tohma Bridge	Bridge on Top
Sürgü Dam	Dam	Malatya	Irrigation, Flood control	8th Region	Malatya-Akçadağ-Gölbaşı Road & Erkenek Tunnel	8.4
Yenişehir Pond	Pond	Hatay	Natural	5th Region	Antakya-Reyhanlı Road	0.2
Cüdeyde Pond	Pond	Hatay	Natural	5th Region	Antakya-Reyhanlı Road	2.8
Balıkli Pond	Pond	Hatay	Natural	5th Region	İslahiye-Hassa Kırıkhan Road	8.9

Source: General Directorate of State Hydraulic Works

Figure 46. Hydrology Map of the 5th Region Sub-projects

Figure 47. Hydrology Map of the 8th Region Sub-projects

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Surface Water Quality

A surface water quality survey was undertaken in the scope of the ESIA studies to establish a description of the baseline conditions through the Project Route. In this regard, samples were taken, and relevant analyses were conducted by Çınar Laboratories Group in line with the TS EN ISO 5667-6 standards.

In the selection of water quality sampling points, consideration is given to the scope of the rehabilitation and reconstruction works planned, as well as the locations of the associated and auxiliary facilities, including construction and accommodation sites, quarries/borrow sites, asphalt plants, concrete plants, and crusher/mechanical facilities used within the scope of the activities.

To be able to assess the water qualities arise from the project activities, water quality measurements were conducted at ten (10) points. The information on the surface water sampling points is given in Table 69 and sampling points are shown in Figure 48 and Figure 49. Moreover, the analyses results are listed in Table 70 (see Appendix-4 for the analyses reports).



Table 69. Surface Water Sampling Locations

No	Sub-project No	Reason for selection	Sampling Location	Activity Status	Sampling Date	Coordinates		
						Zone	East Direction	North Direction
SW-1	P3	Upstream of the bridge that will be demolished and rebuilt between Atatürk and Sutaşı neighborhoods	Samandağ/Hatay	Not started yet*	07.05.2024	36 S	769457.61	3996820.64
SW-2	P3	Downstream of the bridge that will be demolished and rebuilt between Atatürk and Sutaşı neighborhoods	Samandağ/Hatay	Not started yet*	07.05.2024	36 S	769521.17	3996718.19
SW-3	P2	Upstream of the demolished and rebuilt bridge at the Demirköprü neighborhood (Antakya-Reyhanlı Road)	Antakya/Hatay Orontes River	Ongoing	07.05.2024	37 S	262576.83	4014640.93
SW-4	P2	Downstream of the demolished and rebuilt bridge at the Demirköprü neighborhood (Antakya-Reyhanlı Road)	Antakya/Hatay Orontes River	Ongoing	07.05.2024	37 S	262559.16	4014365.82
SW-5	P2	Upstream location of Hatay airport road construction activities (Deep Soil Mixing works)	Hatay Airport Road	Ongoing	08.05.2024	37 S	253964.58	4028204.59
SW-6	P2	Downstream location of Hatay airport road construction activities (Deep Soil Mixing works)	Hatay Airport Road Karasu Creek	Ongoing	08.05.2024	37 S	254929.65	4026990.47
SW-7	P4	Location where landslide removal works are carried out	Gölbaşı/Adıyaman Göksu Creek	Not started yet	10.05.2024	37 S	391908.04	4191552.34
SW-8	P4	The monitoring point after the material storage areas	Gölbaşı/Adıyaman Karanlıkdere River	Not started yet	10.05.2024	37 S	393248.02	4193309.84
SW-9	P4	The monitoring point before Erkenek Construction and Accommodation Site to be established	Doğanşehir/Malatya Karanlıkdere River	Not started yet	10.05.2024	37 S	400332.04	4198196.72
SW-10	P4	The monitoring point near the Erkenek Gravel-Sand Borrow Site to be utilized	Doğanşehir/Malatya	Not started yet	10.05.2024	37 S	411529.33	4198222.93

*Although construction works for P3 have been commenced, the process regarding the bridge has not started yet.





Figure 48. Surface Water Quality Sampling Locations for 5th Regional Directorate of Highway

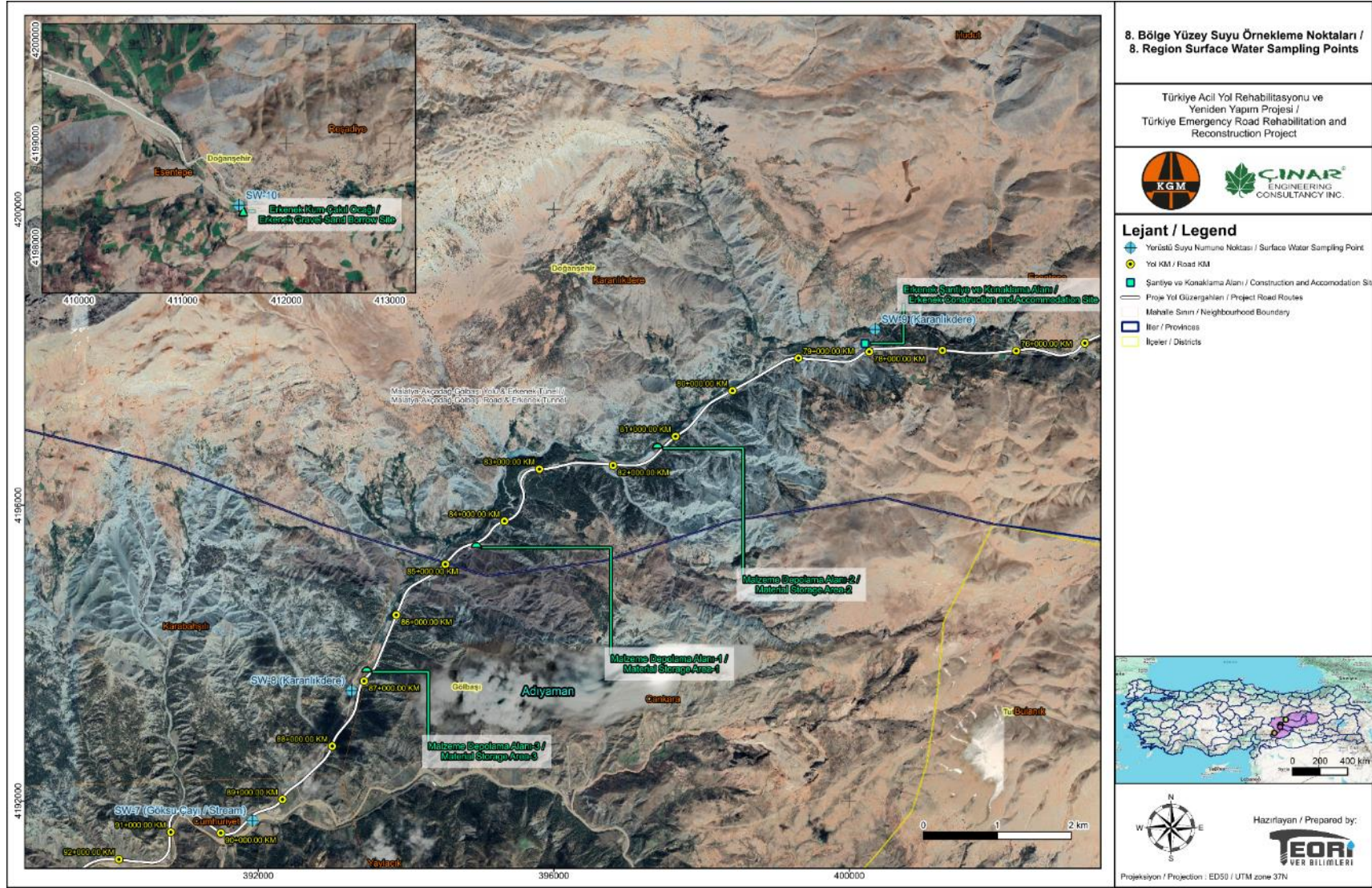


Table 70. Analysis Results of the Surface Water Samples

Parameter	Unit	Water Quality*			Analysis Results									
		Class I (Very Good)	Class II (Good)	Class III (Moderate)	SW-1	SW-2	SW-3	SW-4	SW-5	SW-6	SW-7	SW-8	SW-9	SW-10
pH	-	6-9	6-9	6-9	7.86	7.87	8.24	8.11	8.96	7.86	7.66	8.26	8.36	8.56
Oil and Grease**	mg/L	<0.2	0.3	>0.3	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Color (436 nm)	m ⁻¹	RES 436 nm: ≤ 1.5	RES 436 nm: 3	RES 436 nm: > 4.3	0,6	0,5	<0.1	0,2	0,1	0,3	<0.1	<0.1	<0.1	<0.1
Color (525 nm)	m ⁻¹	RES 525 nm: ≤ 1.2	RES 525 nm: 2.4	RES 525 nm: > 3.7	0,1	0,1	<0.1	<0.1	<0.1	0,1	<0.1	<0.1	<0.1	<0.1
Color (620 nm)	m ⁻¹	RES 620 nm: ≤ 0.8	RES 620 nm: 1.7	RES 620 nm: 2.5	< 0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Conductivity	µS/cm	<400	1000	>1000	1210	1187	1000	852	563	976	308	325	257	226
Dissolved Oxygen	mg/L	>8	6	<6	6.88	7.31	10.31	9.97	8.17	5.02	8.72	9.03	8.58	8.74
Chemical Oxygen Demand (COD)	mg/L	<25	50	>50	24.6	26.5	18	16.3	<10	17.8	<10	<10	<10	<10
Biological Oxygen Demand (BOD)	mg/L	<4	8	>8	8.6	9.6	7	5.3	<3	6.8	<3	<3	<3	<3
Ammonium Nitrogen	mg/L	<0.2	1	>1	0.193	0.168	0.054	0.108	0.096	0.081	<	<	<	<
Nitrate Nitrogen	mg/L	<3	10	>10	3.44	3.37	1.74	1.05	1.47	1.87	0.777	1.01	1.74	0.795
Total Kjeldahl Nitrogen (TKN)	mg/L	<0.5	1.5	>1.5	0.391	0.184	<0.1	0,99	1,5	2,61	0,151	0,564	<0.1	0,807
Total Nitrogen	mg/L	<3.5	11.5	>11.5	3.82	3.58	1.85	2.04	2.99	4.53	<1	1.6	1.77	1.63
Ortho Phosphate Phosphorus	mg/L	<0.05	0.16	>0.16	0.196	0.179	0.029	0.031	< 0.01	0.021	< 0.01	< 0.01	< 0.01	< 0.01
Total Phosphorus	mg/L	<0.08	0.2	>0.2	0.35	0.34	0.096	0.078	0.082	0.176	0.011	0.074	0.085	0.008
Fluoride	µg/L	≤1000	1500	>1500	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Manganese	µg/L	≤100	500	>500	104.2	109	43.7	35.5	31.4	158	19.9	64,1	104	7.03
Selenium	µg/L	≤10	15	>15	0.76	0.75	1.48	1.36	1.51	<0.5	<0.5	<0.5	<0.5	<0.5
Sulfur	µg/L	≤2	5	>5	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
* (a) Purpose of use of water as per quality classes:					1) Surface waters with a high potential of being utilized as drinking water, 2) Water usable for recreational purposes, including those that require body contact, such as swimming, 3) Water that can be used for trout production, 4) Usable water for animal production and farm needs,									
Class I - Water with High Quality (implies that the status of water is "Very good");					1) Surface waters with a high potential of being utilized as drinking water, 2) Water usable for recreational purposes, 3) Water that can be used for fish production other than trout, 4) Irrigation water provided that it meets the irrigation water quality criteria determined by the legislation,									
Class II. - Slightly Contaminated Water (implies that the status of water is "Good");					It refers to water and industrial water that can be used for aquaculture after appropriate treatment, excluding facilities that require qualified water such as food and textiles.									
Class III. - Contaminated water (implies that the status of water is "Moderate");														
**The analysis of the "Oil and Grease" parameter cannot be determined at a level lower than 10 by the relevant laboratory. Therefore, it could not be classified.														



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According to the analysis result given in the table above¹⁴,

- SW-1 and SW-2 are classified as Class III in terms of conductivity, BOD, Ortho Phosphate Phosphorus and Total Phosphorus. This might result from the contamination of the receiving water body with domestic wastewater due to loss, leakage, or discharge caused by inadequate wastewater infrastructure along with diffuse pollution.
- SW-3 and SW-4 are classified as Class II in terms of conductivity and BOD, with SW-3 also being classified as Class II for total phosphorus and SW-4 for total Kjeldahl nitrogen (TKN). At this point, it should be noted that any pollution caused by the construction of the bridge, which has been demolished and rebuilt in the Demirköprü neighborhood, was reflected in the analysis results during the sampling period. When examining the upstream and downstream measurement results, it is observed that the ongoing project activities did not have an immediate significant impact on the water body. On the other hand, it can be said that agricultural-origin pollution exists.
- SW-5 is classified as Class II in terms of conductivity, TKN and Total Phosphorus whereas SW-6 is classified as Class III in terms of dissolved oxygen and TKN. It is predicted that the pollution in the main tributary, Karasu Creek, is mostly caused by agricultural activities. Although it is difficult to determine the direct impact on the water body caused by the project activities, due to the nature of the work and its proximity to the water body, a minor impact, especially on conductivity and COD values, can be considered.
- SW-7 is classified as Class I in terms of all parameters measured. On the other hand, SW-8 is classified as Class II in terms of TKN, while SW-9 is classified as Class II in terms of Total Phosphorus and manganese. It is deduced that there is diffuse pollution originating from the land use.
- SW-10 is classified as Class II in terms of TKN, originated from diffuse pollution from the land use.

4.4.2.2 Groundwater Resources

The subproject areas hydrogeological setting is derived from the International Hydrogeological Map of Europe (IHME1500) at a scale of 1:1,500,000. This map series provides a regional-scale overview of hydrogeological conditions and is compiled through contributions from national hydrogeologists and specialists in relevant scientific fields, coordinated by the International Association of Hydrogeologists (IAH).

Sub-projects under the responsibility of the 5th Regional Directorate of Highways:

Antakya-Samandağ Road Sub-project:

The road is located on non-aquiferous rocks, due to the hard consolidation and structural integrity. Groundwater is used principally for irrigation purposes, and then domestic usage such as drinking. Along the project region, groundwater flows towards the Orontes (Asi) River, which later on discharges to the Mediterranean Sea.

Antakya-Reyhanlı Road Project & Hatay Airport Road Sub-project:

Antakya-Reyhanlı Road Project is located over practically non-aquiferous hydro-stratigraphical units. The presence of joints and fractures in an area significantly enhances the permeability and porosity of the rocks, allowing groundwater to move more freely. This facilitates the replenishment of aquifers, the discharge of groundwater into streams and rivers, and the

¹⁴ The inadequate management of construction/demolition wastes following the February 6, 2023 earthquake, along with damage to the wastewater infrastructure, has also impacted groundwater and surface water resources. This factor should be taken into consideration.



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accessibility of groundwater resources for various uses. Local communities often rely on groundwater sources for drinking, irrigation, and other domestic and agricultural purposes. The presence of joints and fractures, resulting in springs and seeps, provides a direct and convenient means for accessing groundwater. These natural water discharges can be harnessed for various needs, particularly in areas with limited surface water availability.

Hatay Airport Road overlays alluvial aquifer, which is mainly used for irrigation purposes.

TAG Highway-Aslanlı Tunnel-Nurdağı Junction Sub-project:

The Karadağ Formation over which the project is situated, is principally defined as a productive aquifer. The East Anatolian Fault, a major tectonic plate boundary, is known for its seismic activity, which can trigger earthquakes and alter the subsurface structure. Given the proximity of the project to the East Anatolian Fault, it is crucial to consider the potential for groundwater flooding and implement appropriate mitigation measures. By carefully evaluating the potential for groundwater flooding and implementing proactive mitigation strategies, the project can be executed in a manner that minimizes risks and protects the surrounding environment.

İslahiye-Hassa-Kırıkhan Road Sub-project:

The project overlays low and moderately productive porous aquifers as well as low and moderately productive fissured aquifers, including karstified rocks. The East Anatolian Fault reacts as a negative boundary condition throughout the project line. Groundwater is principally used for irrigation purposes by means of groundwater wells, while domestic usage is applied from springs discharging from karstic limestones, somehow far from the project line.

Sub-projects under the responsibility of the 8th Regional Directorate of Highways:

Malatya-Akçadağ-Gölbaşı Road & Erkenek Tunnel Sub-project:

Groundwater potential, throughout the project line, seems to be somehow poor, in which the existing lithologies do not represent good aquifers. Even though low, moderate and non aquiferous rocks are encountered along the project line, groundwater flood risks should be taken into consideration during tunnel operations. Principal usage is irrigation from low discharging groundwater wells drilled in the area.

Beylerderesi Bridge Sub-project:

The Pliocene-Quaternary aged sandstone-conglomerate-mudstone layers, define locally porous aquifers. Main groundwater flow is towards the Beylerbeyi River. Usage is based on irrigation mainly by the local habitant, especially in dry seasons. The existence of dense well amounts give a significant potential for the groundwater in the region.

Tohma Bridge Sub-project:

Pliocene and Pleistocene-aged sediments typically consist of unconsolidated clastic rocks. These formations show low porosity and permeability, making them suitable to un-suitable for hosting groundwater along the Project line. Tohma area is underlain by Pliocene and Pleistocene-aged sediments that form moderate-productive aquifers. Groundwater flow in the area generally tends towards the Tohma River, and groundwater is primarily used for irrigation purposes.

Ağın Bridge Sub-project:

The alluvial lithology, characterized by loose, unconsolidated sediments, exhibits good porosity and permeability, making it a suitable host for groundwater. This suggests that the unit has a highly productive porous aquifer potential. Groundwater flows in the region converge towards the reservoir lake. This indicates that the lake acts as a natural discharge point for groundwater in the area. Agricultural irrigation is the primary water use in the area.



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The consolidation and layering of the Neogene sediments suggest that they may have limited groundwater storage capacity compared to the overlying alluvial deposits.

All sub-projects shown on the "International Hydrogeological Map of Europe, scale 1:1,500,000 (IHME1500)" map given in Figure 50.

Within the scope of the project, groundwater quality analyses have not been carried out. There are groundwater usages specific to some sub-projects and associated/auxiliary facilities (see Table 71). Besides, as an impact mitigation requirement, the Contractor assigned to each sub-project will perform quarterly groundwater analysis from the wells where drinking water is supplied, along with conducting necessary sampling analysis in case of any leakages or spills.

Well-known Groundwater Resources

According to Directorate General For Water Management(SYGM) there is not any protected or well-known groundwater resources in the vicinity of sub-project areas and related/auxiliary facilities that might be affected from project activities.



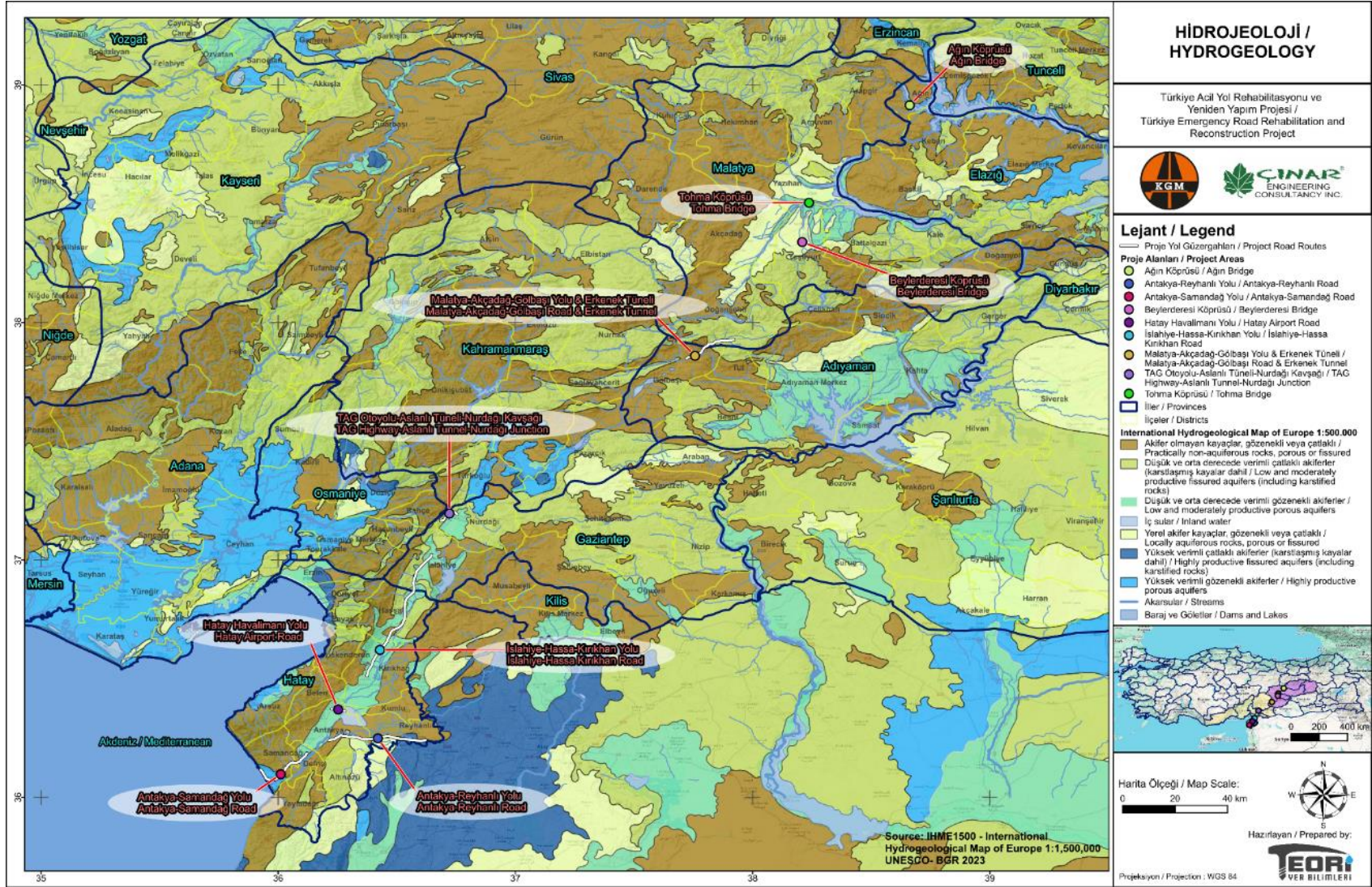


Figure 50. Hydrogeological Map Showing All Sub-projects (IHME 1500, UNESCO, BGR 2023)

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4.4.3 Impact Assessment and Mitigation Measures

4.4.3.1 Land Preparation and Construction Phase

Water will be required by the Project personnel (for drinking and utility purposes) and for construction works (for process water at the associated and auxiliary facilities, dust suppression, concrete production, etc.) during the land preparation and construction phase. The required utility and construction water is planned to be supplied either from nearby settlements using tankers or from groundwater wells drilled or to be drilled near the construction and accommodation sites, in line with the groundwater utilization permits obtained or to be obtained from the State Hydraulic Works (DSI). Drinking water for the Project personnel will be supplied either from groundwater resources, provided they meet drinking water standards, or by using bottled water.

Daily water use by the Project personnel will lead to the generation of domestic wastewater. The amount of water to be used by the Project personnel has been estimated based on the total number of personnel to be employed at each sub-project during the land preparation and construction phase. The daily water need per person is assumed to be 150 liters per person per day (Erođlu & Topacık, 1998). Domestic wastewater will be generated as a result of the use of drinking and utility water. It has been assumed that the wastewater generated will be equal to the water used. Table 71 summarizes the estimated number of personnel, corresponding water use/domestic wastewater generation rates at the peak construction phase as well as planned disposal method.



Table 71. Water Use and Domestic Wastewater Generation for each Sub-project during the Construction Phase

Sub-project No	Sub-project	Estimated Number of Employees	Amount of Water Used and Domestic wastewater Generation Rate (m ³ /day)	Source/Supply of Water for Drinking, Utility and Construction Works	Planned Disposal Method
P1	Tarsus-Adana-Gaziantep (TAG) Motorway Rehabilitation	200	30	<ul style="list-style-type: none"> - For the Ceyhan Construction and Accommodation Site, the drinking water needs of the personnel have been met with bottled water, while utility and process water have been obtained from Hacı Sabancı OIZ, where water taken from the Ceyhan River is treated. - For Tatarlı Basalt Quarry, Bahçe (Ayran) Concrete Plant and road construction areas, the drinking water needs of the personnel have been met from bottled water whereas water used for the personnel and in the process has been purchased and delivered to the facility via tankers/IBC tanks. 	<ul style="list-style-type: none"> - Biological package wastewater treatment plan (WWTP) with 20 m³/day capacity in Ceyhan Construction and Accommodation Site - Sending to nearest licensed municipal infrastructure systems after being stored in impermeable septic tanks at Tatarlı Basalt Quarry and Bahçe (Ayran) Concrete Plant - Utilizing the facilities of nearby commercial enterprises in the road construction area
P2	Hatay Province Roads Rehabilitation and Reconstruction	200	30	<ul style="list-style-type: none"> - For Kızılkaya Construction and Accommodation Site, the drinking water needs of the personnel have been met from bottled water whereas groundwater has been utilizing for personnel usage and in the process. - For Kızılkaya Quarry, the drinking water needs of the personnel have been met from bottled water whereas mains water has been supplied through the neighboring facility "Aslar Beton", which has infrastructure. In addition, the facilities at the Kızılkaya construction and accommodation site have been utilized for the personnel working at Kızılkaya Quarry. - For DSM stations, process water has been purchased through tankers and also sourced from groundwater. 	<ul style="list-style-type: none"> - Sending to nearest licensed municipal infrastructure systems after being stored in impermeable septic tank at Kızılkaya Construction and Accommodation Site - Utilizing the facilities of nearby commercial enterprises in the road construction areas
P3	Antakya-Samandağ Road Reconstruction	100	15	<ul style="list-style-type: none"> - For Kuruyer Construction and Accommodation Site, the drinking water needs of the personnel will be met from bottled water whereas utility water and process water will be provided from groundwater. - For the road construction area, water used for the concrete plant has been delivered via tankers from 	<ul style="list-style-type: none"> - Sending to nearest licensed municipal infrastructure systems after being stored in impermeable septic tank at Kuruyer Construction and Accommodation Site

Sub-project No	Sub-project	Estimated Number of Employees	Amount of Water Used and Domestic wastewater Generation Rate (m ³ /day)	Source/Supply of Water for Drinking, Utility and Construction Works	Planned Disposal Method
				Kızılkaya and/or Kuruyer Construction and Accommodation Site whereas personnel are using water from the nearby facilities and bottled water.	- Utilizing the facilities of nearby commercial enterprises in the road construction area
P4	Erkenek Tunnel Rehabilitation (including Malatya-Akçadağ-Gölbaşı Road)	150	22.5	- For Erkenek Construction and Accommodation Site, drinking water needs of the personnel will be met from bottled water whereas utility water and process water will be purchased and delivered to the site via tankers.	- Sending to nearest licensed municipal infrastructure systems after being stored in impermeable septic tank at Erkenek Construction and Accommodation Site to be established - Utilizing the facilities of nearby commercial enterprises in the road construction area
P5	Tohma, Ağın and Beylerderesi Bridges Rehabilitation	50	7.5	- For the Tohma Construction and Accommodation Site and the Ağın Construction Site, the drinking water needs of the personnel have been met with bottled water. Mains water has been used at the Tohma Construction and Accommodation Site, while utility water has been delivered to the Ağın Construction Site via tankers.	- Sending to nearest licensed municipal infrastructure systems after being stored in impermeable septic tanks at Tohma Construction and Accommodation Site and Ağın Construction Site - Utilizing the facilities of nearby commercial enterprises in the road construction area
Total		700	105	-	-

In addition to the daily domestic water use, water will be required for dust suppression at road construction and other work sites, as well as for production activities at facilities such as asphalt plants, concrete plants and crushers/mechanical facilities. Table 72 outlines the anticipated daily water demand for each activity during their operation period.

Table 72. Estimated Water Demand for the Auxiliary Facilities

Activity/Unit	Daily Water Consumption (per activity) *	Number of Plants/Components for each sub-project	Total Water Consumption
Asphalt Plant	2 m ³ /day	1 (for P1) 1 (for P2) 1 (for P3)	6 m ³ /day
Concrete Plant	300 m ³ /day	1 (for P1) 1 (for P2) 2 DSM Machines (for P2)	Since the generated wastewater will be recycled, water consumption/ requirement will occur at regular intervals.



Activity/Unit	Daily Water Consumption (per activity) *	Number of Plants/Components for each sub-project	Total Water Consumption
		1 (for P3) 1 (for P4)	
Crushing and screening facility/crusher	2.8 m ³ /day	1 (for P2) 1 (for P4)	5.6 m ³ /day
Mechanical Facility/Plant mixed	12 m ³ /day	1 (for P1) 1 (for P3) 1 (for P4)	36 m ³ /day
Dust suppression for each associated and auxiliary facility		18 m ³ /day**	504 m ³ /day

*Assumed based on the literature review.

**Average water volume in a water truck. It is assumed that 2 water tankers will be used per day for each auxiliary facility and road.



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Dust suppression will be carried out at construction and accommodation sites, as well as at quarries and borrow sites, using appropriate methods such as water trucks during dry periods. Since the water used for dust suppression will evaporate on-site, no wastewater will be generated from this operation. Similarly, the water utilized for the mechanical plant and asphalt operations will be entirely consumed during production, resulting in no wastewater being generated from these units. On the other hand, wastewater produced during the washing of sand-gravel material at the crushing and screening facility, as well as from the ready-mixed concrete facility, will be managed by recirculating it after sedimentation in tanks.

The potential adverse impacts and/or risks on water resources during the land preparation and construction phase, which are required to be managed within the scope of the project, are listed below.

- Impacts on the water resources (surface waters and/or groundwater, depending on the resources to be used) due to water use for construction activities including associated and auxiliary facilities and due to operation of the quarries/borrow sites depending on the location of these sites and the groundwater level,
- Degradation impacts on surface water quality due to improper management of the wastewater, waste and chemicals/hazardous substances along with surface runoff resulting in sediment accumulation on the waterbody,
- Impacts on surface water flow and flood risk due to poor management of surface runoff,
- Impacts on groundwater resources due to accidental spill/leakage and improper management of hazardous materials and waste (including wastewater).

4.4.3.2 Operation Phase

During the operational phase of the project, the potential impacts on water resources are anticipated to be more restricted compared to the construction phase. The primary focus will be on managing water usage and wastewater generation resulting from repair, maintenance, housekeeping, and landscaping activities, as well as implementing effective stormwater management measures. Considering that employees at the highway operation directorates (an average team of twenty people for each sub-project) use bottled water for drinking and services will continue to be provided through existing facilities with wastewater infrastructure in place, it is anticipated that the project will not impose any additional burden.

The potential adverse impacts and/or risks on water resources during the operation phase, which are required to be managed within the scope of the project, are listed below.

- Increased surface runoff due to impermeable road,
- Contamination of surface waters due to repair/maintenance/housekeeping/landscaping operations; accidental spillage/leak of chemicals resulting from traffic/transportation; surface runoff containing routine deposits and spills from the highways.

Impact significance and mitigation measures corresponding to relevant E&S impacts and risks are provided in Table 73.



Table 73. Impact Significances, Proposed Mitigation Measures and Value of Residual Impacts – Water & Wastewater

Impact Description	Project Phase	Receptor	Impact Magnitude					Sensitivity/ Value of Resource/ Receptor	Impact Significance (prior to mitigation or with existing mitigation)	Proposed Mitigation Measures	Residual Impact Significance
			Extent	Reversibility	Duration	Frequency	Overall Magnitude				
Degradation Impacts on Surface Water Quality	Land Preparation and Construction Phase	Nearby surface water resources and rivers/streams/dams to be crossed	Local	Short-term reversible	Short-term	Intermittent	Medium	Medium	Moderate	<ul style="list-style-type: none"> Contractor's ESMPs will be developed and implemented by the Contractors by covering relevant E&S issues and all personnel will receive the necessary training on water resources, water quality and wastewater management. Domestic wastewater generated due to land preparation and construction activities at the construction and accommodation site, quarries, borrow sites and other auxiliary facilities including asphalt plant, concrete plant and crusher/mechanical facility will be deposited in septic tank(s) that will be impervious, in accordance with "Regulation on Pit Opening Where Sewer System Construction is not Applicable" being published in Official Gazette No.13783 dated 19.03.1971. When the pits are filled, wastewater will be removed by sewage trucks, and disposal will be provided periodically within the scope of the protocol to be made with the municipalities, that have licensed wastewater infrastructure systems with enough capacity. Wastewater from concrete plants will be collected in sedimentation ponds and the settled water will be recycled into the production process and there will not be any wastewater discharge to a receiving environment. If a package wastewater treatment plant (WWTP) is planned to be established, treated domestic wastewater will be discharged into nearby receiving environment in accordance with the Project Standards and environmental permits on wastewater discharge obtained from the authorities along with identity document of the WWTP. Effluent discharge will be monitored periodically as specified in the respective environmental permit for the package WWTP. Discharge of any kinds of untreated wastewater and waste to receiving bodies (soil and surface waters), drain fields, dry wells or separate storm drainage and interception channels will be prevented. All chemical storage tanks, including those for diesel fuel and dangerous liquid waste, will be stored in secondary containment structures with a capacity of up to 110% of the volume of material stored, in compliance with construction site requirements. Additionally, spill kits or absorbent pads should be readily available near storage areas. The positioning of stockpiles near to water bodies and in the flood risk areas will be avoided. Works during high flow events and during heavy rainfall will be avoided to reduce the risk of fine sediment release into watercourses, watercourse erosion and increased flood risk. Sediment barriers will be provided between earthworks and the watercourse to avoid contamination of waterbodies with sediment. When determining the locations of temporary fuel or oil storage areas, location of surface water resources will be taken into account. Accidental spill of hazardous materials such as fuel, oil, oil, cement etc. will be taken under control immediately. To collect and reduce the flow of surface runoff originated from construction and accommodation sites and other areas of impermeable surfaces; drainage systems and related strategies will be planned and implemented. Washing of vehicles/or machinery will not be permitted in surface waters. In order to monitor the water quality of the surface waters within the project area, considering location of the pollution sources during land preparation and construction phase, water samples should be collected and assessment of the water quality of the samples will be performed biannually at the locations where baseline measurements were conducted in the ESIA process. 	Minor
Impacts on Surface Water Flow and Flood Risk	Land Preparation and Construction Phase	Nearby surface water resources and rivers/streams/dams to be crossed	Wide	Short-term reversible	Short-term	Intermittent	Medium	Medium	Moderate	<ul style="list-style-type: none"> Surface runoff or wastewater generation due to dust suppression activities will be prevented. Surface runoff management practices designed to slow peak runoff flow, reduce sediment load, and increase infiltration will be implemented in accordance with KGM Technical Specifications. Natural drainage systems flowing towards the motorway will be intercepted by means of properly designed drainage channels and diverted the intercepted flow towards the nearest river/stream beds. Appropriate design and construction methods for hydraulic structures such as bridges, culverts and viaducts for river and stream crossings will be developed and implemented in accordance with KGM design standards/specifications. 	Negligible
Impact on Groundwater Resources	Land Preparation and Construction Phase	Groundwater	Local	Medium-term reversible	Short-term	Intermittent	Medium	Medium	Moderate	<ul style="list-style-type: none"> Sustainable use of water resources through water use minimization and recycling should be promoted. When determining the locations of temporary fuel or oil storage areas, location of groundwater resources will be taken into account. Accidental spill of hazardous materials such as fuel oil, oil, cement etc. will be taken under control immediately. 	Minor



Impact Description	Project Phase	Receptor	Impact Magnitude					Sensitivity/ Value of Resource/ Receptor	Impact Significance (prior to mitigation or with existing mitigation)	Proposed Mitigation Measures	Residual Impact Significance
			Extent	Reversibility	Duration	Frequency	Overall Magnitude				
										<ul style="list-style-type: none"> Construction activities may pose the potential for accidental release/leakages of petroleum-based products, such as lubricants, hydraulic fluids, or fuels during their storage, transfer, or use in equipment. All chemical storage containers, including diesel fuel, and hazardous liquid waste drums/containers should be placed in secondary containments/drip trays so as to minimize the risk of soil, surface water and groundwater contamination during construction and land preparation phase. Spill kits should be kept on site to be deployed in the event of a spillage, and site staff trained in their use. The units of the Project that are in touch with water, wastewater and chemicals will be constructed with using concrete with appropriate cement ratio and durability in order to provide basement impermeability. Thus, no leakages to soil and groundwater will occur during the construction phase of the Project. Containers containing hazardous materials will be placed in sealed vessels to prevent spills and leaks. Hazardous wastes will be transported by licensed waste transportation companies and will be disposed of at licensed facilities. Groundwater utilization permits will be obtained from the related authorities for the use of groundwater in construction activities. Quarry activities will be designed and implemented in such a way as to minimize drawdown, considering potential impacts to surface and groundwater resource flow and availability, including potential ecological impacts. Appropriate blasting design and procedures, including ensuring the correct burning of explosives, will be implemented. Where possible, alternatives to blasting, such as hydraulic hammers or other mechanical methods should be considered. If drinking water is supplied from wells, the contractor will perform quarterly groundwater analysis. Additionally, in case of leakage/spill, the contractor will perform the necessary sampling and analysis. 	
Increased Surface Runoff due to Impermeable Road	Operation	Surface water resources	Wide	Long-term reversible/ Irreversible	Long-term	Intermittent	Medium	Medium	Moderate	<ul style="list-style-type: none"> Regular inspection and maintenance of permanent erosion and runoff control features will be conducted. Surface runoff along the highways should be collected using ditches and diversion channels, and the collected water should be diverted to the nearest receiving water bodies. 	Minor
Contamination of Surface Waters with Maintenance Chemicals/Agents Accidental Spillage of the chemicals due to traffic/transportation Surface Runoff Containing Routine Deposits and Spills from the Highways	Operation	Nearby surface water resources and rivers/streams/dams to be crossed	Local	Short-term reversible	Short-term	Intermittent	Low	Medium	Minor	<ul style="list-style-type: none"> Appropriate and environmentally friendly anti-icing and deicing agents will be selected based on expected pavement temperatures and weather information to minimize their use. The design of drainage and site reinstatement will consider the impacts of anti-icing and deicing agent runoff on surface waters. If road accidents occur that may result in spills and leakages, the Emergency Preparedness and Response Plan will be implemented to effectively manage any potential contamination. In the event of any large-scale spill, absorbent materials from spill response kits will be used. These kits will be available at relevant centers and locations. To avoid the generation of contaminated runoff from cleaning asphalt equipment, diesel will be substituted with vegetable oil as a release and cleaning agent. Additionally, measures will be taken such as containing cleaning products and contaminated asphalt residues, scraping before cleaning, and conducting cleaning activities away from surface water features or drainage structures. 	Negligible

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4.5 Resource and Waste Management

4.5.1 Methodology and Project Standards

This chapter identifies the national legislation and international standards and good international industry practices related to resource and waste management applicable to the project. It provides baseline information, details the existing status and approach to be taken in terms resources and waste management, and identifies related impacts along with proposed measures to avoid or mitigate these impacts during both the construction and operation phases.

Resource usage for the project will primarily be an issue during the reconstruction and rehabilitation phase, where there will be an extensive need for the supply of construction materials such as aggregate, basalt, limestone, etc. Consequently, several quarries and material borrow sites will be utilized to fulfill the project's construction material requirements. On the other hand, during the operation phase, procurement of materials will be necessary for maintenance and repair works on the highways and bridges.

The daily activities of personnel in the project area, construction and accommodation sites, as well as quarries/material borrow sites, will result in the production of various types of non-hazardous and hazardous wastes during both the construction and operation phases of the project. Similarly, maintenance of the highways will lead to waste generation during the operation phase.

As with all infrastructure projects, both the requirements for construction materials and waste generation can be substantial. Therefore, a well-planned organizational approach, including preventive corrective actions and mitigation measures, is essential for managing all types of waste. The methodology for evaluating potential impacts associated with waste generation and the standards for waste management are listed below. Relevant impacts have been identified based on these assessments, and the necessary measures have been determined according to the significance of these impacts.

Both qualitative and quantitative approaches have been adopted in the E&S impact assessment to evaluate the project's material use and waste management.

The assessment, including the establishment of initial baseline information, is based on the following reports, guidelines and data sources:

- AİIB ESS 1: Environmental and Social Assessment and Management,
- WBG General EHS Guidelines (2007),
- Mining resource maps of material borrow sites and quarries published in the internet site of General Directorate of Mineral Research and Exploration (MTA),
- Provincial Environmental Status Reports published by the Provincial Directorates of Environment, Urbanization and Climate Change,
- National Waste Management and Action Plan published by the Ministry of Environment, Urbanization and Climate Change, General Directorate of Environmental Management (2016-2023), and
- Waste statistics published by TurkStat.

Regulation on Waste Management is the basis of national legislation relating to the management of waste in Türkiye. In addition to this there are other regulations for specific waste types. These include waste streams from excavations, constructions, building demolitions, waste oils, packaging waste, waste batteries and accumulators, medical waste, waste electrical and electronic equipment, and waste tire. The full list of national waste legislation to be complied within the scope of the project is provided in Chapter 2 of the ESIA



Report. Key standards/requirements defined in the national legislation regarding waste management are briefly given in Table 74.

Table 74. Key Standards / Terms Defined by National Waste Management Legislation

National Legislation	Standards/Terms
Regulation on Waste Management	<ul style="list-style-type: none"> ▪ Waste Management Plan is developed and implemented for reduction at source, reuse and recycling of solid wastes, ▪ "3-Year Industrial Waste Management Plan" is developed, approved (by the authorities) and implemented for the wastes, ▪ Different types of wastes (domestic, recyclable, hazardous, etc.) are stored in separate containers, ▪ Hazardous and non-hazardous wastes are stored in designated temporary storage areas, ▪ Closed containers are used to store hazardous wastes and these containers should be in good condition, durable and closed tightly and placed on water resistant surface such as concrete floor, ▪ Labels put on the waste containers to identify type of the waste, amount of the waste and date of storage, ▪ Records of wastes generated are kept at the project site, ▪ Waste declaration forms (for the waste generated in the previous year) are filled in the online platform of the Ministry of Environment, Urbanization and Climate Change until March of the coming year, ▪ Agreements are made with municipalities or licensed companies for recovery, recycling, and final disposal.
Regulation on Packaging Waste Control	<ul style="list-style-type: none"> ▪ Packaging wastes are temporarily stored in a designated place separate from other wastes and chemicals, ▪ Recyclable waste is delivered to licensed recycling companies.
Regulation on Waste Oil Control	<ul style="list-style-type: none"> ▪ Characteristics of waste oils are analyzed according to the parameters specified in Regulation on Control of Waste Oils and categorization of waste oils are done accordingly.
Regulation on Control of Excavation Soil, Construction and Demolition Waste	<ul style="list-style-type: none"> ▪ Topsoil is stored at a designated storage area separately from the coarse/excavated materials and necessary measures are implemented during the storage period to ensure that it can be reused in rehabilitation or landscaping activities.
Zero Waste Regulation	<p>In order to use resources efficiently in production, consumption and service processes in line with the principles of sustainable development through the effective management of raw materials and natural resources; it is essential to;</p> <ul style="list-style-type: none"> ▪ Prevent waste generation, ▪ Reduce waste in cases where it is not possible to prevent waste generation, ▪ Evaluate the reuse possibilities of products and materials.

At the international level, the main standard applicable to the Project's impacts on potential materials and wastes is AIB ESS 1: Environmental and Social Assessment and Management and it necessitates below issues;

- Implementation of the pollution prevention and control technologies and practices under the Project consistent with international good practice, as reflected in internationally recognized standards, such as the WBG EHS Guidelines,
- Adopting clean production processes and good energy efficiency practices,
- Avoiding pollution, or when avoidance is not feasible, minimize or control the intensity or load of pollutant emissions and discharges, including direct and indirect greenhouse gas emissions,
- Minimizing and managing waste generation, including through waste reduction and recycling, and release of hazardous materials from production, transportation, handling and storage,
- Avoid the use of hazardous materials subject to international bans or phase outs.

As mentioned in AIIB ESS 1, WBG General EHS Guidelines requires the establishment of a waste management hierarchy that considers the prevention, reduction, reuse, recovery, recycling, disposal of waste and finally waste disposal (see Figure 51).

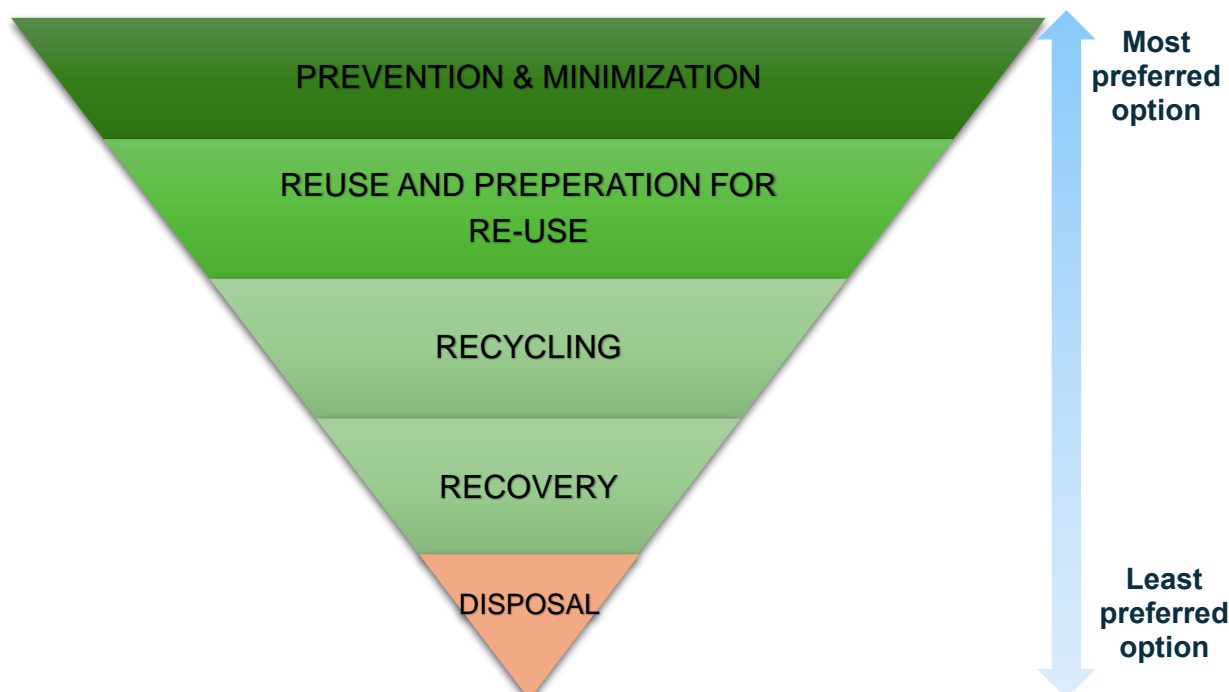


Figure 51. Waste Management Hierarchy

4.5.2 Baseline Conditions

4.5.2.1 Material Requirements

The project involves the reconstruction and rehabilitation of certain sections of existing roads and bridges damaged by the February 2023 earthquake in Gaziantep, Hatay, Adıyaman, Malatya, and Elazığ Provinces, located in the Southeastern and Eastern Anatolia regions of Türkiye.

The mining sector along the route varies, encompassing activities in both industrial raw materials mining and metallic mining sectors. Mineral maps of the provinces¹⁵ located along the project routes are provided between Figure 52 and Figure 57.

It should be noted that the project will utilize mostly its own licensed quarries/material borrow sites owned by relevant Regional Directorate of Highways (see Table 15). The provided maps of existing quarries are presented to state that, there are no problem regarding material source in each city. Besides, it is planned that some of the raw materials will be supplied from licensed quarries/material borrow sites operated by third parties. On the other hand, a suitable portion of the cut material will be reused for fill works.

Quarries/material borrow sites to supply raw materials will be selected based on rigorous criteria, including proximity to the construction site to minimize transportation costs and environmental impact, geological suitability, and adherence to environmental and social

¹⁵ It was evaluated in the case of Adana province, since it is close to the project area and one of the construction sites and one of the quarries (Tatarlı Basalt Quarry) within the scope of the project is located in Adana province (i.e. Ceyhan Construction and Accommodation Site).

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sustainability standards. Ensuring that the quarries comply with these criteria is vital for minimizing the environmental footprint and supporting sustainable practices.

Quarry operations are subject to strict environmental regulations to mitigate potential adverse impacts. Operating quarries and/or selecting quarries that adhere to these regulations and, implementing measures to minimize dust, noise, and other environmental disturbances during material extraction, will contribute to the overall environmentally conscious approach of the project.

Efficient transportation logistics are integral to the construction phase. By sourcing construction materials from quarries along the project routes, the need for extensive transportation is reduced, minimizing associated carbon emissions, traffic congestion, and overall environmental impact.

To maintain the construction material's quality and consistency, a robust quality control system is implemented. Regular testing and monitoring procedures are in place to ensure that materials extracted from the designated quarries meet the project's engineering and safety standards.

Sourcing construction materials from designated quarries contributes to the local economy by generating employment opportunities and supporting quarry-related businesses. This approach aligns with the project's commitment to fostering socio-economic benefits within the project's vicinity.

In conclusion, the selection of quarries for sourcing construction materials is a carefully planned and environmentally responsible strategy. It ensures that the project meets its engineering requirements while adhering to sustainability principles and supporting the economic development of the local communities involved in quarry operations.



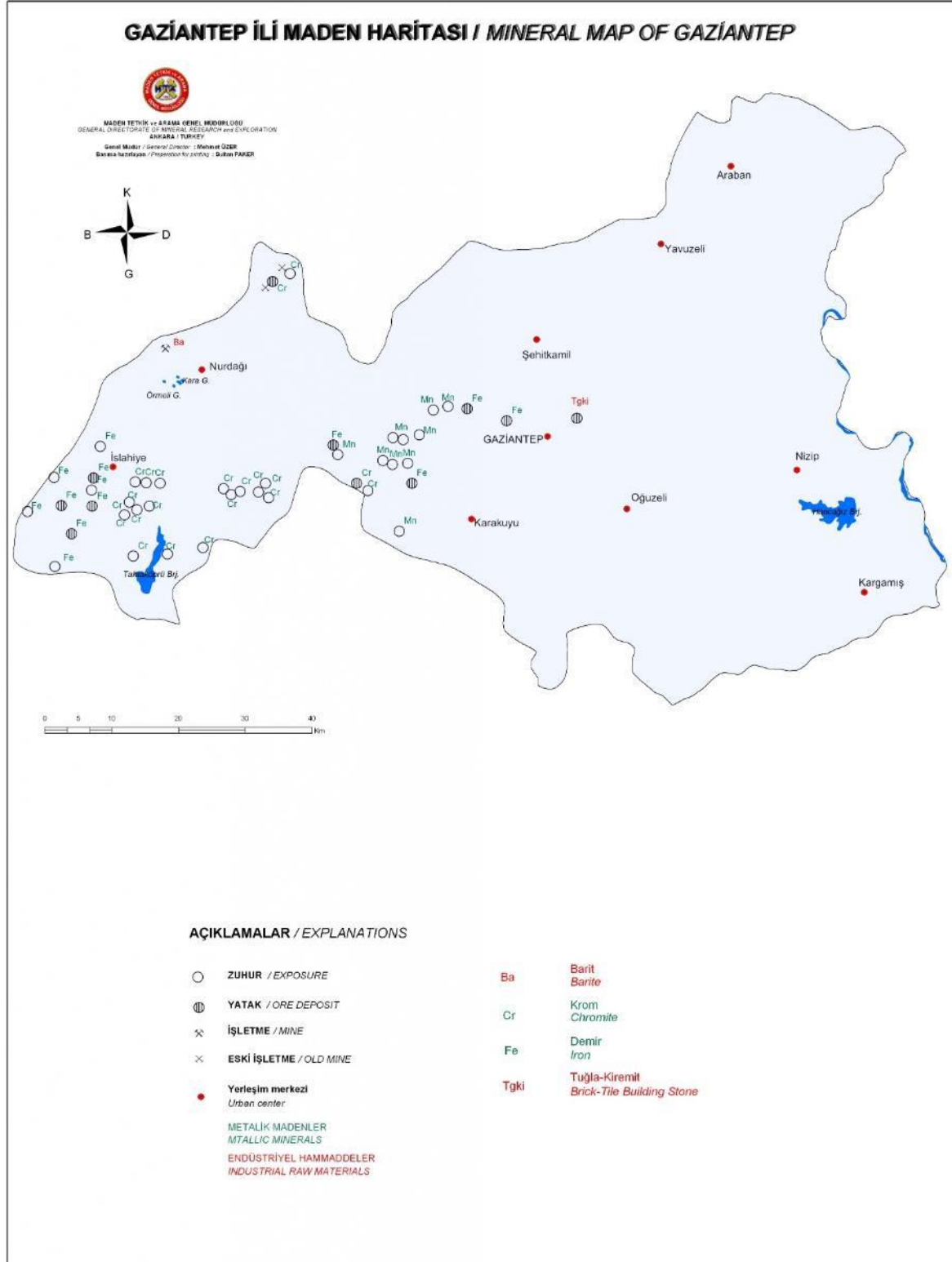


Figure 52. Mineral Map of Gaziantep Province

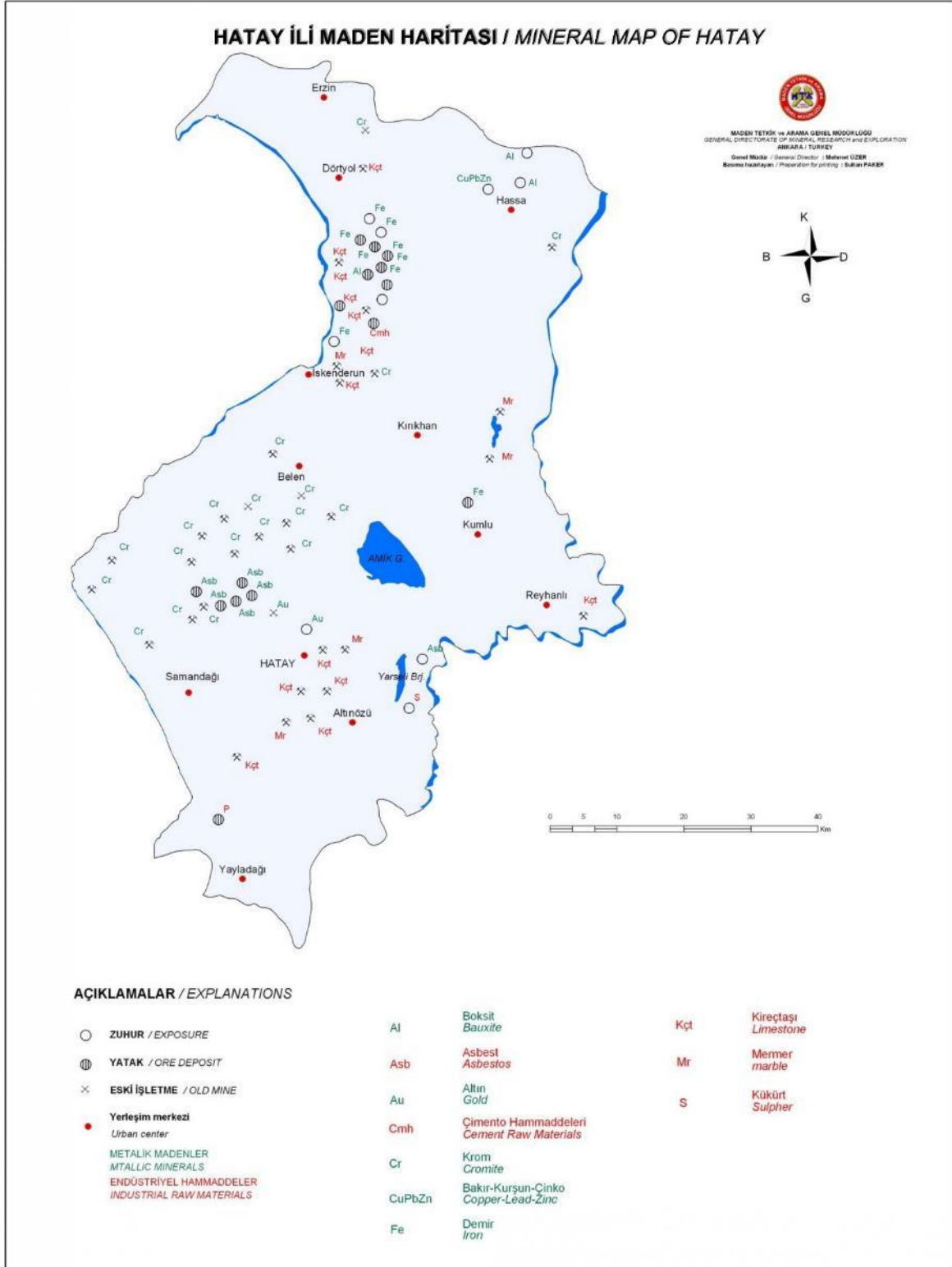


Figure 53. Mineral Map of Hatay Province

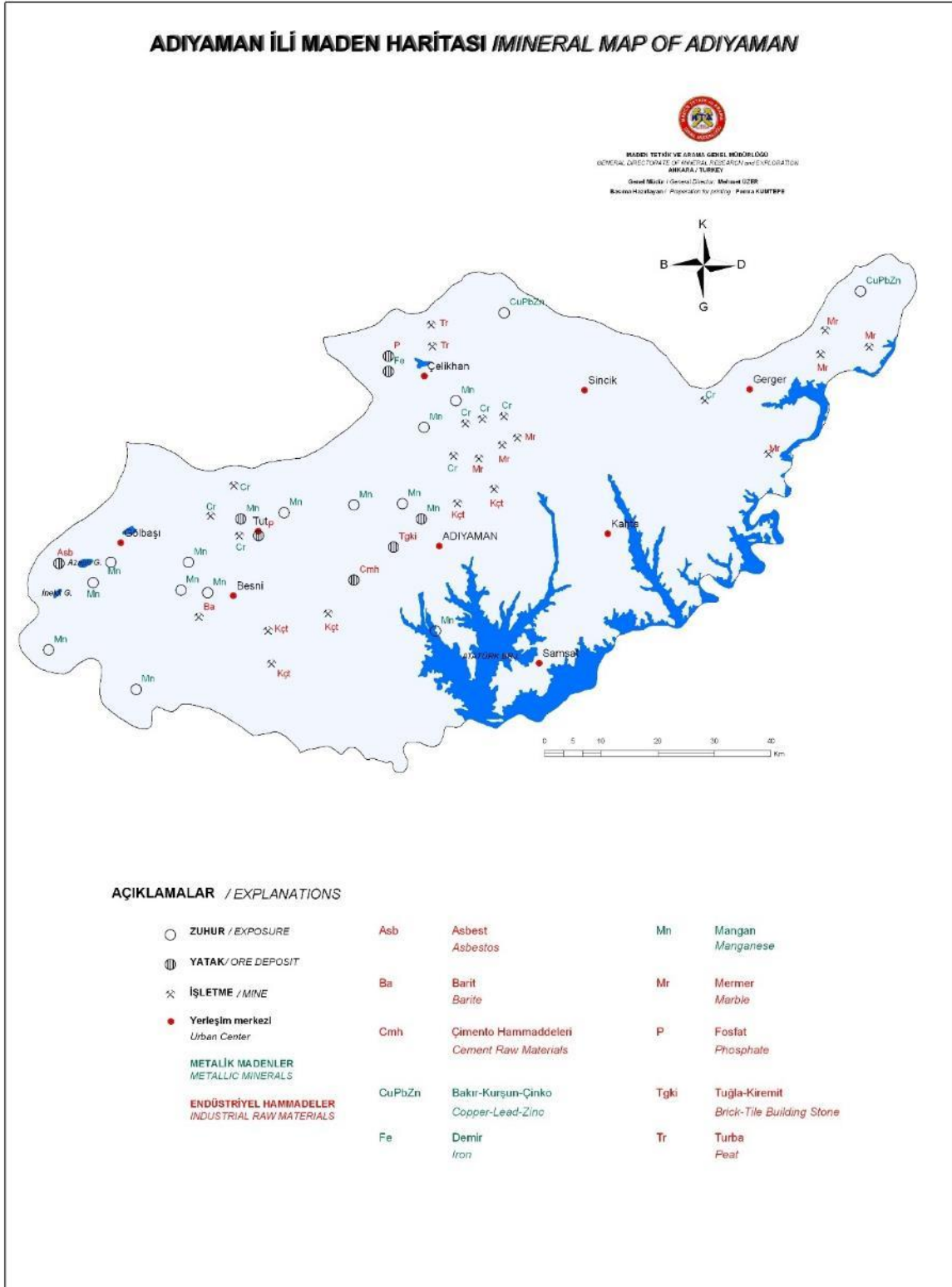


Figure 54. Mineral Map of Adiyaman Province

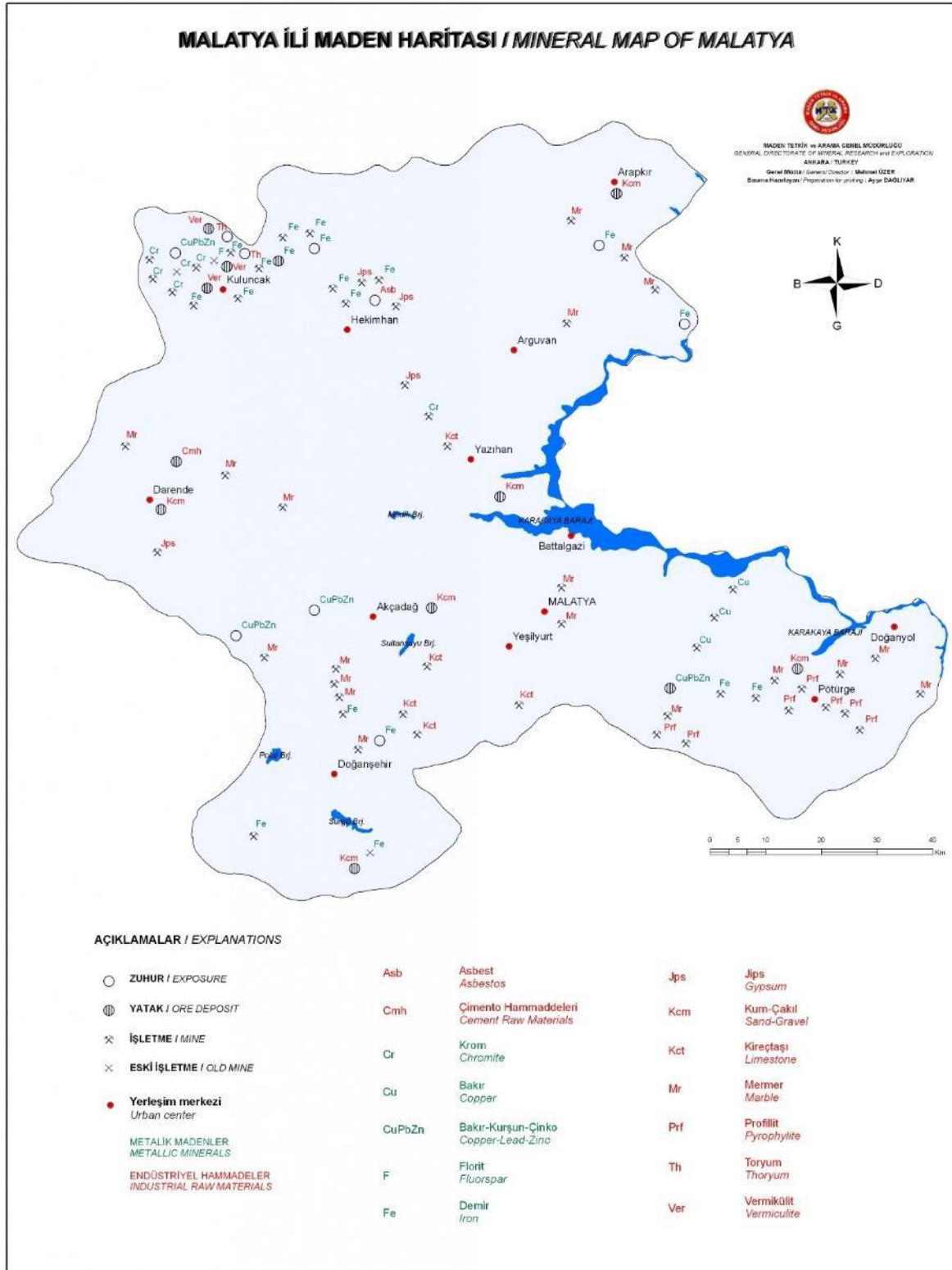


Figure 55. Mineral Map of Malatya Province

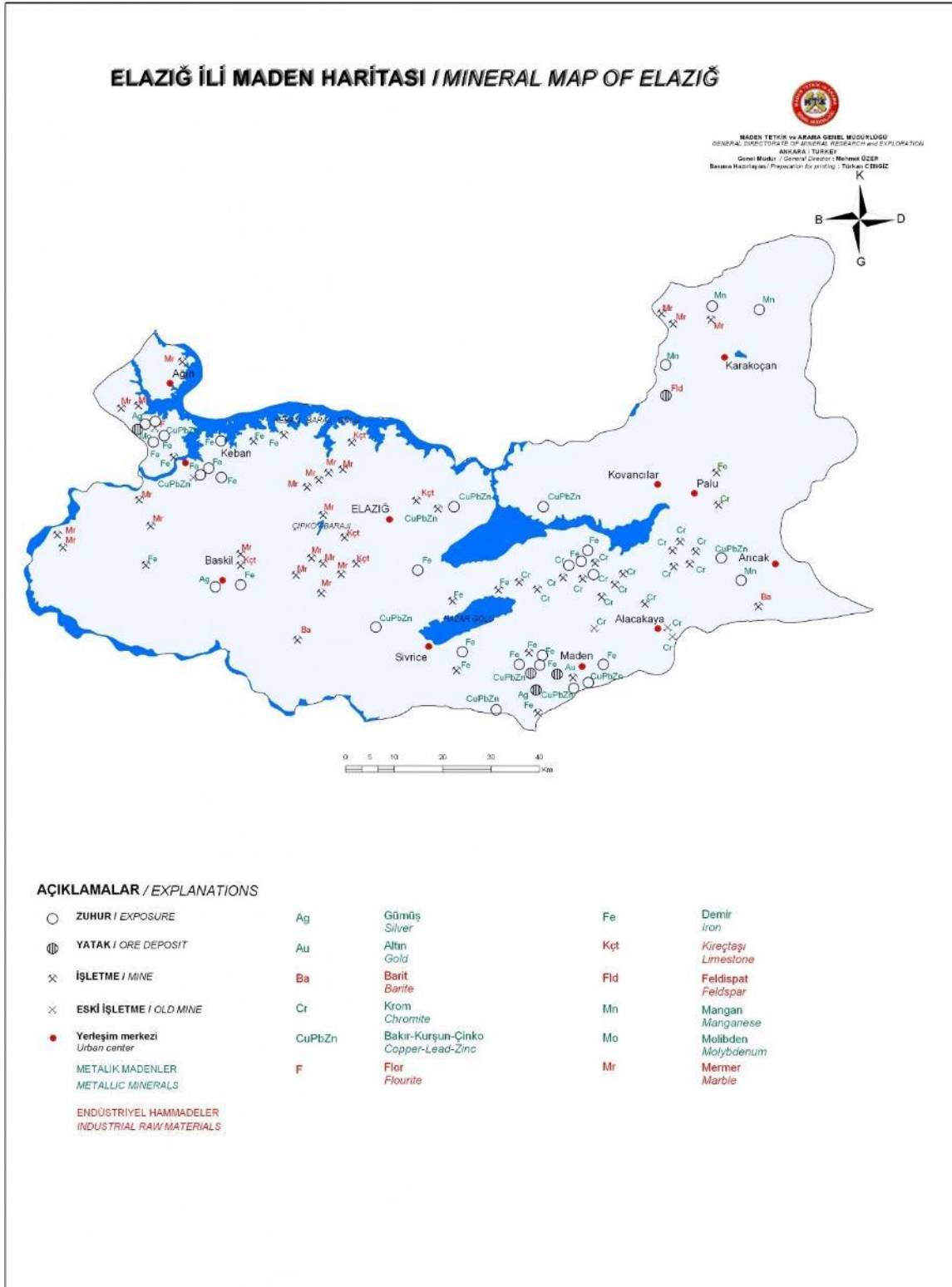


Figure 56. Mineral Map of Elazığ Province

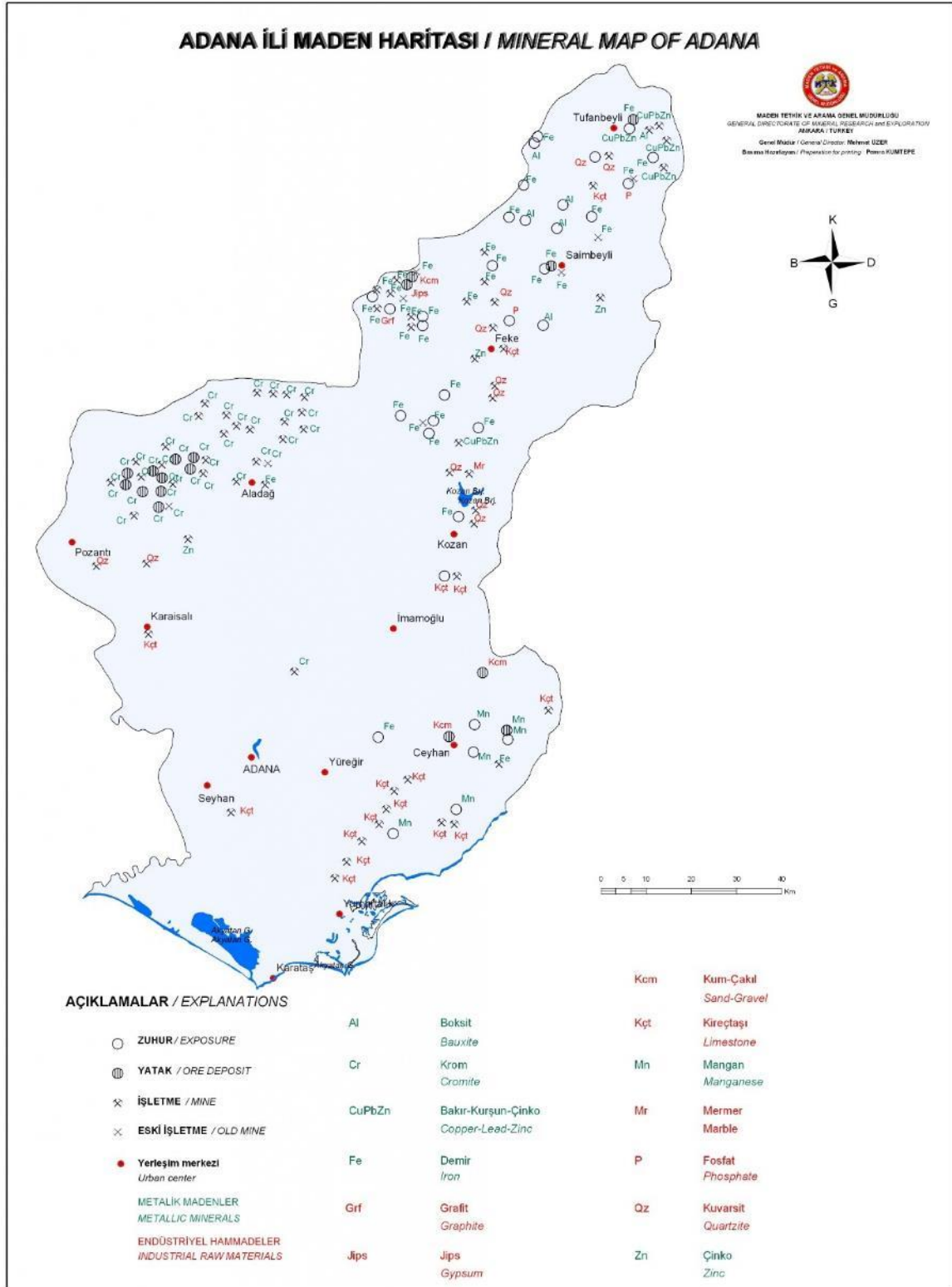


Figure 57. Mineral Map of Adana Province

4.5.2.1.1 Waste Generation Rates and Waste Management Infrastructure in the Region

Average daily waste generation values for the provinces located on the Project routes and Türkiye are presented in Table 75.

Table 75. Waste Statistics of the Project Locations (kg/day/person) (2022)

Location	Domestic (Non-Recyclable)*	Recyclable*	Total
Adana	0.567	0.243	0.81
Adıyaman	0.714	0.306	1.02
Elazığ	0.658	0.282	0.94
Gaziantep	0,609	0,261	0.87
Hatay	0.938	0,402	1.34
Malatya	0.525	0.225	0.75
Türkiye's average	0,721	0,309	1.03

*Recyclable and non-recyclable wastes have been calculated based on the Environmental Indicators published by the MoEUCC, General Directorate of Environmental Management (2022), which states that approximately 30% of generated municipal waste (by weight) consists of packaging (recyclable) waste.

Source: Turkstat Municipality Waste Statistics, <https://biruni.tuik.gov.tr/medas/?kn=119&locale=tr>

In Hatay province, there is the Gökçeğöz Sanitary Landfill, managed by the Hatay Metropolitan Municipality. It features a leachate collection system as well as an energy production system from landfill gas. Additionally, another Solid Waste Regular Landfill, which produces energy from landfill gas, falls under the responsibility of the İskenderun Körfez Solid Waste Association. Additionally, there is one Excavation Soil, Construction, and Demolition Waste Storage Site - along with eleven (11) Excavation Soil Rehabilitation Areas. On the other hand, according to the Packaging Information System (2022) data on zero waste management, there are 12 packaging waste recycling facilities located throughout the province (Provincial Environmental Status Reports for Hatay (2021)). At this point, it should be noted that there are difficulties not only in waste management in Hatay Province but also in regional waste management, as regional pressure on waste management increased after the February 6, 2023 earthquake and its effects are still ongoing. Therefore, effective implementation of the waste management hierarchy and best practices within the scope of the project is essential to prevent an additional burden.

In Gaziantep Province, there are two (2) solid waste sanitary landfill facilities, located in both the city center and Nizip district. In terms of Excavation Soil Management, there is one disposal site available. Additionally, there are 95 Packaging Waste Recovery Facilities throughout the province (Provincial Environmental Status Reports for Gaziantep (2021)).

In the center and districts of Adıyaman province, there are no sanitary landfill sites, but there are wild dumping areas. There are a total of seven (7) packaging waste recovery facilities in the province (Provincial Environmental Status Reports for Adıyaman (2021)).

In Malatya, the Malatya Metropolitan Municipality owns two separate sites: the Malatya Integrated Environmental Facility, which includes a separation plant, a refuse derived fuel facility, a gasification plant, a biomethanization unit, a sanitary landfill and plans for compost production, and the Kapıkaya Solid Waste Sanitary Landfill and Disposal Site. Additionally, there are 2 (two) excavation disposal sites for excavation management. Across the province, there are 4 (four) packaging waste recovery facilities (Provincial Environmental Status Reports for Malatya (2021)).

At the Solid Waste Sanitary Landfill Facility located in the central district of Elazığ, municipal wastes are regularly deposited, and electricity is generated from methane gas. Additionally, there are 2 (two) excavation disposal sites for excavation management. Across the province,



there is only one packaging waste recovery facility located (Provincial Environmental Status Reports for Elazığ (2021)).

In Adana, municipal wastes are disposed of at the Adana Integrated Solid Waste Disposal Facility, which includes a mechanical separation and biomethanization system, energy production facility and sanitary landfill. Additionally, there are 5 (five) excavation disposal sites for excavation management. Across the province, there are 38 packaging waste recovery facilities (Provincial Environmental Status Reports for Adana (2021)).

4.5.3 Impact Assessment and Mitigation Measures

In general, waste needs to be properly managed to avoid or minimize potential impacts on occupational and community health, safety, and the environment, as well as to prevent unbalanced loads on local waste management facilities (e.g., sanitary landfills). Even though the number of workers and the amount of construction machinery and equipment involved in the construction will be high, and significant volumes of earthworks will take place, the Project will mitigate impacts due to waste generation by complying with national legislation requirements and applying international waste management standards.

The assessment of impacts and the measures to be taken for minimizing resource use and managing waste during construction and operation phases of the project are provided below.

4.5.3.1 Land Preparation and Construction Phase

Wastes anticipated to be generated during the land preparation and construction phase include municipal solid wastes including recyclable packaging waste, excavation waste (i.e., the portion of excavation material that will not be reused on-site for cut and fill works), construction and demolition waste (as a result of excavation/dismantling of existing roads), wood, timber and metallic scraps, and hazardous waste such as waste oils, waste vegetable oils, end-of-life tires, contaminated materials, waste batteries and accumulators, waste electric and electronic equipment, and medical waste. In addition, wastes originating from the operation of quarries and borrow sites will also be generated.

According to the waste lists given in the annexes of the Waste Management Regulation, the types of waste and waste codes that may occur during the land preparation and construction phase of the Project are given in Table 76.

Table 76. General List of Wastes for the Land Preparation and Construction Phase

Waste Code	Waste Code Definition
01	Wastes Produced During Exploration, Extraction, Operation, Physical and Chemical Processing of Mines
01 01	Waste from Mine Excavations
01 04	Wastes from Physical and Chemical Processes of Non-Metallic Minerals
08	Waste From the Production, Formulation, Supply and Use of Primers (Paints, Varnishes and Vitreous Enamels), Adhesives, Pastes and Printing Inks
08 01	Wastes Arising from the Manufacture, Formulation, Supply and Use of Paint and Varnish and Dismantling
13	Waste Oils and Liquid Fuel Wastes (Except Edible Oils, 05 And 12)
13 01	Waste Hydraulic Oils
13 02	Waste Motor, Transmission, and Lubrication Oils
13 07	Wastes of Liquid Fuels
15	Waste Packaging, Unspecified Absorbents, Wiping Cloths, Filter Materials, and Protective Clothing
15 01	Packaging (Including Municipality's Separately Collected Packaging Waste)



Waste Code	Waste Code Definition
15 02	Absorbents, Filter Materials, Cleaning Cloths, and Protective Clothing
16	Wastes Not Otherwise Specified in the List
16 01	Wastes Arising from End-of-Life Vehicles in Various Types of Transport (Including Construction Machinery) and Dismantling of End-of-Life Vehicles and Vehicle Maintenance (except 13, 14, 16 06 and 16 08)
16 02	Waste Electrical and Electronic Equipment
16 04	Explosive Waste
16 06	Batteries and Accumulators
17	Construction and Demolition Wastes (Including Excavation Removed from Contaminated Areas)
17 01	Concrete, Brick, Tile, and Ceramic
17 02	Wood, Glass, and Plastic
17 03	Bituminous Mixtures, Coal Tar, and Tar Products
17 04	Metals (Including Alloys)
17 05	Soil (Including Excavation from Contaminated Sites), Stones, and Sludges from Bottom Cleaning
17 06	Insulation Materials and Construction Materials Containing Asbestos
17 08	Plaster-Based Construction Materials
17 09	Other Construction and Demolition Wastes
18	Wastes Arising from Human and Animal Health and/or Research in These Fields (Excluding Non-health-related Kitchen and Restaurant Wastes)
18 01	Wastes Arising from Birth, Diagnosis, Treatment, or Disease Prevention Studies in Humans
19	Wastes from Waste Management Facilities, Off-Site Wastewater Treatment Plants, and Water Preparation Facilities for Human Consumption and Industrial Use
19 08	Wastewater Treatment Plant Wastes Not Otherwise Specified
20	Municipal Wastes Including Separately Collected Fractions (Arising from Homes and Similar Commercial, Industrial, and Institutional Wastes)
20 01	Separately Collected Fractions (except 15 01)
20 02	Garden and Park Wastes (Including Cemetery Wastes)
20 03	Other Municipal Wastes

Excavation and Construction Waste

The Project will aim to maximize the use of excavated material to ensure resource efficiency, minimize the amount of material to be extracted from borrow sites, and reduce associated costs. Excavated material of sufficient quality for fill operations will be reused in the construction works, and the remaining material will need to be disposed of at designated storage sites.

The Contractor of each sub-project will determine the storage areas with sufficient capacity to store all excavated material. When sufficient storage areas are identified, the Project will not have an additional impact on existing local excavation waste disposal infrastructure capacities.

In addition to excavation waste, some of the temporary structures, junk materials and some other materials such as excess, unusable concrete will constitute construction waste. Recyclable waste like cement bags, metal scraps, packaging and wooden crates, etc. will be segregated from other wastes and stored temporarily on the site for eventual recycling process. Licensed companies will be contracted to remove the recyclable waste from the construction sites.



Non-Hazardous Municipal Solid Waste

Approximate amount of municipal waste expected to be generated was calculated (by using the average daily waste generation values for the provinces provided in Table 75) within the scope of each sub-project as shown in Table 77.

Table 77. Estimated Amount of Municipal Waste Generation for each Sub-project

Sub-project No	Sub-project	Corresponding Province	Estimated Number of Employees	Amount of Municipal Waste Expected to be Generated (tons/day)*	Amount of Recyclable Waste Expected to be Generated (tons/day)**
P1	Tarsus-Adana-Gaziantep (TAG) Motorway Rehabilitation	Gaziantep	200	121.8	36.5
P2	Hatay Province Roads Rehabilitation and Reconstruction	Hatay	200	187.6	56.3
P3	Antakya-Samandağ Road Reconstruction	Hatay	100	93.8	28.1
P4	Erkenek Tunnel Rehabilitation (including Malatya-Akçadağ-Gölbaşı Road)	Adıyaman and Malatya	150	92.9	27.9
P5	Tohma, Ağın and Beylerderesi Bridges Rehabilitation	Malatya and Elazığ	50	29.6	8.9
Total			700	525.7	157.7

* Source: Turkstat Municipality Waste Statistics, <https://biruni.tuik.gov.tr/medas/?kn=119&locale=tr> (see also Table 75). In projects covering more than one province, the average waste generation value was taken as basis.

**Approximately 30% of generated municipal waste (by weight) consists of packaging (recyclable) waste (General Directorate of Environmental Management (2022)).

It should also be noted that the Project will prioritize employment from the local population, meaning a large proportion of the personnel will be residents of the towns and neighborhoods along the project routes. As these local employees already contribute to the waste generation totals of their provinces, the actual increase in waste due to the Project will be minimal. Additionally, waste management training will be provided, and the separate collection of packaging waste will be encouraged at the related and auxiliary facilities to decrease the total amount of municipal waste sent to landfills. Therefore, the potential impact of the Project on the capacity of existing waste disposal infrastructure will be negligible. This impact will be temporary and will significantly reduce upon the completion of the construction phase.

Hazardous and Special Waste

During the land preparation and construction phase of the Project, various hazardous wastes will be generated as a result of the activities/works involving use of fuels, chemicals, paints, oils, solvents, etc. If not managed properly, hazardous wastes may result in soil, surface water and groundwater contamination, as well as health and safety issues for the local communities and the Project personnel.

The following hazardous and special wastes are anticipated to be generated as a result of the land preparation and construction activities along with the operation of concrete and asphalt plants. It should be noted that the earthworks will constitute a major part of the land



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preparation and construction phase and the amount of chemicals/hazardous substances to be used for the construction works are anticipated to be limited:

- Waste and materials (PPEs, rugs, clothes, etc.) contaminated with hazardous substances such as lubricants hydraulic fluids or fuels,
- The operation and maintenance of construction equipment and machinery requiring the use, storage and transfer of varying quantities of fuels and oils/lubricants,
- Solvents and paints to be used in construction activities,
- Herbicides and pesticides to be used in landscaping activities,
- Vegetable oils, batteries, electrical/electronic equipment, cables, fluorescent lamps, medical supplies to be consumed by Project personnel.
- Scrap metals and materials that contact with fuels, hazardous substances/chemicals, etc. at the workshops, laboratories, concrete plants, fuel stations, etc.,
- Waste tires and accumulators of the construction machinery.
- Mining and explosive wastes from the quarries and material borrow sites operations,
- Treatment sludge due to the operation of WWTP in construction and accommodation sites,
- Slurry and unused concrete originated from the concrete plants along with waste oil, bitumen and asphaltic concrete resulting from the operation of asphalt plants.

Hazardous and special wastes need to be properly managed to avoid significant impacts on both environmental receptors and human health. The Project will fully comply with the national waste legislation and apply international waste management standards in line with a Waste Management Plan based on the waste hierarchy, thus no significant impact is anticipated due to waste generation during the land preparation and construction phase of the Project.

Potential E&S impacts and risks originated from project activities during the land preparation and construction phase in terms of resource and waste management are summarized below:

- Raw material and energy usage due to the construction and rehabilitation activities together with operation of the quarry/material borrow site and other associated and auxiliary facilities.
- Possible impacts from storage of excavation surplus materials in case excavated materials are not reused/recycled, resulting in additional land occupation,
- Potential impacts of hazardous and non-hazardous solid wastes due to poor waste management, resulting in environmental pollution and occupational and community related health and safety risks.
- Additional load on the waste management facilities around the sub-project area in the absence of best management practices and effective waste management.

4.5.3.2 Operation Phase

Number of personnel and use of hazardous materials will significantly reduce during the operation phase. The operation phase will mainly involve recyclables and municipal wastes, while hazardous wastes from maintenance, repair, housekeeping and landscaping activities will also need to be properly managed during the operation phase. Generation of the following types of wastes is anticipated during the operation phase:

- Solid waste generated due to daily activities of the personnel to be employed at operating offices around to the highways,
- Road resurfacing waste (removal of old surface material),
- Road litter (including illegally dumped non-hazardous waste),
- Maintenance related hazardous waste (waste oils from maintenance vehicles, paint containers, hydraulic oils, packaging materials, PPEs, filters, and other material contaminated with hazardous substances, etc.),
- Sediment and sludge removed from storm water drainage systems,



- Landscape and vegetation related waste such as vegetation trimmings and mowed grass (non-hazardous),
- Removed paint materials,
- Maintenance and repair related waste,
- Roadkill (animal carcass).

According to the waste lists given in the annexes of the Waste Management Regulation, the types of waste and waste codes that may occur during the operation phase of the Project are given in Table 78.

Table 78. General List of Wastes for the Operation Phase

Waste Code	Waste Code Definition
08	Waste From the Production, Formulation, Supply and Use of Primers (Paints, Varnishes and Vitreous Enamels), Adhesives, Pastes and Printing Inks
08 01	Wastes Arising from the Manufacture, Formulation, Supply and Use of Paint and Varnish and Dismantling
13	Oil Waste and Liquid Fuel Waste (Except Renewable Oils, 05 And 12)
13 01	Waste Hydraulic Oils
13 02	Waste Motor, Transmission, and Lubrication Oils
13 07	Wastes of Liquid Fuels
15	Waste Packaging, Unspecified Absorbents, Wiping Cloths, Filter Materials, and Protective Clothing
15 01	Packaging (Including Municipality's Separately Collected Packaging Waste)
15 02	Absorbents, Filter Materials, Cleaning Cloths, and Protective Clothing
16	Wastes Not Otherwise Specified in the List
16 01	Wastes Arising from End-of-Life Vehicles in Various Types of Transport (Including Construction Machinery) and Dismantling of End-of-Life Vehicles and Vehicle Maintenance (except 13, 14, 16 06 and 16 08)
16 02	Waste Electrical and Electronic Equipment
16 06	Batteries and Accumulators
17	Construction and Demolition Wastes (Including Excavation Removed from Contaminated Areas)
17 04	Metals (Including Alloys)
20	Municipal Wastes Including Separately Collected Fractions (Arising from Homes and Similar Commercial, Industrial, and Institutional Wastes)
20 01	Separately Collected Fractions (Except 10,01)
20 02	Garden and Park Wastes (Including Cemetery Wastes)
20 03	Other Municipal Wastes

Potential E&S impacts and risks originated from project activities during the operation period in terms of resource and waste management are summarized below:

- Potential impacts of hazardous and non-hazardous solid wastes generated from maintenance, repair and housekeeping of the highways due to poor waste management, resulting in environmental pollution and occupational and community related health and safety risks.
- Additional load on the waste management facilities around the sub-project area in the absence of best management practices and effective waste management.

Impact significance and mitigation measures corresponding to relevant E&S impacts and risks are provided in Table 79.



Table 79. Impact Significances, Proposed Mitigation Measures and Value of Residual Impacts – Resource and Waste

Definition of Impact	Project Phase	Receptor	Magnitude of Impact					Sensitivity/ Value of Resource/ Receptor	Impact Significance (prior to mitigation or with existing mitigation)	Proposed Mitigation Measures	Residual Impact
			Extent	Reversibility	Duration	Frequency	Overall Magnitude				
Material and Energy Use	Land Preparation and Construction	Quarries/borrow sites to be selected, Energy demand, Local environment	Wide	Irreversible	Short term	Continuous	High	Low	Moderate	<ul style="list-style-type: none"> “EIA Positive” or “EIA Not Required” Decisions for the determined quarries and borrow sites will be taken. Additionally, environmental permits and/or exemption letters will be obtained for them, along with blasting permits and raw material production licenses. Energy efficient tools and equipment will be preferred and idling of vehicles will be prohibited. In a planned manner, unnecessary energy/fuel consumption will be avoided. In line with the waste mitigation hierarchy and resource efficiency strategy, reuse/recycle/recovery steps will be followed to prevent excess use of materials. To understand fluctuations in usage, monthly usage statistics will be obtained, and the cause of the fluctuations will be analyzed and recorded in the Resource Usage Monitoring Chart. 	Minor
Possible Impacts from Storage of Excavation Surplus Materials	Land Preparation and Construction	Environmental resources (soil, surface water, groundwater), Ecological receptors, Community health and safety	Wide	Irreversible	Short term	Continuous	High	Low	Moderate	<ul style="list-style-type: none"> Excavation material will be used as much as possible in filling works by providing separation of topsoil. Excavated material that cannot be used for filling operations will be stored in designated temporary storage areas where necessary permissions have been obtained and having sufficient capacity. The cut and fill program will be proceeded to minimize excavation wastes during excavation operations. 	Minor
Potential Impacts of Hazardous and Non-Hazardous Solid Wastes	Land Preparation and Construction	Environmental resources (soil, surface water and groundwater), Ecological receptors, Community health and safety, Health and safety of project staff	Restricted	Short-term reversible	Short term	Continuous	Medium	Medium	Moderate	<ul style="list-style-type: none"> C-ESMP will be developed and implemented by the Contractor by covering relevant E&S issues and all personnel will receive the necessary training on waste management. The requirements of the applicable regulations related to waste management will be followed for the management of all waste generated as a result of the project activities, Separation of wastes (hazardous / non-hazardous, recyclable / non-recyclable) and temporary storage in designated storage areas will be ensured. Packaging wastes made of plastic, metal, glass, paper and board, composite and similar materials will be collected separately from other wastes and given to Packaging Waste Collection, Segregation and Recovery Facilities licensed by the Ministry of Environment, Urbanization and Climate Change (MoEUCC). After segregating the municipal solid waste by collecting recyclable materials separately, the organic portion of the municipal solid waste will be collected by the municipalities in accordance with the waste collection agreements. Vegetable waste oils will be stored separately and collected by environmental licensed recovery facilities and vegetable waste oil interim storage facilities. Ensuring that waste storage areas meet the standards set by the national legislation and international standards: <ul style="list-style-type: none"> - Determining sufficient and appropriate storage areas and ensuring that conditions such as container types, labels and classifications are appropriate in these areas, - Ensuring impermeability on the grounds of storage areas against possible contamination of soil and groundwater, - Sufficient ventilation of the area under conditions where volatile wastes need to be stored, - Establishing a suitable drainage system against leaks, - Restriction of physical access to waste storage areas (through gates, fences, etc.); ensuring that only authorized persons can enter the storage areas, - Placing warning signs and panels with the name and contact number of authorized personnel in storage areas, - In order to be prepared for emergencies such as spillage, fire, absorbent materials, fire extinguishing equipment, etc. near the area. be ready, - Quick identification of any possible spillages / leaks by periodically performing visual checks in hazardous waste areas, Wastes are not spilled out of areas other than those reserved for this purpose will be ensured and all necessary waste management training and periodic repetition of these trainings will be provided to all personnel. Waste oils will only be transported by licensed transportation companies and will only be delivered to licensed recycling or disposal facilities. Stripped topsoil will be separated from general trash and organic, liquid, and chemical wastes on site, and stored in designated areas. Construction wastes will be regularly collected by licensed collectors at the permitted excavation waste storage site of the Municipality. All necessary precautions will be taken to prevent contamination of land. 	Negligible

Definition of Impact	Project Phase	Receptor	Magnitude of Impact					Sensitivity/ Value of Resource/ Receptor	Impact Significance (prior to mitigation or with existing mitigation)	Proposed Mitigation Measures	Residual Impact
			Extent	Reversibility	Duration	Frequency	Overall Magnitude				
										<ul style="list-style-type: none"> Waste batteries and accumulators will be delivered to waste battery and accumulator disposal facilities within the Municipal borders through authorized transportation companies. In cases when tires of the vehicles to be changed during construction activities; end-of-life tires will be delivered to the companies that distributes and sells tires via the authorized transportation companies in accordance with the Regulation on Control of End-of-Life Tires. Medical wastes will be collected in special containers in the infirmary and given to the licensed Medical Waste Disposal Facilities. The provisions of the "Medical Waste Control Regulation" will be complied with. No waste should be disposed of any receiving environment or burned at the construction site. Waste explosives and used explosive canisters will be labeled as explosive waste and stored separately in designated storage areas. Only authorized personnel will be permitted to handle these materials. Additionally, transportation of such waste will be carried out by firms holding relevant licenses. Waste records will be recorded by means of online platform of MoEUC on Integrated Environment Information System/Waste Management Application (Waste Declaration System). Hazardous wastes will be separated from other waste streams at the source to prevent cross-contamination. After temporarily storing hazardous wastes in designated areas with appropriate containment measures to prevent leaks or spills, they will be disposed of at licensed facilities. Hazardous waste deliveries will be made via MoTAT (Mobile Waste Tracking System) by ensuring selection of licensed recycling/recovery/disposal facilities. All personnel will receive periodic training on effective waste management, zero waste principles, and resource efficiency. 	
	Operation	Environmental resources (soil, surface water, groundwater), Ecological receptors, Community health and safety, Health and safety of project staff	Restricted	Short-term reversible	Long-term	Intermittent	Low	Medium	Minor	<ul style="list-style-type: none"> The requirements of applicable waste management regulations will be complied with for the management of all waste types generated as a result of the Project activities. Visual checks along the highway routes will be conducted to identify illegally dumped waste and litter. These wastes will be collected periodically. After collection, their characteristics (hazardous or non-hazardous) will be determined through analysis in accordance with related legislation. Based on recyclability, waste will be segregated and stored in separate containers. Finally, the wastes will be disposed of in line with relevant national waste management regulations. Recycling of road resurfacing waste should be conducted where feasible, by using the waste in reclaimed asphalt pavement, reclaimed concrete material, or as a base. Any waste caused by landscaping activities, drainage system maintenance, sediment removal, tree/shrub trimming, animal carcasses, waste tires, metal pieces, etc., will be removed immediately from the road surface and disposed of in accordance with the relevant national waste management regulations. Lead free paints will be used for maintenance activities. Herbicide and pesticide used for landscaping of the highways along with paint inventories used for maintenance operations will be managed to minimize waste generation. 	Negligible
Additional load on the waste management facilities around the sub-project area	Land Preparation and Construction	Local/regional waste management infrastructure	Wide	Irreversible	Short-term	Continuous	Medium	Low	Minor	<ul style="list-style-type: none"> In line with the waste management hierarchy and good practices, reuse and recycling practices will be preferred. Excavated material storage sites with sufficient number and capacity will be used in case the designated material storage areas are insufficient Waste disposal agreements will be made with the municipality and licensed recycling / disposal firms. 	Negligible
	Operation	Local/regional waste management infrastructure	Wide	Irreversible	Long-term	Intermittent	Medium	Low	Minor	<ul style="list-style-type: none"> It will be ensured that waste disposal agreements are established with municipalities and licensed recovery/disposal firms. 	Negligible

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4.6 Cultural Heritage

4.6.1 Methodology and Project Standards

Methodology

The baseline conditions of the cultural heritage elements within the study area have been characterized based on the findings of the desktop study conducted as part of the ESIA. Following data has been reviewed:

- Official correspondences with the Ministry of Culture and Tourism (MoCT)
- Provincial cultural inventories
- Data from Regional Council for the Conservation of Cultural Property (KVKBKM) of related provinces

Following the determination of intangible cultural heritage elements revealed by the desktop studies¹⁶¹⁷¹⁸¹⁹ in the project provinces, Mukhtar interviews were also conducted to obtain more information on intangible cultural heritage in the region.

Project Standards

Law on the Protection of Cultural and Natural Heritage:

As per Article 63 of the Constitution of the Republic of Türkiye, "The State shall ensure the protection of the historical, cultural and natural assets, and shall take supportive and promotive measures towards that end".

In line with the Constitution, movable and immovable cultural and natural assets are protected and shall be conserved under the Law on the Conservation of Cultural and Natural Property (Law No: 2863,1983).

Immovable cultural and natural property to be protected by legislation are specified under Article 6 of the Law as below:

- Natural property to be protected and the immovable property built until the end of the 19th century,
- The immovable property created after the mentioned date that the MoCT deems necessary to be protected considering its importance and characteristics,
- Immovable cultural property situated in the conservation site (As per the Law on Conservation of Cultural and Natural Properties (No. 2863, 1983), conservation site shall be the cities and remains of cities that are product of various prehistoric to present civilizations that reflect the social, economic, architectural and similar characteristics of the respective period, areas that have been stages of social life or important historical events with a concentration of cultural property and areas the natural characteristics of which have been documented to require protection.),
- Buildings that were stages of great historic events during the National War of Independence and the Foundation of the Republic of Türkiye that are not subject to time and registration rules due to their importance for national history, areas to be identified as such and houses used by Mustafa Kemal Atatürk,
- However, the immovable property not decided to be protected by the Conservation Councils on the basis of their architectural, historical, aesthetic, archaeological and

¹⁶ <https://hatay.ktb.gov.tr/TR-201517/somut-olmayan-kulturel-miras-sokum.html>

¹⁷ <https://malatya.ktb.gov.tr/TR-220546/turk-destani-dede-korkut-unesco.html#:~:text=T%C3%BCrk%20Destan%C4%B1%20'Dede%20Korkut'%20UNESCO,Korkutun%20temsil%20e diildi%C4%9Fi%20il%20oldu.>

¹⁸ <https://www.kulturportali.gov.tr/turkiye/malatya/kulturatlasi/dede-korkut->

¹⁹ <https://yakegm.ktb.gov.tr/TR-243105/unesco-somut-olmkultmiras-online-sergisi.html>



other important characteristics shall not be regarded as immovable cultural property to be protected.

- Rock-cut tombs, stones with inscription, painting, and relief, cave paintings, mounds (huyuk), tumuli, archaeological sites, acropolis and necropolis, castle, fortress, tower, wall, historic barrack, bastion and fortification with their fixed weaponry, ruins, caravanserai, khan, public bath and madrasah, cupola, tomb and tablets, bridges, aqueducts, waterways, cisterns and wells, ancient road ruins, stones indicating distance, stones with holes delineating ancient borders, obelisks, altars, shipyards, quays, ancient palaces, pavilions, dwellings, waterside residences and mansions, mosques, masjids, musallahs, namazgahs, fountains and sebils, imarethane (communal kitchen), mint, şifahane (hospital), muvakkithane (room for the mosque timekeeper), simkeşhane (silver shop), tekke (dervish lodge) and zaviyahs, cemeteries, hazire (graveyard), arasta, bedesten, bazaar, sarcophagi, stelae, synagogue, basilica, church, monasteries, külliye (complex of buildings adjacent to a mosque), ancient monuments and mural ruins, frescoes, reliefs, mosaics, chimney rocks and similar immovable are examples of immovable cultural property.
- Historic rock shelters, tree and tree populations with special characteristics and such are examples of immovable natural property.

The relevant requirements of the Law on Conservation of Cultural and Natural Property (No. 2863, 1983) applicable to the Project construction works are listed in Table 80.

Table 80. Applicable Requirements of the Law No. 2863

Article	Provision
Article 4 – Obligation to Notify	<p>Persons that discover movable and immovable cultural and natural property, owners, proprietors or occupants that know or have recently found out about the existence of cultural and natural property on the land they own or use shall be obliged to notify the nearest museum directorship or the village headman or the local administrators of other places within at the latest three days.</p> <p>If such property is in military garrisons and restricted areas, the relevant command levels shall be notified in line with the relevant procedure.</p> <p>The village headman, the local administrator receiving such notification or the relevant authorities that are directly notified of such property shall take the necessary measures to protect and secure such property. The village headman shall notify the nearest local administrator as of the situation and the measures taken on the same day. The local administrator and other authorities shall notify in writing the MoCT and the nearest museum within ten days.</p> <p>Upon receiving this notification, the Ministry and Museum Director shall instigate due proceedings as soon as possible in line with the provisions of this law.</p>
Article 5 – Quality of state property	<p>Immovable property belonging to the state, public institutions and organizations and movable and immovable cultural and natural property to be protected that is known to exist or will be discovered on an immovable property owned by real and legal persons subject to civil law shall have the quality of state property.</p> <p>Registered and annexed foundation property subject to a separate status due to its special qualities shall not be covered by this provision.</p>
Article 25 – Transfer to Museums	<p>MoCT shall classify and register based on scientific principles movable cultural and natural property declared to MoCT according to article four and movable cultural and natural property to be protected as specified in article 23. Antiquities that need to be conserved in state museums shall be duly transferred to museums.</p> <p>The criteria, procedures and principles for classification, registration and transfer to museums of movable cultural and natural property to be protected shall be specified in a regulation.</p> <p>The historical features of all kinds of weapons and materials concerning Turkish military history are carried out by Turkish General Staff.</p>

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In addition to the Law on Conservation of Cultural and Natural Property (Law No: 2863, 1983), secondary legislation (e.g. regulations, principal decisions) govern the procedures about the conservation of cultural and natural assets. The most prominent one being the Principal Decision No. 658 issued on 5 November 1999, which states that all archaeological sites need to be classified and protected according to their significant features. Three main categories are determined relevant to archaeological sites as:

- **1st Degree Archaeological Sites:** Areas requiring highest level of protection. They shall be preserved except for scientific excavations. The area shall be free of any type of buildings and construction. All kinds of construction, excavation, and modification activities are prohibited. However, for exceptional cases such as the necessity for essential infrastructure construction, Regional Preservation Boards may permit such activities based on the approval of the relevant museum and the head of the scientific excavation team.
- **2nd Degree Archaeological Sites:** Areas requiring medium level of protection. They shall be preserved based on the conditions of protection and utilization set by the Regional Preservation Boards. Additional construction is prohibited. As the 1st Degree Sites, for exceptional cases such as necessity for infrastructure construction among others, Regional Preservation Boards may permit such activities based on the approval of the relevant museum and the head of the scientific excavation team.
- **3rd Degree Archaeological Sites:** Lowest level of protection area. Construction is permitted based on the decisions of Regional Preservation Boards. Before applying for a construction permit, test pit excavations shall be conducted, and the outcomes of these excavations shall be reviewed by the relevant museum and, if present, the head of the scientific excavation team. Reviews shall be submitted to Regional Preservation Boards. The Boards may ask for extension of the coverage of test pits before taking any decision.

UNESCO put into effect the “Convention for the Safeguarding of the Intangible Cultural Heritage” in the 32nd General Conference held in Paris between September 29th and October 17th, 2003. The convention was officially accepted by the Republic of Türkiye with the “Law No. 5448 Regarding the Approval of the Convention of Safeguarding of Intangible Cultural Heritage on January 19th, 2006”. The intangible cultural heritage legally safeguarded by the relevant law was defined as follows:

“Cultural products and production processes such as oral narratives and oral traditions created by the folk in oral culture environments and included in folklore studies, performance arts, social practices, rituals and festivals, folklore, practices related to the universe and nature, handcraft traditions.”

4.6.1.1 International Conventions and Guidelines

Türkiye has ratified the following key international conventions regarding the cultural heritage, which are applicable to the Project:

- United Nations Educational, Scientific, and Cultural Organization (UNESCO), Convention on the Protection and Promotion of the Diversity of Cultural Expressions. Paris, 20 October 2005
- United Nations Educational, Scientific, and Cultural Organization (UNESCO), Convention for the Safeguarding of the Intangible Cultural Heritage. Paris, 17 October 2003.
- United Nations Educational, Scientific, and Cultural Organization (UNESCO), Convention on the Protection of World Cultural and Natural Heritage. Paris, 16 November 1972.



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- United Nations Educational, Scientific, and Cultural Organization (UNESCO), Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property. Paris, 14 November 1970.
- Convention for the Safeguarding of the Intangible Cultural Heritage. Paris, 17 October 2003.

In addition, the “Guidance on Heritage Impact Assessments for Cultural World Heritage Properties, ICOMOS 2011” has been taken into consideration.

4.6.1.2 International Standards

AIIB ESF-ESS 1: Environmental and Social Assessment and Management

Cultural resources encompass movable or immovable objects, sites, structures, groups of structures, and natural features and landscapes that possess archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance, including graveyards and individual grave sites. These resources may be found in urban or rural settings, above or below ground, or underwater. Their cultural importance can range from local to provincial, national, or even international levels.

Actions required for effective management of cultural resources include:

- **Conserve and Avoid Impacts:** Ensure preservation and prevent adverse effects on cultural resources during the project.
- **Review Documentation and Conduct Surveys:** Examine available records and conduct field surveys using qualified experts to assess cultural resources.
- **Integrate into ESMP or ESMPF:** Address cultural resources as a component of the Environmental and Social Management Plan (ESMP) or Environmental and Social Management Framework (ESMPF), or both if applicable.
- **Prepare Cultural Resources Management Plan:** Develop a plan to mitigate and monitor impacts on cultural resources when avoidance is not feasible. This plan may be incorporated into the ESMP/ESMPF or be standalone.
- **Implement "Chance Find" Procedures:** Establish pre-approved procedures for managing and conserving cultural resources that may be unexpectedly discovered during project site preparation or implementation.
- **Consider Disclosure of Information:** Consult with relevant stakeholders, including the Bank, to determine if disclosing information about cultural resources could compromise their safety or integrity. In cases where sensitivity is a concern, certain details may be withheld from public disclosure.

4.6.2 Baseline Conditions

4.6.2.1 Tangible Cultural Heritage

The provinces of Hatay, Gaziantep, Malatya, Adıyaman, and Elazığ in Türkiye are regions rich in archaeological and historical significance. These areas have been inhabited since ancient times, hosting numerous civilizations that have left behind a wealth of archaeological heritage.

Among these provinces, Hatay is one of the most historically significant provinces in Türkiye, known for its ancient city of Antioch (Antakya). Hatay stands out with its long and diverse history, having been inhabited and influenced by various civilizations including the Hittites, Assyrians, Persians, Greeks, Romans, Byzantines, and Ottomans. This historical tapestry has left a wealth of cultural and archaeological sites that reflect the region's significance through the ages.



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Gaziantep, historically known as Antep, has a rich history dating back to the Hittite period. The province is famous for the ancient city of Zeugma, which contains some of the most exquisite Roman mosaics. The Gaziantep Museum of Archaeology showcases many finds from the region. Other notable sites include the Gaziantep Castle, dating back to the Roman period, and various Ottoman-era structures.

Malatya has been an important settlement since the Hittite period, with significant archaeological sites such as Arslantepe, a mound that has revealed artifacts from the Hittite and Urartian periods. The city was also a notable center during the Roman and Byzantine periods. The Malatya Museum houses many artifacts from these excavations.

Adiyaman is home to the famous Mount Nemrut, a UNESCO World Heritage site, which features the tomb-sanctuary of King Antiochus I of Commagene. The site is renowned for its colossal statues and extensive archaeological remains. The province also contains the ancient city of Perre and the Roman bridge at Cendere.

Elazığ, historically known as Harput, has a rich history with notable archaeological sites such as the Harput Castle, dating back to the Urartian period. The region also includes remnants from the Byzantine and Ottoman periods. The Elazığ Archaeology and Ethnography Museum displays a wide array of artifacts from these periods.

Since the sub-projects P2 and P3 are passing through Hatay province, known as a cultural center, the desktop studies focused on this region. The area of influence for the cultural heritage was determined as a 2-km corridor extending each side of the roads undergoing rehabilitation and 2-km radius area around the boundaries of each related facility. The cultural heritage assets within this area are shown in Figure 58 and listed in Table 81. As it can be seen from the figure that most of the assets are located in Hatay province.



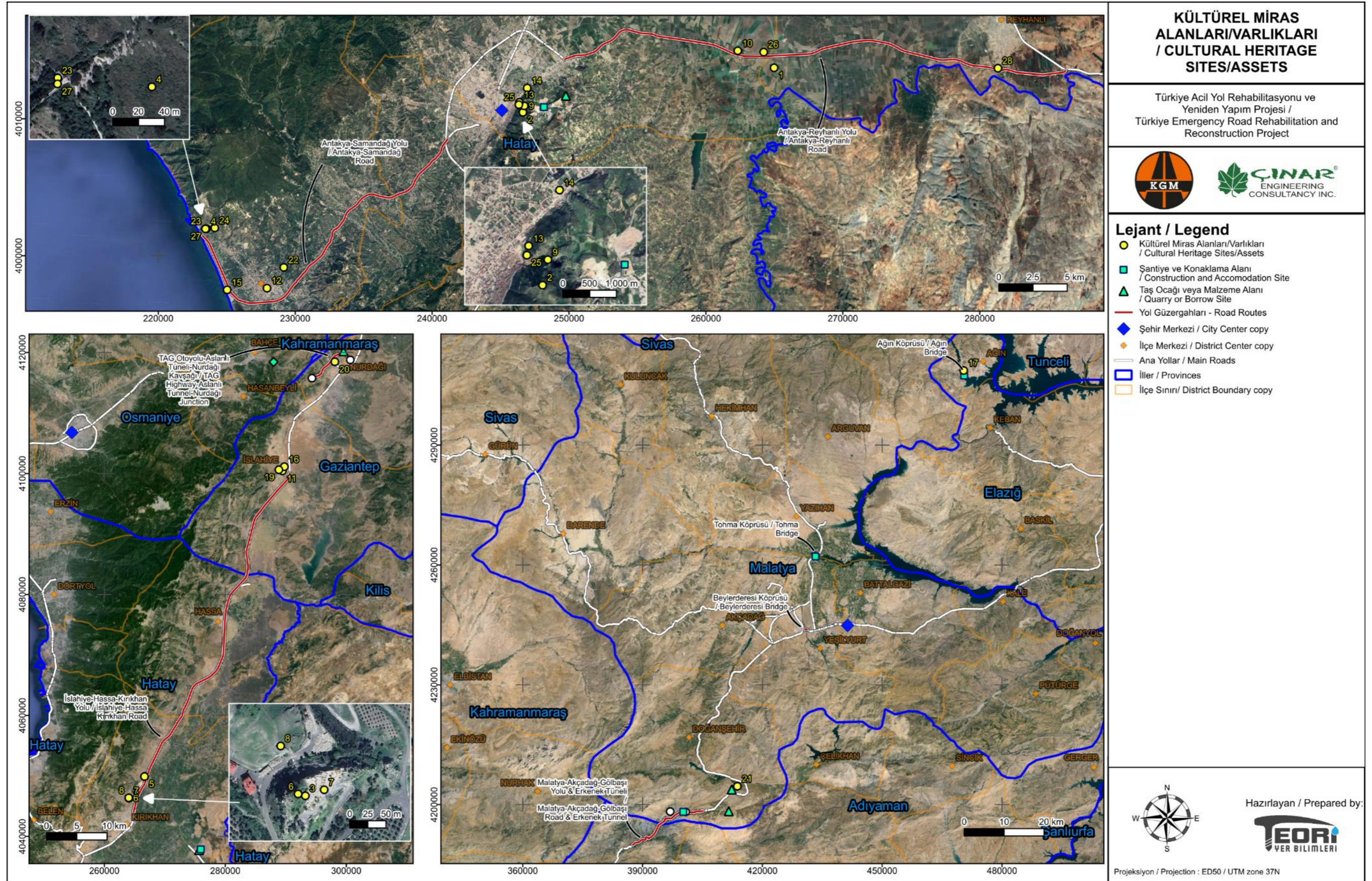


Figure 58. Cultural Heritage Assets

The table below shows the distance between cultural heritage assets and the nearest sub-project / related facility as measured by air distance. There are 28 registered assets within the area of influence (for the cultural heritage) of the project area, including all sub-project areas and related facilities. There are no cultural assets in the vicinity of Hatay Airport Road.

Table 81. List of Cultural Heritage Assets

No	Turkish Name of Asset	Category	Approximate Distance to the Project Area	
			Distance (km)	Closest Sub-project / Auxiliary Facility
1	Alalakh	Ancient City	0.86	Antakya-Reyhanlı Road
2	Antakya Kalesi	Castle	1.59	Kuruyer Construction Site
3	Bayezid-i Bestami Türbesi	Mausoleum	1.3	İslahiye-Hassa-Kırıkhan Road
4	Beşikli Mağara	Rock Tomb	0.58	Antakya Samandağ Road
5	Büyük Höyük	Tumulus	0.4	İslahiye-Hassa-Kırıkhan Road
6	Darb-ı Sak Kalesi	Castle	1.31	İslahiye-Hassa-Kırıkhan Road
7	Darb-ı Sak Kalesi Şeşmesi	Fountain	1.28	İslahiye-Hassa-Kırıkhan Road
8	Darb-ı Sak Su Kemerli	Aqueduct	1.35	İslahiye-Hassa-Kırıkhan Road
9	Demirkapı	Dam	1.45	Kuruyer Construction Site
10	Demirköprü Köprüsü	Bridge	0.3	Antakya-Reyhanlı Road
11	Derviş Paşa Camii, İslahiye	Mosque	1.28	İslahiye-Hassa-Kırıkhan Road
12	Ebu'l Fütuh Camii	Mosque	1.03	Antakya-Samandağ Road
13	Haron Kabartması	Statue	1.84	Kuruyer Construction Site
14	Hatay Arkeoloji Müzesi	Museum	1.86	Kuruyer Construction Site
15	Hz.Hızır Türbesi	Mausoleum	0.17	Antakya-Samandağ Road
16	İslahiye Tren İstasyonu	Train Station	1.42	İslahiye-Hassa-Kırıkhan Road
17	Karamağara Köprüsü	Bridge	1.01	Ağın Bridge
18	Nebi Yahya Nebi Hamza Türbesi	Mausoleum	1.33	Antakya-Samandağ Road
19	Nikopolis	Ancient City	1.89	İslahiye-Hassa-Kırıkhan Road
20	Nurdağı Kalesi	Castle	0.61	TAG Highway Aslanlı Tunnel Nurdağı Junction
21	Reşadiye Höyüğü	Tumulus	1.66	Reşadiye Limestone Quarry
22	Samandağ St. İlyas Rum Ortodoks Kilisesi	Church and Monastery	1.41	Antakya-Samandağ Road
23	Seleucia Köprüsü	Bridge	0.55	Antakya-Samandağ Road
24	Seleucia Pieria	Ancient City	1.04	Antakya-Samandağ Road
25	St. Pierre Kilisesi	Church and Monastery	1.84	Kuruyer Construction Site
26	Tell Tayinat	Tumulus	1.31	Antakya-Reyhanlı Road
27	Vespasianus Titus Tüneli	Tunnel	0.55	Antakya-Samandağ Road
28	Yenişehir Camii	Mosque	0.12	Antakya-Reyhanlı Road

Source: <https://kulturenvanteri.com/tr/>



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Within the scope of the project, opinions were obtained for each sub-project from the KVKBKM of the relevant province. The official correspondences were given in Appendix-2.2 and summarized in Table 82.

Table 82. Summary of the Official Correspondences regarding Cultural Heritage

No	Sub-project	Letter From	Opinion	Action
P1	TAG Highway	Gaziantep KVKBKM	In the inspections carried out in the sub-project area on 14.12.2023, it was determined that there were no immovable cultural assets within the scope of Law No. 2863 in the project area and its immediate surroundings.	No additional action required. Permit has been given for the sub-project.
P2	İslahiye-Hassa-Kırıkhan Road	Hatay KVKBKM	The sub-project is passing through; - 3 rd degree archaeological site section of the Saylak Mevkii Ancient Settlement - 3 rd degree archaeological site section of Çukurtarla Ruins	Road and intersection construction works have been allowed, provided that they remain within the existing road corridor. However, permission must be obtained from the Regional Conservation Board before any physical construction work is carried out in the protected areas mentioned and in the protected areas located near the Hassa-Kırıkhan State Road.
		Gaziantep KVKBKM	In the inspections carried out in the sub-project area on 14.12.2023, it was determined that there were no immovable cultural assets within the scope of Law No. 2863 in the project area and its immediate surroundings.	No additional action required. Permit has been given for the sub-project.
P2	Antakya-Reyhanlı Road	Hatay KVKBKM	The project intersects with: - Ilica Ancient Settlement 1 st degree archaeological site (Figure 59) - Kavalcık Necropolis 3 rd degree archaeological site (Figure 60) - Tell Tayinat Tumulus 1 st and 3 rd degree archaeological sites (Figure 61) The project route borders: - Bahlile Tumulus 3 rd degree archaeological site (Figure 62) - Askerçayırı 1 st degree archaeological site (Figure 63) - Reyhanlı Cemetery 1 st degree archaeological site (Figure 64) In the vicinity of the project: - Büyük Algene Tumulus 1st degree archaeological site (Figure 65) - Küçük Algene Tumulus 1st degree archaeological site (Figure 65)	Information and documents detailing the necessity of the superstructure improvement work planned for the overlapping areas, along with the project containing plans, sections, and views showing its relationship with the protected areas, and the technical report containing application details (such as width, length, depth, machinery to be used, etc.), must be submitted for evaluation by the board. No construction or physical activity should be carried out until permission is received from the institution regarding this part within the protected area.
P2	Hatay Airport Road	Hatay KVKBKM	In the inspections carried out in the sub-project area on 05.12.2023, it was determined that there were no immovable cultural assets within the scope of Law No. 2863 in the project area and its immediate surroundings.	No additional action required. Permit has been given for the sub-project.



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No	Sub-project	Letter From	Opinion	Action
P3	Antakya-Samandağ Road	Hatay KVKBKM	The project is located in the borders of Seleukeia Pieria Ancient City 1 st and 3 rd degree archaeological sites (Figure 66).	Information and documents detailing the necessity of the superstructure improvement work planned for the overlapping areas, along with the project containing plans, sections, and views showing its relationship with the protected areas, and the technical report containing application details (such as width, length, depth, machinery to be used, etc.), must be submitted for evaluation by the board. No construction or physical activity should be carried out until permission is received from the institution regarding this part within the protected area.
P4	Erkenek tunnel – Gölbaşı Road	Adıyaman KVKBKM Malatya KVKBKM	There is no protected area within the scope of Law No. 2863 or registered archaeological, historical, urban sites or immovable cultural assets that need to be protected in the sub-project area.	No additional action required. Permit has been given for the sub-project.
P5	Technological Bridges	Malatya KVKBKM Elazığ KVKBKM	There is no protected area within the scope of Law No. 2863 or registered archaeological, historical, urban sites or immovable cultural assets that need to be protected in the sub-project area. It has been determined that Ağin Bridge does not feature any cultural property within the scope of Law No. 2863.	No additional action required. Permit has been given for the sub-project.





Figure 59. Ilica Ancient Settlement 1st degree archaeological site



Figure 60. Kavalcık Necropolis 3rd degree archaeological site



Figure 61. Tell Tayinat Tumulus 1st and 3rd degree archaeological sites



Figure 62. Bahlile Tumulus 3rd degree archaeological site



Figure 63. Askerçayırı 1st degree archaeological site



Figure 64. Reyhanlı Cemetery 1st degree archaeological site



Figure 65. Büyük Algene and Küçük Algene Tumulus 1st degree archaeological sites

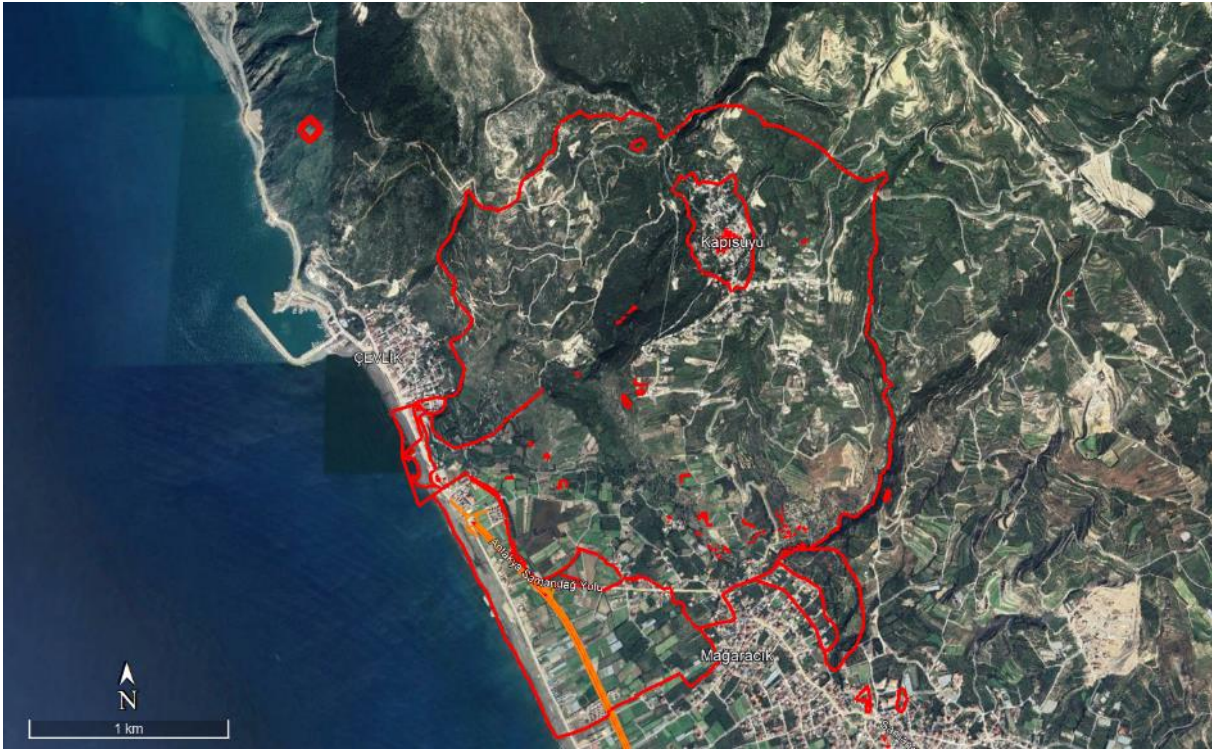


Figure 66. Seleukeia Pieria Ancient City 1st and 3rd degree archaeological sites

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4.6.2.2 Intangible Cultural Heritage

There are many intangible cultural heritages in the project provinces.

Cimem (Tıbayka-tıbak-sayni-sini): The history of Sini knitting, which is within the scope of vegetable knitting in Anatolia, dates back to the pre-Republican period. This handicraft, also known as vegetable tray knitting, or wheat stalk knitting, and generally known as "tıbayka, tıbak, cimem" in the region, continues to be done in some districts and villages of Hatay.

Hatay Laurel Soap (Gar) Soap: Also called Gar soap, it is a natural soap type that uses a mixture of olive oil and laurel oil. The main ingredient of laurel soap is laurel oil, which is obtained from the fruit of the laurel tree.

Hasnı (Prayer of Goodness, Prayer for Fertility, Prayer for Rain): Hasnı (prayer for rain and abundance) is generally applied in the autumn (September, October) months when drought occurs, but it is also seen to be applied in the summer months in some regions. The village headman, members and opinion leaders of the village take part in the preparation phase. A few people assigned by this group go around the houses one by one and collect olive oil, bulgur, wheat or money from the houses. A bull or a ram is bought with the money collected and this animal is slaughtered as a sacrifice.

Cheese Kunefe: Kunefe used to be cooked in ground stoves set up in the middle of Antakya's courtyard houses. Four stones were placed on the edge of the hearth and the stones were surrounded by embers. Nowadays, künefe is cooked on specially prepared barbecues.

Hatay Sarisi: Hatay yellow silk and silkworm farming are one of the important cultural elements of the region. Turkey's "Sericulture and Traditional Production of Silk for Weaving" was included in the List of Intangible Cultural Heritage of Humanity of the United Nations Educational, Scientific and Cultural Organization (UNESCO).

Gaziantep is one of the richest cities in Turkey in terms of intangible cultural heritage.

Antep Embroidery²⁰ is one of the important cultural elements of Antep, which is a candidate to be included in the UNESCO Intangible Cultural Heritage List.

Gaziantep Game and Toy Museum²¹ continues to transfer Gaziantep children's games, which are among the intangible cultural heritage items, to future generations.

Turkish Epic 'Dede Korkut'²² was unanimously accepted to the UNESCO World Intangible Cultural Heritage Representative List. Malatya Province, one of the Project Provinces, was the province where Dede Korkut was represented. Battalgazi Epic is an Intangible Cultural Heritage item of Malatya²³.

In Malatya Province, studies are also carried out on the forgotten Intangible Cultural Heritage items. Crocus Day²⁴, which is one of the other names and practices of Nevruz, an intangible cultural heritage, and the Crocus Festival in the Kurşunlu Town of Malatya's Hekimhan District is one of them.

During the field visit, no intangible cultural heritage elements were identified in the settlements within the scope of Project Aol. In addition, the mukhtars stated that not only within Project Aol but also in the provinces affected by the earthquake, especially in Hatay, the regional intangible cultural heritage elements could not be sustained, considering the very low population due to the earthquake and the living conditions after the earthquake. Almost all of the Mukhtars stated

²⁰ <https://www.gaziantep.bel.tr/tr/haberler/gelecege-tasinmasi-icin-antep-isi-nakisi-unesco-yolunda>

²¹ <https://gaziantep.ktb.gov.tr/TR-174062/gaziantep-oyun-ve-oyuncak-muzesi.html>

²² <https://malatya.ktb.gov.tr/TR-220546/turk-destani-dede-korkut-unesco.html#:~:text=T%C3%BCrk%20Destan%C4%B1%20'Dede%20Korkut'%20UNESCO,Korkutun%20temsil%20e dildi%C4%9Fi%20il%20oldu.>

²³ <https://malatya.ktb.gov.tr/TR-321674/somut-olmayan-kulturel-miras-toplantisi-yapildi.html>

²⁴ https://sobider.com/?mod=makale_tr_ozet&makale_id=31490



that the intangible cultural heritage elements were also negatively affected after the earthquake, as a large proportion of the population that maintained the intangible cultural heritage in the region was no longer present in the region.

The following assessment was included in the UNESCO Turkey National Commission Committee Reports, a report confirming the mukhtars' statements on this issue:

"The protection and transmission of intangible cultural heritage is related to the community and the daily life of the community. Ceremonies and practices related to death, which is one of the transition periods, have the function of comforting the relatives of the deceased culturally and psychologically, in addition to the relevant religious rituals. The fact that funeral ceremonies or mourning rituals could not be performed during this period made it difficult for individuals to continue their daily lives."

In addition, intangible cultural heritage items in the settlements within the project impact area are not items that may be affected by the Project. The interviewed mukhtars also gave examples of handmade crafts (Hatay-Defne) and local stories (Malatya-Dede Korkut). None of the Mukhtars stated that the intangible cultural heritage elements in their regions were affected by the Project activities.

The project will not have an impact on any intangible cultural heritage item in the region.

4.6.3 Impact Assessment and Mitigation Measures

Following impacts may occur on cultural heritage assets during the construction phase of the sub-projects and operation phase of related facilities:

- Heavy machinery, excavation, and blasting can cause physical damage to archaeological sites, structures, and artifacts.
- Vibrations from construction activities can destabilize ancient structures and lead to cracks or collapses.
- Explosive materials used in quarries can cause shockwaves that damage nearby archaeological sites.
- Earthmoving and grading can alter the landscape, potentially uncovering and disturbing buried archaeological resources.
- Heavy vehicle movement can inadvertently damage nearby cultural assets due to their weight and vibrations.

General management measures applicable to different types of sites are given in Table 83. Specific measures and actions stipulated by the relevant cultural heritage authorities in their official decisions will be implemented for the management of potential cultural heritage impacts as part of the Project.

Table 83. General Management Measures Applicable to Different Type of Sites

Site Type	General Management Measures
Registered Sites or Sites in the Process of Registration as per the Law No. 2863	<ul style="list-style-type: none"> ▪ Avoiding physical intervention ▪ Archaeological monitoring for potential disturbance of the project activities. ▪ Following the decisions of the relevant Regional Council
Archaeological Site	<ul style="list-style-type: none"> ▪ Avoiding physical intervention ▪ Notify the cultural heritage authorities ▪ Mark as archaeological sensitive area in the Project/construction drawings and quarry plans ▪ Avoiding physical intervention/construction until the final decision of the Regional Council is Issued ▪ Following/implementing the decisions of the Regional Council (e.g. test or salvage excavation, if required)



Site Type	General Management Measures
Other Sites including the remains of a historic bridge, a grave/graveyard, fountain etc.	<ul style="list-style-type: none"> ▪ Archaeological monitoring for implementation of Regional Council decision. ▪ Avoiding physical intervention ▪ Notify the cultural heritage authorities. ▪ Relocation of moveable cultural heritage asset where applicable ▪ Consideration of Project alternatives in case of immovable cultural heritage assets where applicable ▪ Avoiding physical intervention/construction until the final decision of the Regional Council is Issued ▪ Following/implementing the decisions of the Regional Council (e.g. technical documentation, measured drawing, etc., if required) ▪ Archaeological monitoring for implementation of Regional Council decision.

No new road construction or road expansion is planned within the scope of the project. Construction works will be carried out within the existing expropriation corridor. However, as it was stated in Table 82, final approval from the relevant institutions must be obtained prior to the construction works at the mentioned archaeological sites.

Additionally, relevant Museum Directorate must be notified in case of any chance finds during construction works by avoiding physical intervention. Chance Find Procedure (CFP) (see Appendix-2 of ESMPs) will be executed in the event of a discovery of a Chance Find during the land preparation and construction activities. Training on implementation of CFP will be provided to all personnel (including Contractor and Sub-contractors). Contractor will be responsible for complying with the CFP for on-site activities.

It is expected that the project will not have an impact on any intangible cultural heritage item in the region, as indicated in baseline section. In addition, as a measure, active stakeholder engagement should continue to identify any possible intangible cultural assets. Any intangible cultural heritage that may be identified will be considered and managed in line with the applicable principles of ESS1 and UNESCO Convention for the Safeguarding of the Intangible Cultural Heritage.

It is assessed that the project will not have adverse impacts on cultural heritage receptors if the proposed mitigation measures are implemented throughout the project.

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4.7 Biological Environment

The biological environment covers topics such as habitat classification, terrestrial flora and fauna, invasive alien species, and critical habitat assessment. Ph.D. Levent Biler and M.Sc.c. Gamze Kaya surveyed the sites in March 2024. Observations were conducted at all sub-project locations.

4.7.1 Methodology

The baseline data for the biological environment of the project area and project Biodiversity Survey Area (BSA) are gathered from previously published scientific work, literature information on habitats and species, field surveys and expert judgement. The ecological study was conducted with the following objectives:

- Using various standard techniques, assess the status of major floral and faunal components of all terrestrial habitats (grassland, agro-ecosystem, and homestead plantation) present in the Project BSA;
- Data collection and compilation on the status of floral and faunal components and habitats;
- Provide quantitative data on various floral and faunal components;
- Identification and listing of floral and faunal species of conservation significant (CR, EN, VU and threatened and endemic species in accordance with the International Union of Conservation for Nature - IUCN RED List) in the Project BSA; and
- Identification of conservation-sensitive areas (which are given in Section 3.2 - Legally Protected and Internationally Recognized Areas of High Biodiversity Value) in the Project BSA.

Some of the general methodologies for field surveys can be listed as the following:

- In determining sampling/vantage points, locations that represent different habitat types and those that had been identified to be significant to species were considered.
- Some of the flora and fauna species were recorded through direct observations.

Methodology for Terrestrial Flora Species

To identify the flora composition of the Project BSA, first sampling points representing the habitat type in the area were determined during the scoping phase. For assessment of Project-related impacts, field surveys were conducted at different locations in the Project area. At each of the sampling locations, flora species were identified based on related findings and observations.

Methodology for Amphibians and Reptiles Species

The detection of amphibians and reptiles in the Project BSA is based on field observations, previously prepared reports in the region, a detailed literature study and the ecological structure of the region.

Field surveys started with daylight in the morning and continued until dusk for nocturnal species. In order to detect frogs and reptiles, stone and rock bottoms and rock crevices were checked during the fieldwork.

Field surveys were conducted to identify and observe habitats suitable for the life of frogs and reptiles. The "Visual Contact Research Technique, GTAT (Visual Encounter Survey, VES) was used to detect the presence of frog and reptile species during the observations". In field surveys, after identifying and photographing the species caught by hand, they were released back into the wild to avoid disrupting the ecological balance.



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During the detection of frogs and reptiles, species were tried to be determined by direct observation as well as indirect observation. During the above-mentioned surveys, auxiliary materials such as tonk (snake catching tongs), protective leather gloves, notepads, satellite images, digital cameras with telephoto lenses were used.

Methodology for Birds

The detection of birds in the Project BSA is based on field observations, previously prepared reports in the region, a detailed literature study and the ecological structure of the region.

During the survey, the specified study areas was visited, and bird observation surveys were carried out with line transect and point transect methods²⁵. All heard and seen species and their numbers were recorded and identified at species level.

Methodology for Mammals

The detection of mammals in the Project BSA is based on field observations, previously prepared reports in the region, a detailed literature study and the ecological structure of the region.

Direct and indirect observation techniques were used to detect mammals. Also, species prints were determined by collecting fragments such as footprints and feces. A 1/25.000 scale topographic map of the region, satellite images, Magellan handheld GPS, Nikon D7200 DSLR Camera, Sigma 18-50 mm lens, Sigma 55-300 mm lens, 600-800 mm Telescope 1000 mm Telescope lens, lens, Nikon 8x40 binoculars, notepad, and other auxiliary materials were used during the above-mentioned survey.

4.7.2 Project Standards

This section lists Turkish legislation and international standards for managing nature, biodiversity, and wildlife during construction activities.

National Legislation

The General Directorate of Nature Conservation and National Parks is the authority in charge of biodiversity conservation. The National Parks Law and Land Hunting Law, both published by the General Directorate, as well as relevant regulations, communiqués, and announcements, are examples of national biodiversity legislation. KGM will follow all relevant project standards, statutory requirements, permit and license conditions, and obtain all necessary permits and licenses. The relevant legislations are listed in Section 2.1.

International Standards and Principles

Environmental criteria of the AIIB ESS1 and EU regulations will also be considered during Project implementation. These criteria include but are not limited to following international conventions ratified by Türkiye and international standards:

- Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention),
- The Convention on Biological Diversity of United Nations (The Convention was opened for signature at the Earth Summit in Rio de Janeiro on 5 June 1992 and entered into force on 29 December 1993),
- UNESCO Convention Concerning the Protection of the World Cultural and Natural Heritage) (1972),

²⁵ Bibby, C.J., Burgess, N.D., Hill, D.A. and Mustoe, S.H. 2000. Bird census techniques. Academic Press, London.



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- The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES Convention Signed at Washington, D.C., on 3 March 1973 Amended at Bonn, on 22 June 1979),
- The Convention on Wetlands of International Importance, especially as Waterfowl Habitat (Ramsar Convention signed in Ramsar, Iran, in 1971),
- The European Landscape Convention (adopted on 20 October 2000 in Florence of Italy and came into force on 1 March 2004 (Council of Europe Treaty Series no. 176),
- AIIB ESS 1 Environmental and Social Assessment and Management.

AIIB Environmental and Social Framework

Environmental and social sustainability are critical components of the AIIB's support for infrastructure development and increased interconnectivity in Asia. The Bank's ESF is a system that helps the bank and its clients achieve environmentally and socially sustainable development goals. It accomplishes this by incorporating best international practices in environmental and social planning, as well as risk and impact management, into Bank-supported project decision-making, preparation, and implementation.

AIIB has an ESF designed to ensure that projects financed by the Bank are environmentally sustainable and socially inclusive. The framework establishes the policies and mandatory requirements that AIIB-financed projects must meet.

All activities to be carried out during the construction and operation phase of the Project will be carried out in accordance with the AIIB ESF and ESS1 and national regulatory requirements. These standards, requirements and guidelines collectively create the Project Standards. KGM and Contractor commits to carry out the Project activities of the Project in accordance with the Project Standards.

4.7.3 Biodiversity Survey Area (BSA)

A biodiversity survey area describes a designated area where studies and research related to biological diversity are conducted. The term "biodiversity" describes the range of life forms on Earth, encompassing species diversity, genetic diversity within species, and ecosystem diversity. Studying biodiversity is crucial to comprehending, recording, and protecting the variety of life forms on Earth. This area is determined based on the type and impact of relevant projects.

The Project and related sites are located within seven (7) Provinces, including Adana, Osmaniye, Hatay, Gaziantep Malatya, Adıyaman, and Elazığ Provinces. To identify impacts of the Project on biodiversity and to conduct critical habitat assessment in line with the provisions of the AIIB ESS1, 100 m buffer to each research area (100 m for all construction areas and facilities) was considered as the Biodiversity Survey Area (BSA). The BSA of all Project components are given in Appendix-3.3.



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4.7.4 Habitat Classification

The European Nature Information System (EUNIS) puts forward a system for identification and classification of European habitat types. Classification area is quite large including the entire European mainland and seas including islands that are close to the mainland (except for Cyprus, Iceland and Greenland), EU states' archipelagos (Canary Islands, Madeira Islands and Azore Islands) and the European mainland to the west of Ural Mountains that cover Türkiye and the Caucasus. The main objective of the EUNIS habitat classification is to create a European reference set of habitat types including a description of all types and hierarchical classification.

Habitats within the project BSA are evaluated in accordance with the EUNIS classification, which is useful in terms of not only relating the national classifications to international level, but in terms of corresponding EUNIS habitats to habitats listed in Annex I of Habitats Directive for "designation of special areas of conservation" and the European Red List of Habitats for the critical habitat assessment.

Natural habitat types of the project BSA, related EUNIS codes, corresponding Habitat Directive Annex I habitats and Natura 2000 codes, as well as the European Red List categories are presented in Table 84.

The maps showing the EUNIS habitats are provided in Appendix-3.4.



Table 84. Habitat of the Project BSA

EUNIS Habitat Type	Habitats Directive Annex I	Natural/Modified
TAG Highway-Aslanlı Tunnel- Nurdağı Junction		
I1.2 : Mixed crops of market gardens and horticulture	-	Modified
E1.2E - Irano-Anatolian steppes	Annex-I	Natural
J3.2 : Active opencast mineral extraction sites, including quarries	-	Modified
J4.2 : Road networks	-	Modified
G5.2 - Small broadleaved deciduous anthropogenic woodlands	-	Natural
G4.6 - Mixed Abies - Picea - Fagus woodland	-	Natural
Ceyhan Construction and Accommodation Site		
I1.2 : Mixed crops of market gardens and horticulture	-	Modified
J4.2 : Road networks	-	Modified
J2.3 - Rural industrial and commercial sites still in active use	-	Modified
Başpınar Limestone Quarry		
I1.2 : Mixed crops of market gardens and horticulture	-	Modified
J4.2 : Road networks	-	Modified
G5.2 - Small broadleaved deciduous anthropogenic woodlands	-	Natural
Tatarlı Basalt Quarry		
J3.2 - Active opencast mineral extraction sites, including quarries	-	Modified
F6.2 - Eastern garrigues	-	Natural
Bahçe (Ayran) Concrete Plant		
I1.2 - Mixed crops of market gardens and horticulture	-	Modified
J3.2 - Active opencast mineral extraction sites, including quarries	-	Modified
J4.2 - Road networks	-	Modified
H5.6 - Trampled areas	-	Natural
G3.7 - Lowland to montane mediterranean Pinus woodland (excluding Pinus nigra)	Annex-I	Natural
İslahiye-Hassa-Kırkhan Road		
C2.3 - Permanent non-tidal, smooth-flowing watercourses	Annex-I	Natural



EUNIS Habitat Type	Habitats Directive Annex I	Natural/Modified
E1.2 : Perennial calcareous grassland and basic steppes	Annex-I	Natural
E1.E - Trampled xeric grasslands with annuals	-	Natural
FB.3 - Shrub plantations for ornamental purposes or for fruit, other than vineyards	-	Modified
FB.4 - Vineyards	-	Modified
G1.D4 - Fruit orchards	-	Modified
G3.7 - Lowland to montane mediterranean Pinus woodland (excluding Pinus nigra)	Annex-I	Natural
G5.6 - Early-stage natural and semi-natural woodlands and regrowth	Annex-I	Natural
H5.6 - Trampled areas	-	Natural
I1.2 - Mixed crops of market gardens and horticulture	-	Modified
J1.1 - Residential buildings of city and town centres	-	Modified
J2.2 - Rural public buildings	-	Modified
J3.2 - Active opencast mineral extraction sites, including quarries	-	Modified
J4.2 - Road networks	-	Modified
Kızilkaya Limestone Quarry, Kızilkaya Construction and Accommodation Site		
FB.3 - Shrub plantations for ornamental purposes or for fruit, other than vineyards	-	Modified
G5.6 - Early-stage natural and semi-natural woodlands and regrowth	Annex-I	Natural
I1.2 - Mixed crops of market gardens and horticulture	-	Modified
J3.2 - Active opencast mineral extraction sites, including quarries	-	Modified
Hatay Airport Road and Deep Soil Mixing Stations		
I1.2 - Mixed crops of market gardens and horticulture	-	Modified
J4.2 - Road networks	-	Modified
C2.3 - Permanent non-tidal, smooth-flowing watercourses	Annex-I	Natural
Antakya-Reyhanlı Road (including Demirkopru site)		
C2.3 - Permanent non-tidal, smooth-flowing watercourses	Annex-I	Natural
FB.3 - Shrub plantations for ornamental purposes or for fruit, other than vineyards	-	Modified
G2.9 - Evergreen orchards and groves	-	Natural
G5.6 - Early-stage natural and semi-natural woodlands and regrowth	Annex-I	Natural
I1.2 - Mixed crops of market gardens and horticulture	-	Modified



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EUNIS Habitat Type	Habitats Directive Annex I	Natural/Modified
J2.3 - Rural industrial and commercial sites still in active use	-	Modified
J4.2 - Road networks	-	Modified
Kuruyer Construction and Accommodation Site		
E1.D - Unmanaged xeric grassland	-	Natural
G2.9 - Evergreen orchards and groves	-	Natural
J2.3 - Rural industrial and commercial sites still in active use	-	Modified
J3.2 - Active opencast mineral extraction sites, including quarries	-	Modified
J4.2 - Road networks	-	Modified
Antakya-Samandağ Road		
C2.3 - Permanent non-tidal, smooth-flowing watercourses	Annex-I	Natural
FB.3 - Shrub plantations for ornamental purposes or for fruit, other than vineyards	-	Modified
G1.D4 - Fruit orchards	-	Modified
I1.2 - Mixed crops of market gardens and horticulture	-	Modified
J1.1 - Residential buildings of city and town centres	-	Modified
J4.2 - Road networks	-	Modified
Malatya-Akçadağ-Gölbası Road & Erkenek Tunnel, Permanent Material Storage Areas and Erkenek Construction and Accommodation Site		
G4.E - Mixed mediterranean pine - evergreen oak woodland	-	Natural
J2.1 - Scattered residential buildings	-	Modified
F9.1 - Riverine scrub	Annex-I	Natural
I1.2 - Mixed crops of market gardens and horticulture	-	Modified
J3.2 - Active opencast mineral extraction sites, including quarries	-	Modified
J4.2 - Road networks	-	Modified
C2.3 - Permanent non-tidal, smooth-flowing watercourses	Annex-I	Natural
J2.3 - Rural industrial and commercial sites still in active use	-	Modified
J3.3 - Recently abandoned above-ground spaces of extractive industrial sites	-	Modified
H5.3 - Sparsely- or un-vegetated habitats on mineral substrates not resulting from recent ice activity	-	Natural
J2.4 - Agricultural constructions	-	Modified
J2.7 - Rural construction and demolition sites	-	Modified



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EUNIS Habitat Type	Habitats Directive Annex I	Natural/Modified
Reşadiye limestone quarry		
J4.2 - Road networks	-	Modified
H3.5 - Almost bare rock pavements, including limestone pavements	Annex-I	Natural
Erkenek gravel-sand borrow site		
E1.D - Unmanaged xeric grassland	-	Natural
I1.2 - Mixed crops of market gardens and horticulture	-	Modified
J3.2 - Active opencast mineral extraction sites, including quarries	-	Modified
J4.2 - Road networks	-	Modified
Beylerderesi Bridge		
I1.2 - Mixed crops of market gardens and horticulture	-	Modified
J4.2 - Road networks	-	Modified
C2.3 - Permanent non-tidal, smooth-flowing watercourses	Annex-I	Natural
E2.5 - Meadows of the steppe zone	-	Natural
Tohma Bridge and Tohma Construction and Accommodation Site		
C1.2 - Permanent mesotrophic lakes, ponds and pools	Annex-I	Natural
I1.2 - Mixed crops of market gardens and horticulture	-	Modified
I2.2 - Small-scale ornamental and domestic garden areas	-	Modified
J4.2 - Road networks	-	Modified
J2.3 - Rural industrial and commercial sites still in active use	-	Modified
C3.4 - Species-poor beds of low-growing water-fringing or amphibious vegetation	Annex-I	Natural
J2.7 - Rural construction and demolition sites	-	Modified
Ağın Bridge and Ağın Construction Site		
C1.2 - Permanent mesotrophic lakes, ponds and pools	Annex-I	Natural
J4.2 - Road networks	-	Modified
J2.3 - Rural industrial and commercial sites still in active use	-	Modified
E1.9 - Open non-Mediterranean dry acid and neutral grassland, including inland dune grassland	Annex-I	Natural



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TAG Highway-Aslanlı Tunnel-Nurdağı Junction BSA contains both natural and modified habitats. Road networks (J4.2), active opencast mineral extraction sites, including quarries (J3.2), and mixed crops of market gardens and horticulture (I1.2) are modified habitats in the BSA. Mixed Abies – Picea – Fagus woodland (G4.6) and small broadleaved deciduous anthropogenic woodlands (G5.2) are natural habitats in the BSA. The Project is expected to have no impact on natural habitats because construction/rehabilitation activities will take place within the existing road corridor..

Ceyhan Construction and Accommodation Site BSA is an existing facility. The BSA contains mixed crops of market gardens and horticulture (I1.2), road networks (J4.2), and rural industrial and commercial sites still in active use (J2.3) modified habitats in the BSA. The presence of the facility is expected to have no impact on natural habitat as it is an existing operating facility..

Bahçe (Ayran) Concrete Plant BSA contains modified and natural habitats like; road networks (J4.2), active opencast mineral extraction sites, including quarries (J3.2), and mixed crops of market gardens and horticulture (I1.2) as modified habitats, also, trampled areas (H5.6) and lowland to montane mediterranean *Pinus* woodland (excluding *Pinus nigra*) (G3.7) as natural habitats. The presence of the facility is expected to have no impact on natural habitat as it is an existing operating facility. Dust formation must be prevented to minimize possible impact on these natural habitats.

Tatarlı Basalt Quarry BSA contains modified and natural habitats like; active opencast mineral extraction sites, including quarries (J3.2) as modified habitat and eastern garrigues (F6.2) as natural habitat. The presence of the facility is expected to have no impact on natural habitat as it is an existing operating facility. Dust formation must be prevented to minimize the impact on natural habitats.

Başpınar Limestone Quarry BSA contains modified and natural habitats like; mixed crops of market gardens and horticulture (I1.2) and road networks (J4.2) as modified habitats, also, small broadleaved deciduous anthropogenic woodlands (G5.2) as natural habitats. Since this quarry has not been opened yet, precautions specified in the flora and fauna sections must be taken during the work to be carried out. At the same time, dust formation should be prevented.

İslahiye-Hassa Kırıkhan Road BSA contains modified and natural habitats like; shrub plantations for ornamental purposes or for fruit, other than vineyards (FB.3), vineyards (FB.4), fruit orchards (G1.D4), mixed crops of market gardens and horticulture (I1.2), residential buildings of city and town centres (J1.1), rural public buildings (J2.2), active opencast mineral extraction sites, including quarries (J3.2), and road networks (J4.2) as modified habitats, also, permanent non-tidal, smooth-flowing watercourses (C2.3), trampled xeric grasslands with annuals (E1.E), perennial calcareous grassland and basic steppes (E1.2), lowland to montane mediterranean *Pinus* woodland (excluding *Pinus nigra*) (G3.7), early-stage natural and semi-natural woodlands and regrowth (G5.6), and trampled areas (H5.6) as natural habitats. Project is expected to have no impact on natural habitats because construction/rehabilitation activities will take place within the existing road corridor..

Kızılkaya Limestone Quarry and Kızılkaya Construction and Accommodation Site BSA contains modified and natural habitats like; mixed crops of market gardens and horticulture (I1.2), shrub plantations for ornamental purposes or for fruit, other than vineyards (Fb.3), and active opencast mineral extraction sites, including quarries (J3.2) as modified habitats, also, early-stage natural and semi-natural woodlands and regrowth (G5.6) as natural habitats. As these are existing facility and quarry, impacts on natural habitat will be limited. Dust formation must be prevented to minimize the impact on natural habitats.

Hatay Airport Road and Deep Soil Mixing Stations BSA contains modified and natural habitats like; mixed crops of market gardens and horticulture (I1.2) and road networks (J4.2) as modified habitats, also, permanent non-tidal, smooth-flowing watercourses (C2.3) as natural habitats. Care should be taken to avoid any impact on water resources during the work to be



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carried out in the area. In this context, operations such as discharging into the wetland or piling up soil should be avoided. Dust formation must be prevented to minimize the impact on natural habitats.

Antakya-Reyhanlı Road BSA contains modified and natural habitats like; shrub plantations for ornamental purposes or for fruit, other than vineyards (FB.3), mixed crops of market gardens and horticulture (I1.2), active opencast mineral extraction sites, including quarries (J3.2), and road networks (J4.2) as modified habitats, also, permanent non-tidal, smooth-flowing watercourses (C2.3), evergreen orchards and groves (G2.9), and early-stage natural and semi-natural woodlands and regrowth (G5.6) as natural habitats. Care should be taken to avoid any impact on water resources during the work to be carried out in the area. In this context, operations such as discharging into the wetland or piling up soil should be avoided. Dust formation must be prevented to minimize the impact on natural habitats.

Kuruyer Construction and Accommodation Site BSA contains modified and natural habitats like; rural industrial and commercial sites still in active use (J2.3), active opencast mineral extraction sites, including quarries (J3.2), and road networks (J4.2) as modified habitats, also, unmanaged xeric grassland (E1.D) and evergreen orchards and groves (G2.9) as natural habitats. Because the area is in active use and modified, the negative impact on natural habitats will be limited.. Dust formation must be prevented to minimize the impact on natural habitats.

Antakya-Samandağ Road BSA contains modified and natural habitats like; shrub plantations for ornamental purposes or for fruit, other than vineyards (FB.3), fruit orchards (G1.D4), mixed crops of market gardens and horticulture (I1.2), residential buildings of city and town centres (J1.1), and road networks (J4.2) as modified habitats, also, permanent non-tidal, smooth-flowing watercourses (C2.3) as natural habitats. Care should be taken to avoid any impact on water resources during the work to be carried out in the area. In this context, operations such as discharging into the wetland or piling up soil should be avoided. Dust formation must be prevented to minimize the impact on natural habitats.

Beylerderesi Bridge BSA contains modified and natural habitats like; mixed crops of market gardens and horticulture (I1.2) and road networks (J4.2) as modified habitats, also, permanent non-tidal, smooth-flowing watercourses (C2.3) and unmanaged xeric grassland (E1.D) as natural habitats. Due to the bridge is an existing structure and construction/rehabilitation activities will be conducted on the bridge, impacts on natural habitat will be limited. Dust formation must be prevented to minimize the impact on natural habitats.

Tohma Bridge and Tohma Construction and Accommodation Site BSA contains modified and natural habitats like; mixed crops of market gardens and horticulture (I1.2), road networks (J4.2), rural industrial and commercial sites still in active use (J2.3), rural construction and demolition sites (J2.7), and small-scale ornamental and domestic garden areas (I2.2) as modified habitats, also, permanent mesotrophic lakes, ponds and pools (C1.2) and species-poor beds of low-growing water-fringing or amphibious vegetation (C3.4) as natural habitats. Care should be taken to avoid any impact on water resources during the work to be carried out in the area. In this context, operations such as discharging into the wetland or piling up soil should be avoided. Dust formation must be prevented to minimize the impact on natural habitats.

Ağın Bridge and Ağın Construction and Accommodation Site BSA contains modified and natural habitats like; road networks (J4.2) and rural industrial and commercial sites still in active use (J2.3) as modified habitats, also, permanent mesotrophic lakes, ponds and pools (C1.2) and open non-Mediterranean dry acid and neutral grassland, including inland dune grassland (E1.9) as natural habitats. Care should be taken to avoid any impact on water resources during the work to be carried out in the area. In this context, operations such as discharging into the



wetland or piling up soil should be avoided. Dust formation must be prevented to minimize the impact on natural habitats.

Malatya-Akçadağ-Gölbaşı Road & Erkenek Tunnel, Permanent Material Storage Areas and Erkenek Construction and Accommodation Site BSA contains modified and natural habitats like; road networks (J4.2), rural industrial and commercial sites still in active use (J2.3), mixed crops of market gardens and horticulture (I1.2), recently abandoned above-ground spaces of extractive industrial sites (J3.3), agricultural constructions (J2.4), active opencast mineral extraction sites, including quarries (J3.2), rural construction and demolition sites (J2.7), and scattered residential buildings (J2.1) as modified habitats, also, permanent non-tidal, smooth-flowing watercourses (C2.3), mixed mediterranean pine - evergreen oak woodland (G4.E), riverine scrub (F9.1), and sparsely- or un-vegetated habitats on mineral substrates not resulting from recent ice activity (H5.3) as natural habitats. Care should be taken to avoid any impact on water resources during the work to be carried out in the area. In this context, operations such as discharging into the wetland or piling up soil should be avoided. Dust formation must be prevented to minimize the impact on natural habitats.

Reşadiye Quarry BSA contains modified and natural habitats like; road networks (J4.2) as modified habitats, also, sparsely- or un-vegetated habitats on mineral substrates not resulting from recent ice activity (H5.3) as natural habitats. Since this quarry has not been opened yet, precautions specified in the flora and fauna sections must be taken during the work to be carried out. At the same time, dust formation should be prevented.

Erkenek Gravel-Sand Quarry BSA contains modified and natural habitats like; road networks (J4.2), mixed crops of market gardens and horticulture (I1.2), and active opencast mineral extraction sites, including quarries (J3.2) as modified habitats, also, unmanaged xeric grassland (E1.D) as natural habitats. Since this quarry has not been opened yet, precautions specified in the flora and fauna sections must be taken during the work to be carried out. At the same time, dust formation should be prevented.

4.7.5 Baseline Findings

Terrestrial Flora

The aim of the survey was to identify the flora and vegetation structure of the route and structures, determine any critical plant species or habitats along the BSA, and minimize the impact of the activities on these species and habitats. Initially, a sufficient number of sample points representing each habitat were determined using Google Earth. Considering the potential effects on both sides of the road during the activities, a zone of 100 meters to the right and left of the road was included in the study. Also, 100 meters buffer zone was determined for the facilities, quarries and construction areas.

TAG Highway-Aslanlı Tunnel-Nurdağı Junction

4 different sample locations representing various habitats were identified along the BSA. When selecting sample points, priority was given to natural habitats and areas where critical species are distributed. The survey locations where the study was conducted, the habitat types of the stations, and their coordinates are given in Table 85 and the maps showing the locations are provided in Appendix-3.5.

Table 85. Survey locations along the project route, their coordinates, and habitat types

Location	X	Y	Habitat
Location 1	36.706012	37.181081	G4.6 Mixed Abies - Piceae - Fagus Woodland
Location 2	36.713064	37.185593	G5.2 Small Broadleaved Deciduous Anthropogenic Woodlands
Location 3	36.720874	37.195267	G5.2 Small Broadleaved Deciduous Anthropogenic Woodlands



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Location 4	36.752091	37.195544	E1.2E Irano-Anatolian Steppes
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During the fieldwork, habitats at each identified point were thoroughly examined, and field notes were recorded in the field diary. The floristic list provided habitat-based species based on findings and observations obtained during the field trip.

The floristic list is presented in the order of ferns (Pteridophyta), gymnosperms (Gymnospermae), and angiosperms (Angiospermae), respectively. Families within each group are listed in alphabetical order. When listing species, the following details are provided sequentially: Turkish names (if available), common names (if available), plant geography region, endemism status, threat level for endemics, inclusion in the Bern and CITES lists, and abundance, which are detailed in Table 86.



Table 86. The Flora List of the Project Route and Surrounding Areas

Family	Species	Turkish Name	Common Name	Endemism	IUCN	CITES	BERN	Phyto-Region	Relative Abundance	inside/outside BSA	Obs./Lit.
Adoxaceae	<i>Sambucus ebulus</i>	Mürver Otu	-	-	LC	-	-	Widespread	3	inside	Obs./Lit.
Amaryllidaceae	<i>Allium karamanoglui</i>	Paşa Soğanı	-	Endemic	NE	-	-	E.Mediterranean	1	outside	Lit.
Caprifoliaceae	<i>Scabiosa rotata</i>	Top Uyuzotu	-	-	NE	-	-	Irano-Turanian	3	inside	Obs./Lit.
Caprifoliaceae	<i>Scabiosa sicula</i>	Ada Uyuzotu	-	-	NE	-	-	Mediterranean	3	inside	Obs./Lit.
Caprifoliaceae	<i>Scabiosa sosnowskyi</i>	Saman Uyuzotu	-	-	NE	-	-	Widespread	3	inside	Obs./Lit.
Caprifoliaceae	<i>Valeriana alliariifolia</i>	Pisot	-	-	NE	-	-	Widespread	3	inside	Obs./Lit.
Caprifoliaceae	<i>Dipsacus laciniatus</i>	Fesçitarağı	-	-	NE	-	-	Widespread	3	inside	Obs./Lit.
Caprifoliaceae	<i>Knautia integrifolia</i>	Götürotu	-	-	NE	-	-	Widespread	3	inside	Obs./Lit.
Caprifoliaceae	<i>Knautia integrifolia</i> var. <i>integrifolia</i>	-	-	-	NE	-	-	Mediterranean	3	inside	Obs./Lit.
Caprifoliaceae	<i>Lonicera caprifolium</i>	Hanımeli	Italian honeysuckle, Perfoliate honeysuckle	-	NE	-	-	Widespread	3	inside	Obs./Lit.
Caprifoliaceae	<i>Lonicera etrusca</i>	Dokuzdon	-	-	NE	-	-	Widespread	3	inside	Obs./Lit.
Caprifoliaceae	<i>Lonicera etrusca</i> var. <i>etrusca</i>	-	-	-	NE	-	-	Mediterranean	3	inside	Obs./Lit.
Caprifoliaceae	<i>Lonicera etrusca</i> var. <i>hispidula</i>	-	-	-	NE	-	-	E.Mediterranean	3	inside	Obs./Lit.
Caprifoliaceae	<i>Lonicera nummulariifolia</i>	Tavşançili	-	-	LC	-	-	Widespread	3	inside	Obs./Lit.
Caprifoliaceae	<i>Lonicera orientalis</i>	Has Çakkana	-	Endemic	NE	-	-	Widespread	1	outside	Lit.
Caprifoliaceae	<i>Morina persica</i>	Merdivençiçeği	-	-	NE	-	-	Widespread	3	inside	Obs./Lit.
Caprifoliaceae	<i>Morina persica</i> var. <i>persica</i>	-	-	-	NE	-	-	Irano-Turanian	3	inside	Obs./Lit.
Caprifoliaceae	<i>Pteroccephalus plumosus</i>	Gök Cücükotu	-	-	NE	-	-	Widespread	3	inside	Obs./Lit.
Caprifoliaceae	<i>Scabiosa argentea</i>	Yazı Süpürgesi	-	-	NE	-	-	Widespread	3	inside	Obs./Lit.
Caprifoliaceae	<i>Scabiosa calocephala</i>	Çayır Uyuzotu	-	-	NE	-	-	Irano-Turanian	3	inside	Obs./Lit.
Caprifoliaceae	<i>Scabiosa micrantha</i>	Kavurotu	-	-	NE	-	-	Widespread	3	inside	Obs./Lit.
Caprifoliaceae	<i>Scabiosa persica</i>	Acem Zivanı	-	-	NE	-	-	Irano-Turanian	3	inside	Obs./Lit.
Caprifoliaceae	<i>Valeriana dioica</i>	İki Kediotu	-	-	NE	-	-	Avrupa-Sibirya	3	inside	Obs./Lit.
Caprifoliaceae	<i>Valeriana dioscoridis</i>	Çobanzurnası	-	-	NE	-	-	E.Mediterranean	3	inside	Obs./Lit.
Caprifoliaceae	<i>Valeriana officinalis</i>	Kediotu	Common Valerian	-	NE	-	-	Widespread	3	inside	Obs./Lit.
Caprifoliaceae	<i>Valeriana sisymbriifolia</i>	İpar Kediotu	-	-	NE	-	-	Irano-Turanian	3	inside	Obs./Lit.
Caprifoliaceae	<i>Valerianella dentata</i>	Dişli Kuzugevreği	-	-	NE	-	-	Widespread	3	inside	Obs./Lit.
Caprifoliaceae	<i>Valerianella dactylophylla</i>	El Kuzugevreği	-	-	NE	-	-	Irano-Turanian	3	inside	Obs./Lit.
Caprifoliaceae	<i>Valerianella discoidea</i>	Ekin Kuzugevreği	-	-	NE	-	-	Mediterranean	3	inside	Obs./Lit.
Caprifoliaceae	<i>Valerianella pumila</i>	Bağ Kuzugevreği	-	-	NE	-	-	Widespread	3	inside	Obs./Lit.
Caprifoliaceae	<i>Valerianella vesicaria</i>	Kuzugevreği	-	-	NE	-	-	Widespread	3	inside	Obs./Lit.
Caryophyllaceae	<i>Eremogone acerosa</i>	Sivri Kumotu	-	Endemic	NE	-	-	Widespread	1	outside	Lit.
Caryophyllaceae	<i>Holosteum umbellatum</i> var. <i>umbellatum</i>	-	-	-	NE	-	-	Widespread	3	inside	Obs./Lit.
Caryophyllaceae	<i>Loeflingia hispanica</i>	Cicibücü	-	-	NE	-	-	Widespread	3	inside	Obs./Lit.
Caryophyllaceae	<i>Minuartia decipiens</i>	Cenup Tıstısı	-	-	NE	-	-	Widespread	3	inside	Obs./Lit.
Poaceae	<i>Setaria viridis</i>	Yeşil Sıçansaçı	Green bristle grass	-	NE	-	-	Widespread	3	inside	Obs./Lit.
Polygonaceae	<i>Atraphaxis billardieri</i>	Teke Buğdayı	-	-	NE	-	-	Widespread	3	inside	Obs./Lit.
Polygonaceae	<i>Polygonum arenastrum</i>	Bezmeceotu	-	-	NE	-	-	Widespread	3	inside	Obs./Lit.
Ranunculaceae	<i>Ranunculus damascenus</i>	Şam Dügünçiçeği	-	-	NE	-	-	Irano-Turanian	3	inside	Obs./Lit.
Ranunculaceae	<i>Ranunculus sprunerianus</i>	Duvar Dügünçiçeği	-	-	NE	-	-	Mediterranean	3	inside	Obs./Lit.
Rosaceae	<i>Amygdalus lycioides</i>	Behiv	-	-	NE	-	-	Widespread	3	inside	Obs./Lit.
Rosaceae	<i>Cotoneaster nummularius</i>	Dağ Muşmulası	-	-	NE	-	-	Widespread	3	inside	Obs./Lit.
Rosaceae	<i>Crataegus microphylla</i>	Kocakarı Armudu	-	-	NE	-	-	Widespread	3	inside	Obs./Lit.
Rosaceae	<i>Geum urbanum</i>	Meryemotu	Herb bennet	-	LC	-	-	European-Siberian	3	inside	Obs./Lit.

Family	Species	Turkish Name	Common Name	Endemism	IUCN	CITES	BERN	Phyto-Region	Relative Abundance	inside/outside BSA	Obs./Lit.
Rosaceae	<i>Rosa canina</i>	Kuşburnu	Dog rose	-	LC	-	-	Widespread	3	inside	Obs./Lit.
Rosaceae	<i>Sanguisorba minor</i>	Çayırduğmesi	Salad burnet, Pimpinella	-	NE	-	-	Widespread	3	inside	Obs./Lit.
Rubiaceae	<i>Asperula orientalis</i>	Gökçe Belumotu	-	-	NE	-	-	Irano-Turanian	3	inside	Obs./Lit.
Scrophulariaceae	<i>Verbascum sinuatum</i>	Bodanotu	-	-	NE	-	-	Widespread	3	inside	Obs./Lit.
Zygophyllaceae	<i>Zygophyllum fabago</i>	İtüzerliği	-	-	NE	-	-	Irano-Turanian	3	inside	Obs./Lit.

IUCN

EX : Extinct
EW : Extinct in the Wild
CR : Critically Endangered
EN : Endangered
VU : Vulnerable
NT : Near Threatened
LC : Least Concern
DD : Data Deficient
NE : Not Evaluated

RELATIVE ABUNDANCES

1: Extremely rare
2: Rare
3: Moderate density
4: Abundant
5: Very abundant

The areas along the BSA, where the project will be implemented, exhibit a vegetation structure shaped by Mediterranean and Continental climates. A significant portion of the BSA consists of dry and irrigated agricultural areas. The natural habitat covers approximately 3.98% of the total area along the BSA. Within the areas where natural vegetation thrives, there are habitats such as Irano-Anatolian steppes (0,82%), mixed Abies-Picea-Fagus woodland (0.61%), and small broadleaved deciduous anthropogenic woodlands (2.53%).

According to the surveys a total of 49 species and taxa at or below the level of family, belonging to 11 families (see Table 86) were observed. Among these identified species, 3 are endemic. All 3 endemic species were not recorded during the field surveys and outside BSA.

Among the plant species detected in the BSA, 4 species are in the "LC" category and the remaining 45 species are in the "NE" category, according to IUCN. Among the species found in the BSA, there are no species in the annexes of the Bern Convention and CITES.

Ceyhan Construction and Accommodation Site

1 sample location were selected representing the habitats along the BSA. The BSA contains only modified habitats. The survey location where the study was conducted, the habitat type of the station, and the coordinates are given in Table 87 and the map showing the locations are provided in Appendix-3.5.

Table 87. Survey locations along the project route, their coordinates, and habitat types

Location	X	Y	Habitat
Location 1	35,658509	36,980508	I1.2 - Mixed crops of market gardens and horticulture

During the fieldwork, habitats at the identified locations were thoroughly examined, and field notes were recorded in the field diary. The floristic list provided habitat-based species based on findings and observations obtained during the field trip.

The floristic list is presented in the order of ferns (Pteridophyta), gymnosperms (Gymnospermae), and angiosperms (Angiospermae), respectively. Families within each group are listed in alphabetical order. When listing species, the following details are provided sequentially: Turkish names (if available), common names (if available), plant geography region, endemism status, threat level for endemics, inclusion in the Bern and CITES lists, and abundance, which are detailed in Table 88.



Table 88. The Flora List of the Project Route and Surrounding Areas

Family	Species	Türkish Name	Common Name	Endemism	IUCN	CITES	BERN	Phyto-Region	Relative Abundance	inside/outside BSA	Obs./Lit.
Apiaceae	<i>Tordylium apulum</i>	Kafkalida	-	-	NE	-	-	Mediterranean	3	inside+outside	Obs./Lit.
Boraginaceae	<i>Echium italicum</i>	Kurtkuyruğu	-	-	NE	-	-	Mediterranean	3	inside+outside	Obs./Lit.
Caryophyllaceae	<i>Silene colorata</i> subsp. <i>colorata</i>	Kum Nakılı	-	-	NE	-	-	Mediterranean	3	inside+outside	Obs./Lit.
Fabaceae	<i>Lathyrus gorgoni</i> var. <i>pilosus</i>	-	-	-	NE	-	-	Mediterranean	3	inside+outside	Obs./Lit.
Fabaceae	<i>Scorpiurus subvillosus</i> var. <i>subvillosus</i>	-	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Fabaceae	<i>Vicia narbonensis</i> var. <i>serratifolia</i>	-	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Hypericaceae	<i>Hypericum perforatum</i>	Kantarın	St John's Wort	-	LC	-	-	-	3	inside+outside	Obs./Lit.
Lamiaceae	<i>Ballota saxatilis</i>	Nemnemotu	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Lamiaceae	<i>Stachys annua</i>	Haciosmanotu	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Papaveraceae	<i>Papaver dubium</i>	Köpekyığı	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Poaceae	<i>Cynodon dactylon</i>	Köpekdişi	Bermuda grass	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Rosaceae	<i>Malus sylvestris</i> subsp. <i>orientalis</i>	Ekşi Elma	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.

IUCN

LC : Least Concern

NE : Not Evaluated

RELATIVE ABUNDANCES

1: Extremely rare

2: Rare

3: Moderate density

4: Abundant

5: Very abundant

The areas along the BSA, where the project will be implemented, exhibit a vegetation structure shaped by Mediterranean and Continental climates. The BSA consists of modified habitats.

According to the surveys a total of 12 species and taxa at or below the level of family, belonging to 9 families (see Table 88) were observed.

Among the plant species detected in the BSA, 1 species are in the "LC" category, and the remaining 11 species are in the "NE" category, according to IUCN. Among the species found in the BSA, there are no species in the annexes of the Bern Convention and CITES.

Başpınar Limestone Quarry

2 different sample locations representing various habitats were identified along the BSA. When selecting sample points, priority was given to natural habitats and areas where critical species are distributed. The survey locations where the study was conducted, the habitat types of the stations, and their coordinates are given in Table 89 and the maps showing the locations are provided in Appendix-3.5.

Table 89. Survey locations along the project route, their coordinates, and habitat types

Location	X	Y	Habitat
Location 1	36.739555	37.203160	G5.2 - Small broadleaved deciduous anthropogenic woodlands
Location 2	36.741534	37.206055	G5.2 - Small broadleaved deciduous anthropogenic woodlands

During the fieldwork, habitats at each identified point were thoroughly examined, and field notes were recorded in the field diary. The floristic list provided habitat-based species based on findings and observations obtained during the field trip.

The floristic list is presented in the order of ferns (Pteridophyta), gymnosperms (Gymnospermae), and angiosperms (Angiospermae), respectively. Families within each group are listed in alphabetical order. When listing species, the following details are provided sequentially: Turkish names (if available), common names (if available), plant geography region, endemism status, threat level for endemics, inclusion in the Bern and CITES lists, and abundance, which are detailed in Table 90.

Table 90. The Flora List of the Project Route and Surrounding Areas

Family	Species	Turkish Name	Common Name	Endemism	IUCN	CITES	BERN	Phyto-Region	Relative Abundance	inside/outside BSA	Obs./Lit.
Adoxaceae	<i>Sambucus ebulus</i>	Mürver Otu		-	LC	-	-	-	3	inside	Obs./Lit.
Caprifoliaceae	<i>Dipsacus laciniatus</i>	Fesçitarağı		-	NE	-	-	-	3	inside	Obs./Lit.
Caprifoliaceae	<i>Scabiosa argentea</i>	Yazı Süpürgesi		-	NE	-	-	-	3	inside	Obs./Lit.
Caprifoliaceae	<i>Scabiosa sosnowskyi</i>	Saman Uyuzotu		-	NE	-	-	-	3	inside	Obs./Lit.
Caprifoliaceae	<i>Valeriana alliariifolia</i>	Pisot		-	NE	-	-	-	3	inside	Obs./Lit.
Caprifoliaceae	<i>Valerianella pumila</i>	Bağ Kuzugevreği		-	NE	-	-	-	3	inside	Obs./Lit.
Cupressaceae	<i>Cupressus sempervirens</i>	Servi	Italian cypress, Cypress	-	LC	-	-	E.Mediterranean	3	inside	Obs./Lit.
Oleaceae	<i>Olea europaea</i>	Zeytin	African Olive	-	DD	-	-	-	3	inside	Obs./Lit.
Pinaceae	<i>Pinus nigra</i>	Karaçam	Black pine	-	LC	-	-	-	4	inside	Obs./Lit.

IUCN
EX : Extinct
EW : Extinct in the Wild
CR : Critically Endangered
EN : Endangered
VU : Vulnerable
NT : Near Threatened
LC : Least Concern
DD : Data Deficient
NE : Not Evaluated

RELATIVE ABUNDANCES
1: Extremely rare
2: Rare
3: Moderate density
4: Abundant
5: Very abundant

The areas along the BSA, where the project will be implemented, exhibit a vegetation structure shaped by Mediterranean and Continental climates. A significant portion of the BSA consists of dry areas. The natural habitat covers approximately 76.43% of the total area along the BSA.

According to the surveys a total of 9 species and taxa at or below the level of family, belonging to 5 families (see Table 90) were observed.

Among the plant species detected in the BSA, 3 species are in the "LC" category, 1 species in the "DD" category, and the remaining 5 species are in the "NE" category, according to IUCN. Among the species found in the BSA, there are no species in the annexes of the Bern Convention and CITES.

Bahçe (Ayran) Concrete Plant

2 different sample locations representing various habitats were identified along the BSA. When selecting sample points, priority was given to natural habitats and areas where critical species are distributed. The survey locations where the study was conducted, the habitat types of the stations, and their coordinates are given in Table 91 and the maps showing the locations are provided in Appendix-3.5.

Table 91. Survey locations along the project route, their coordinates, and habitat types

Location	X	Y	Habitat
Location 1	36.6104081	37.188392	H5.6 - Trampled areas
Location 2	36.609043	37.186230	G3.7 - Lowland to montane mediterranean Pinus woodland (excluding Pinus nigra)

During the fieldwork, habitats at each identified point were thoroughly examined, and field notes were recorded in the field diary. The floristic list provided habitat-based species based on findings and observations obtained during the field trip.

The floristic list is presented in the order of ferns (Pteridophyta), gymnosperms (Gymnospermae), and angiosperms (Angiospermae), respectively. Families within each group are listed in alphabetical order. When listing species, the following details are provided sequentially: Turkish names (if available), common names (if available), plant geography region, endemism status, threat level for endemics, inclusion in the Bern and CITES lists, and abundance, which are detailed in Table 92.



Table 92. The Flora List of the Project Route and Surrounding Areas

Family	Species	Turkish Name	Common Name	Endemism	IUCN	CITES	BERN	Phyto-Region	Relative Abundance	inside/outside BSA	Obs./Lit.
Amaranthaceae	<i>Salsola inermis</i>	Masum Sodaotu	-	-	NE	-	-	Irano-Turanian	3	outside	Obs./Lit.
Caprifoliaceae	<i>Lonicera nummulariifolia</i>	Tavşançili	-	-	LC	-	-	-	2	outside	Obs./Lit.
Caprifoliaceae	<i>Lonicera orientalis</i>	Has Çakkana	-	Endemic	NE	-	-	-	1	outside	Lit.
Caprifoliaceae	<i>Pterocephalus plumosus</i>	Gök Cücükotu	-	-	NE	-	-	-	3	outside	Obs./Lit.
Caprifoliaceae	<i>Scabiosa micrantha</i>	Kavurotu	-	-	NE	-	-	-	3	inside	Obs./Lit.
Caprifoliaceae	<i>Scabiosa rotata</i>	Top Uyuzotu	-	-	NE	-	-	Irano-Turanian	3	inside	Obs./Lit.
Caprifoliaceae	<i>Scabiosa sicula</i>	Ada Uyuzotu	-	-	NE	-	-	Mediterranean	2	inside+outside	Obs./Lit.
Caprifoliaceae	<i>Valeriana dioica</i>	İki Kediotu	-	-	NE	-	-	European-Siberian	2	inside	Obs./Lit.
Caprifoliaceae	<i>Valerianella dentata</i>	Dişli Kuzugevreği	-	-	NE	-	-	-	3	outside	Obs./Lit.
Caryophyllaceae	<i>Dianthus strictus</i>	Dimisok	-	-	NE	-	-	-	3	outside	Obs./Lit.
Pinaceae	<i>Pinus brutia</i>	Kızılcım	-	-	LC	-	-	-	4	inside+outside	Obs./Lit.
Poaceae	<i>Echinochloa colona</i>	Cinek	-	-	LC	-	-	-	3	outside	Obs./Lit.
Poaceae	<i>Lolium subulatum</i>	Köseçim	-	-	NE	-	-	Irano-Turanian	3	outside	Obs./Lit.
Poaceae	<i>Lolium perenne</i>	Çim	Perennial ryegrass	-	LC	-	-	European-Siberian	2	inside	Obs./Lit.
Poaceae	<i>Setaria glauca</i>	Sıçansaçı	-	-	NE	-	-	-	3	outside	Obs./Lit.
Poaceae	<i>Setaria viridis</i>	Yeşil Sıçansaçı	Green bristle grass	-	NE	-	-	-	3	outside	Obs./Lit.
Poaceae	<i>Stipa holosericea</i>	Dirgen Kılaç	-	-	NE	-	-	Irano-Turanian	3	outside	Obs./Lit.
Polygonaceae	<i>Atraphaxis billardieri</i>	Teke Buğdayı	-	-	NE	-	-	-	2	inside	Obs./Lit.
Polygonaceae	<i>Polygonum arenastrum</i>	Bezmeceotu	-	-	NE	-	-	-	3	outside	Obs./Lit.
Pteridaceae	<i>Anogramma leptophylla</i>	Maydanoz Eğreltisi	-	-	LC	-	-	-	3	outside	Obs./Lit.
Ranunculaceae	<i>Adonis annua</i>	Kanavcıotu	-	-	NE	-	-	Mediterranean	2	inside	Obs./Lit.
Ranunculaceae	<i>Ranunculus trichophyllus</i>	Suluçanak	-	-	LC	-	-	-	2	inside	Obs./Lit.
Rosaceae	<i>Cotoneaster nummularius</i>	Dağ Muşmulası	-	-	NE	-	-	-	3	outside	Obs./Lit.
Rosaceae	<i>Crataegus microphylla</i>	Kocakarı Armudu	-	-	NE	-	-	-	3	outside	Obs./Lit.
Rosaceae	<i>Geum urbanum</i>	Meryemotu	Herb bennet	-	LC	-	-	European-Siberian	3	outside	Obs./Lit.
Rosaceae	<i>Rubus sanctus</i>	Böğürtlen	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Rubiaceae	<i>Asperula orientalis</i>	Gökçe Belumotu	-	-	NE	-	-	Irano-Turanian	2	outside	Obs./Lit.
Rubiaceae	<i>Cruciata taurica</i>	Kırım Güzeli	-	-	NE	-	-	Irano-Turanian	2	outside	Obs./Lit.
Scrophulariaceae	<i>Verbascum sinuatum</i>	Bodanotu	-	-	NE	-	-	-	3	outside	Obs./Lit.
Solanaecae	<i>Solanum americanum</i>	İtüzümü	-	-	NE	-	-	-	2	outside	Obs./Lit.
Xanthorrhoeaceae	<i>Asphodeline taurica</i>	Kılçiriş	-	-	NE	-	-	E.Mediterranean	2	outside	Obs./Lit.

IUCN

EX : Extinct
EW : Extinct in the Wild
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EN : Endangered
VU : Vulnerable
NT : Near Threatened
LC : Least Concern
DD : Data Deficient
NE : Not Evaluated
RELATIVE ABUNDANCES
1: Extremely rare
2: Rare
3: Moderate density
4: Abundant
5: Very abundant

The areas along the BSA, where the project will be implemented, exhibit a vegetation structure shaped by Mediterranean and Continental climates. A significant portion of the BSA consists of forests. The natural habitat covers approximately 56,00% of the total area along the BSA.

According to the surveys a total of 31 species and taxa at or below the level of family, belonging to 13 families (see Table 90) were observed. Among these identified species, 1 is endemic. The endemic species was not recorded during the field surveys and outside BSA.

Among the plant species detected in the BSA, 7 species are in the "LC" category and the remaining 24 species are in the "NE" category, according to IUCN. Among the species found in the BSA, there are no species in the annexes of the Bern Convention and CITES.

Tatarlı Basalt Quarry

Two different sample locations representing various habitats were identified along the BSA. When selecting sample points, priority was given to natural habitats and areas where critical species are distributed. The survey locations where the study was conducted, the habitat types of the stations, and their coordinates are given in Table 93 and the maps showing the locations are provided in Appendix-3.5.

Table 93. Survey locations along the project route, their coordinates, and habitat types

Location	X	Y	Habitat
Location 1	36.074653	37.108395	F6.2 - Eastern garrigues
Location 2	36.079097	37.1086889	F6.2 - Eastern garrigues

During the fieldwork, habitats at each identified point were thoroughly examined, and field notes were recorded in the field diary. The floristic list provided habitat-based species based on findings and observations obtained during the field trip.

The floristic list is presented in the order of ferns (Pteridophyta), gymnosperms (Gymnospermae), and angiosperms (Angiospermae), respectively. Families within each group are listed in alphabetical order. When listing species, the following details are provided sequentially: Turkish names (if available), common names (if available), plant geography region, endemism status, threat level for endemics, inclusion in the Bern and CITES lists, and abundance, which are detailed in Table 94.



Table 94. The Flora List of the Project Route and Surrounding Areas

Family	Species	Turkish Name	Common Name	Endemism	IUCN	CITES	BERN	Phyto-Region	Relative Abundance	inside/outside BSA	Obs./Lit.
Pteridaceae	<i>Adiantum capillus-veneris</i>	Baldırıkara	-	-	LC	-	-	-	2	inside+outside	Obs./Lit.
Araceae	<i>Arum dioscoridis</i>	Tirşik Pancarı	-	-	NE	-	-	-	4	inside+outside	Obs./Lit.
Araliaceae	<i>Hedera helix</i>	Duvar Sarmaşığı	Common English ivy, Ivy	-	LC	-	-	-	3	inside+outside	Obs./Lit.
Asteraceae	<i>Bellis perennis</i>	Koyungözü	Double daisy	-	NE	-	-	European-Siberian	3	inside+outside	Obs./Lit.
Asteraceae	<i>Centaurea iberica</i>	Deligözdikeni	-	-	NE	-	-	-	4	inside+outside	Obs./Lit.
Asteraceae	<i>Silybum marianum</i>	Devedikeni	Milk thistle	-	LC	-	-	-	3	inside+outside	Obs./Lit.
Asteraceae	<i>Xanthium spinosum</i>	Pıtrak	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Boraginaceae	<i>Cynoglossum creticum</i>	Pisiktetiği	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Boraginaceae	<i>Heliotropium europaeum</i>	Akrep Otu	-	-	NE	-	-	Irano-Turanian	2	inside+outside	Obs./Lit.
Brassicaceae	<i>Capsella bursa-pastoris</i>	Çobançantası	Sheperd's purse	-	LC	-	-	-	4	inside+outside	Obs./Lit.
Brassicaceae	<i>Neslia paniculata</i> subsp. <i>thracica</i>	Göçmen Hardalı	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Campanulaceae	<i>Legousia falcata</i>	Eğri Kadınaynası	-	-	NE	-	-	Mediterranean	3	inside+outside	Obs./Lit.
Capparaceae	<i>Capparis spinosa</i>	Kebere	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Amaranthaceae	<i>Chenopodium album</i>	Aksirken	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Convolvulaceae	<i>Calystegia sepium</i>	Çit Sarmaşığı	-	-	LC	-	-	-	2	inside+outside	Obs./Lit.
Crassulaceae	<i>Umbilicus luteus</i>	Sarı Göbekotu	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Cucurbitaceae	<i>Bryonia cretica</i>	Karahaylin	-	-	NE	-	-	E.Mediterranean	2	inside+outside	Obs./Lit.
Fabaceae	<i>Trifolium purpureum</i>	Mor Üçgül	-	-	NE	-	-	-	4	inside+outside	Obs./Lit.
Geraniaceae	<i>Geranium dissectum</i>	Dilimli İtr	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Lamiaceae	<i>Ballota nigra</i>	Yalancı Isırgan	-	-	LC	-	-	-	2	inside+outside	Obs./Lit.
Lamiaceae	<i>Melissa officinalis</i> subsp. <i>inodora</i>	Anababakokusu	-	-	NE	-	-	Mediterranean	3	inside+outside	Obs./Lit.
Lamiaceae	<i>Mentha longifolia</i> subsp. <i>typhoides</i>	Dere Nanesi	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Malvaceae	<i>Malva sylvestris</i>	Ebegümeci	Common mallow, Field mallow	-	LC	-	-	-	4	inside+outside	Obs./Lit.
Myrtaceae	<i>Eucalyptus camaldulensis</i>	Sıtma Ağacı	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Onagraceae	<i>Epilobium hirsutum</i>	Hasanhüseyin Çiçeği	-	-	LC	-	-	-	3	inside+outside	Obs./Lit.
Primulaceae	<i>Anagallis arvensis</i>	Farekulağı	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Rhamnaceae	<i>Paliurus spina-christi</i>	Karaçalı	-	-	NE	-	-	-	4	inside+outside	Obs./Lit.
Plantaginaceae	<i>Kickxia lanigera</i>	Tüylü Fukaraotu	-	-	NE	-	-	Mediterranean	2	inside+outside	Obs./Lit.
Plantaginaceae	<i>Veronica cymbalaria</i>	Venüsçiçeği	-	-	NE	-	-	Mediterranean	3	inside+outside	Obs./Lit.
Solanaecae	<i>Solanum americanum</i>	İtüzümü	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Verbenaceae	<i>Verbena officinalis</i>	Mineçiçeği	Vervain	-	NE	-	-	-	2	inside+outside	Obs./Lit.

IUCN

EX : Extinct

EW : Extinct in the Wild

CR : Critically Endangered

EN : Endangered

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NT : Near Threatened

LC : Least Concern

DD : Data Deficient

NE : Not Evaluated

RELATIVE ABUNDANCES

1: Extremely rare

2: Rare

3: Moderate density

4: Abundant

5: Very abundant

The areas along the BSA, where the project will be implemented, exhibit a vegetation structure shaped by Mediterranean and Continental climates. A significant portion of the BSA consists of eastern garrigues. The natural habitat covers approximately 73.24% of the total area along the BSA.

According to the surveys a total of 31 species and taxa at or below the level of family, belonging to 23 families (see Table 94) were observed.

Among the plant species detected in the BSA, 8 species are in the "LC" category and the remaining 23 species are in the "NE" category, according to IUCN. Among the species found in the BSA, there are no species in the annexes of the Bern Convention and CITES.

İslahiye-Hassa Kırıkhan Road

Four different sample locations representing various habitats were identified along the BSA. When selecting sample points, priority was given to natural habitats and areas where critical species are distributed. The survey locations where the study was conducted, the habitat types of the stations, and their coordinates are given in Table 95 and the maps showing the locations are provided in Appendix-3.5.

Table 95. Survey locations along the project route, their coordinates, and habitat types

Location	X	Y	Habitat
Location 1	36.462691	36.538414	G5.6 - Early-stage natural and semi-natural woodlands and regrowth
Location 2	36.462691	36.670007	G5.6 - Early-stage natural and semi-natural woodlands and regrowth
Location 3	36.500344	36.712497	H5.6 - Trampled areas
Location 4	36.596959	36.968172	G3.7 - Lowland to montane mediterranean Pinus woodland (excluding Pinus nigra)

During the fieldwork, habitats at each identified point were thoroughly examined, and field notes were recorded in the field diary. The floristic list provided habitat-based species based on findings and observations obtained during the field trip.

The floristic list is presented in the order of ferns (Pteridophyta), gymnosperms (Gymnospermae), and angiosperms (Angiospermae), respectively. Families within each group are listed in alphabetical order. When listing species, the following details are provided sequentially: Turkish names (if available), common names (if available), plant geography region, endemism status, threat level for endemics, inclusion in the Bern and CITES lists, and abundance, which are detailed in Table 96.

Table 96. The Flora List of the Project Route and Surrounding Areas

Family	Species	Turkish Name	Common Name	Endemism	IUCN	CITES	BERN	Phyto-Region	Relative Abundance	inside/outside BSA	Obs./Lit.
Adoxaceae	<i>Sambucus nigra</i>	Ağaç Mürver	Common Elder, Elder, Elderberry	-	LC	-	-	-	2	inside+outside	Obs./Lit.
Amaranthaceae	<i>Amaranthus retroflexus</i>	Tilkikuyruğu	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Anacardiaceae	<i>Cotinus coggygria</i>	Boyacı Sumağı	Smoke bush	-	LC	-	-	-	3	inside+outside	Obs./Lit.
Apiaceae	<i>Angelica sylvestris</i>	Kekire	-	-	LC	-	-	-	3	inside+outside	Obs./Lit.
Apiaceae	<i>Eryngium falcatum</i>	Çatal Boğadikeni	-	-	NE	-	-	E.Mediterranean	3	inside+outside	Obs./Lit.
Apiaceae	<i>Pimpinella kotschyana</i>	Kır Anasonu	-	-	NE	-	-	Irano-Turanian	3	inside+outside	Obs./Lit.
Apiaceae	<i>Smyrniolum conatum</i>	Yabani Kereviz	-	-	NE	-	-	Mediterranean	3	inside+outside	Obs./Lit.
Asparagaceae	<i>Ruscus aculeatus</i>	Tavşanmemesi	Butcher's broom	-	LC	-	-	-	3	inside+outside	Obs./Lit.
Asparagaceae	<i>Scilla bifolia</i>	Orman Sümbülü	Alpine squill	-	LC	-	-	Mediterranean	2	inside+outside	Obs./Lit.
Asteraceae	<i>Achillea kotschyi</i> subsp. <i>kotschyi</i>	Ayvadana	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Asteraceae	<i>Anthemis haussknechtii</i>	Çöl Papatyası	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Asteraceae	<i>Bellis annua</i>	Akbubeçlik	-	-	NE	-	-	Mediterranean	3	inside+outside	Obs./Lit.
Asteraceae	<i>Bellis perennis</i>	Koyungözü	Double daisy	-	NE	-	-	European-Siberian	3	inside+outside	Obs./Lit.
Asteraceae	<i>Carduus pycnocephalus</i>	Soymaç	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Asteraceae	<i>Carduus pycnocephalus</i> subsp. <i>pycnocephalus</i>	Soymaç	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Asteraceae	<i>Carthamus dentatus</i>	Kınadikeni	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Asteraceae	<i>Coryza canadensis</i>	Selviotu	Horseweed, Blood stanch	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Asteraceae	<i>Crepis sancta</i>	Yaban Kiskısı	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Asteraceae	<i>Filago pyramidata</i>	Ateşpamuğu	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Asteraceae	<i>Helichrysum stoechas</i>	Kudama	-	-	LC	-	-	-	3	inside+outside	Obs./Lit.
Asteraceae	<i>Inula viscosa</i>	Sümenit	-	-	NE	-	-	Mediterranean	3	inside+outside	Obs./Lit.
Asteraceae	<i>Notobasis syriaca</i>	Yavan Kenger	-	-	NE	-	-	Mediterranean	3	inside+outside	Obs./Lit.
Asteraceae	<i>Rhagadiolus stellatus</i>	Çatlakçanak	-	-	NE	-	-	Mediterranean	3	inside+outside	Obs./Lit.
Asteraceae	<i>Senecio vernalis</i>	Kanaryaotu	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Asteraceae	<i>Senecio vulgaris</i>	Taşakçilotu	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Asteraceae	<i>Siebera pungens</i>	Fezaçiçeği	-	-	NE	-	-	Irano-Turanian	3	inside+outside	Obs./Lit.
Asteraceae	<i>Sonchus asper</i>	Eşekgevreği	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Asteraceae	<i>Tripleurospermum decipiens</i>	Sarı Papatya	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Asteraceae	<i>Urospermum picroides</i>	Acıyemlik	-	-	NE	-	-	Mediterranean	2	inside+outside	Obs./Lit.
Asteraceae	<i>Xanthium strumarium</i>	Koca Pıtrak	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Boraginaceae	<i>Heliotropium europaeum</i>	Akrep Otu	-	-	NE	-	-	Irano-Turanian	3	inside+outside	Obs./Lit.
Boraginaceae	<i>Heliotropium hirsutissimum</i>	Aygün Çiçeği	-	-	NE	-	-	E.Mediterranean	2	inside+outside	Obs./Lit.
Brassicaceae	<i>Arabidopsis thaliana</i>	Fenotu	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Brassicaceae	<i>Biscutella didyma</i>	Çitçitotu	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Brassicaceae	<i>Calepina irregularis</i>	Top Hardal	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Brassicaceae	<i>Clypeola jonthlaspi</i>	Akçeotu	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Brassicaceae	<i>Draba bruniifolia</i> subsp. <i>bruniifolia</i>	Kaya Dolaması	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Brassicaceae	<i>Raphanus raphanistrum</i>	Eşek Turpu	-	-	LC	-	-	-	3	inside+outside	Obs./Lit.
Brassicaceae	<i>Sinapis alba</i>	Mamanık	-	-	LC	-	-	-	3	inside+outside	Obs./Lit.
Caprifoliaceae	<i>Pterocarpus plumosus</i>	Gök Cücükotu	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Caprifoliaceae	<i>Valerianaella vesicaria</i>	Kuzugevreği	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Caryophyllaceae	<i>Silene latifolia</i> subsp. <i>alba</i>	Gıcığıcı	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Caryophyllaceae	<i>Silene subconica</i>	Mahruti Nakıl	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Caryophyllaceae	<i>Stellaria media</i>	Kuşotu	Chickweed	-	LC	-	-	-	3	inside+outside	Obs./Lit.

Family	Species	Turkish Name	Common Name	Endemism	IUCN	CITES	BERN	Phyto-Region	Relative Abundance	inside/outside BSA	Obs./Lit.
Caryophyllaceae	<i>Vaccaria hispanica</i>	Ekin Ebesi	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Cucurbitaceae	<i>Cucumis melo</i>	Kavun	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Cupressaceae	<i>Juniperus drupacea</i>	Andız	-	-	LC	-	-	E.Mediterranean	2	inside+outside	Obs./Lit.
Euphorbiaceae	<i>Euphorbia helioscopia</i>	Feribanotu	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Fabaceae	<i>Astragalus hamosus</i>	Koçboynuzu	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Fabaceae	<i>Calicotome villosa</i>	Keçiboğan	-	-	NE	-	-	Mediterranean	2	inside+outside	Obs./Lit.
Fabaceae	<i>Cercis siliquastrum</i>	Erguvan	Judas tree, Redbud	-	LC	-	-	-	3	inside+outside	Obs./Lit.
Fabaceae	<i>Cytisopsis dorycniifolia</i>	Keditırnağı	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Fabaceae	<i>Lathyrus variabilis</i>	Bayır Burçağı	-	-	NE	-	-	E.Mediterranean	3	inside+outside	Obs./Lit.
Fabaceae	<i>Medicago orbicularis</i>	Paralık	-	-	LC	-	-	-	2	inside+outside	Obs./Lit.
Fabaceae	<i>Ononis viscosa</i>	Siyek Dikeni	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Fabaceae	<i>Sophora alopecuroides</i>	Acımeyan	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Fabaceae	<i>Tetragonolobus purpureus</i>	Al Canavardışi	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Fabaceae	<i>Trifolium arvense</i>	Tavşanayağı	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Fabaceae	<i>Trifolium cherleri</i>	Tokalı Dücük	-	-	NE	-	-	Mediterranean	3	inside+outside	Obs./Lit.
Fabaceae	<i>Trifolium scabrum</i>	Hıyar Dücük	-	-	NE	-	-	Mediterranean	2	inside+outside	Obs./Lit.
Geraniaceae	<i>Erodium cicutarium</i>	İğnelik	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Geraniaceae	<i>Erodium moschatum</i>	Kulunc	-	-	NE	-	-	Mediterranean	3	inside+outside	Obs./Lit.
Geraniaceae	<i>Geranium molle</i>	Yumuşak İtir	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Lamiaceae	<i>Salvia verbenaca</i>	Elmakekiği	-	-	NE	-	-	Mediterranean	3	inside+outside	Obs./Lit.
Lamiaceae	<i>Ajuga chamaepitys</i>	Acıgıcı	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Lamiaceae	<i>Lamium amplexicaule</i>	Baltutan	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Lamiaceae	<i>Salvia sclarea</i>	Paskulak	Clary sage	-	LC	-	-	-	2	inside+outside	Obs./Lit.
Lamiaceae	<i>Salvia viridis</i>	Zarif Şalba	-	-	NE	-	-	Mediterranean	3	inside+outside	Obs./Lit.
Lamiaceae	<i>Teucrium chamaedrys</i>	Kısamahmut	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Lamiaceae	<i>Teucrium montbretii</i>	Fatmacıkotu	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Lamiaceae	<i>Thymbra spicata</i>	Zahter	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Lythraceae	<i>Lythrum salicaria</i>	Hevhulma	Purple loosestrife	-	LC	-	-	European-Siberian	3	inside+outside	Obs./Lit.
Malvaceae	<i>Malva neglecta</i>	Çobançöreği	-	-	LC	-	-	-	3	inside+outside	Obs./Lit.
Paeoniaceae	<i>Paeonia daurica</i>	Yörükgülü	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Papaveraceae	<i>Glaucium corniculatum</i>	Çömlekçatlatan	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Papaveraceae	<i>Glaucium flavum</i>	Gündürmelâlesi	Yellow Horned Poppy	-	LC	-	-	-	3	inside+outside	Obs./Lit.
Papaveraceae	<i>Papaver rhoeas</i>	Gelincik	Corn poppy, Shirley poppy, Common poppy, Poppy	-	LC	-	-	-	3	inside+outside	Obs./Lit.
Plantaginaceae	<i>Anarrhinum orientale</i>	Süpürgeotu	-	-	NE	-	-	Irano-Turanian	3	inside+outside	Obs./Lit.
Plantaginaceae	<i>Globularia trichosantha</i>	Köse Yayılımı	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Plantaginaceae	<i>Globularia trichosantha</i> subsp. <i>trichosantha</i>	Köse Yayılımı	-	-	NE	-	-	Irano-Turanian	3	inside+outside	Obs./Lit.
Plantaginaceae	<i>Veronica persica</i>	Cırcamuk	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Poaceae	<i>Sorghum halepense</i> var. <i>halepense</i>	-	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Poaceae	<i>Aegilops columnaris</i>	Kıl Buğday	-	-	LC	-	-	Irano-Turanian	2	inside+outside	Obs./Lit.
Poaceae	<i>Aeluropus litoralis</i>	Sahil Ayırığı	-	-	LC	-	-	-	3	inside+outside	Obs./Lit.
Poaceae	<i>Alopecurus myosuroides</i>	Tarla Tilikuyruğu	Black grass, Slender meadow foxtail	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Poaceae	<i>Briza maxima</i>	Kuşyüreği	Greater quaking-grass	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Poaceae	<i>Bromus japonicus</i>	İyeotu	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Poaceae	<i>Bromus pseudobranchystachys</i>	Oyalı Kılcan	-	-	NE	-	-	Irano-Turanian	3	inside+outside	Obs./Lit.
Poaceae	<i>Dactylis glomerata</i>	Domuzayrığı	Cocksfoot, Cock's foot	-	NE	-	-	-	3	inside+outside	Obs./Lit.

Family	Species	Turkish Name	Common Name	Endemism	IUCN	CITES	BERN	Phyto-Region	Relative Abundance	inside/outside BSA	Obs./Lit.
Poaceae	<i>Melica ciliata</i>	Kirpikli İnci	Silky-spike Melick, Silky-spike Melic	-	NE	-	-	European-Siberian	3	inside+outside	Obs./Lit.
Polygonaceae	<i>Polygonum maritimum</i>	Sicimlik	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Polygonaceae	<i>Rumex acetosella</i>	Kuzukulağı	-	-	LC	-	-	-	2	inside+outside	Obs./Lit.
Portulacaceae	<i>Portulaca oleracea</i>	Semizotu	Purslane, Common purslane, Pigweed, Pursley	-	LC	-	-	-	2	inside+outside	Obs./Lit.
Primulaceae	<i>Anagallis arvensis</i> var. <i>arvensis</i>	-	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Ranunculaceae	<i>Adonis aestivalis</i>	Kandamlası	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Rosaceae	<i>Cerasus mahaleb</i> var. <i>mahaleb</i>	-	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Rosaceae	<i>Crataegus monogyna</i> var. <i>monogyna</i>	-	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Rosaceae	<i>Sarcopoterium spinosum</i>	Abdestbozan	-	-	NE	-	-	E.Mediterranean	3	inside+outside	Obs./Lit.
Rubiaceae	<i>Asperula stricta</i>	Yurt Belumotu	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Urticaceae	<i>Parietaria lusitanica</i>	Kaya Sırçaotu	-	-	NE	-	-	Mediterranean	2	inside+outside	Obs./Lit.
Xanthorrhoeaceae	<i>Eremurus spectabilis</i>	Çiriş	-	-	NE	-	-	Irano-Turanian	3	inside+outside	Obs./Lit.
Zygophyllaceae	<i>Tribulus terrestris</i>	Çobançökerten	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.

IUCN

EX : Extinct

EW : Extinct in the Wild

CR : Critically Endangered

EN : Endangered

VU : Vulnerable

NT : Near Threatened

LC : Least Concern

DD : Data Deficient

NE : Not Evaluated

RELATIVE ABUNDANCES

1: Extremely rare

2: Rare

3: Moderate density

4: Abundant

5: Very abundant

The areas along the BSA, where the project will be implemented, exhibit a vegetation structure shaped by Mediterranean and Continental climates. A significant portion of the BSA consists of woodland and grassland. The natural habitat covers approximately 94.64% of the total area along the BSA.

According to the surveys a total of 102 species and taxa at or below the level of family, belonging to 31 families (see Table 96) were observed.

Among the plant species detected in the BSA, 21 species are in the "LC" category and the remaining 81 species are in the "NE" category, according to IUCN. Among the species found in the BSA, there are no species in the annexes of the Bern Convention and CITES.

Kızılkaya Limestone Quarry and Kızılkaya Construction and Accommodation Site

Two different sample locations representing various habitats were identified along the BSA. When selecting sample points, priority was given to natural habitats and areas where critical species are distributed. The survey locations where the study was conducted, the habitat types of the stations, and their coordinates are given in Table 97 and the maps showing the locations are provided in Appendix-3.5.

Table 97. Survey locations along the project route, their coordinates, and habitat types

Location	X	Y	Habitat
Location 1	36.500362	36.450062	I1.2 - Mixed crops of market gardens and horticulture
Location 2	36.510827	36.473256	I1.2 - Mixed crops of market gardens and horticulture

During the fieldwork, habitats at each identified point were thoroughly examined, and field notes were recorded in the field diary. The floristic list provided habitat-based species based on findings and observations obtained during the field trip.

The floristic list is presented in the order of ferns (Pteridophyta), gymnosperms (Gymnospermae), and angiosperms (Angiospermae), respectively. Families within each group are listed in alphabetical order. When listing species, the following details are provided sequentially: Turkish names (if available), common names (if available), plant geography region, endemism status, threat level for endemics, inclusion in the Bern and CITES lists, and abundance, which are detailed in Table 98.



Table 98. The Flora List of the Project Route and Surrounding Areas

Family	Species	Turkish Name	Common Name	Endemism	IUCN	CITES	BERN	Phyto-Region	Relative Abundance	inside/outside BSA	Obs./Lit.
Apiaceae	<i>Bupleurum boissieri</i>	Şeytankirpiği	-	-	NE	-	-	-	2	outside	Obs./Lit.
Asteraceae	<i>Bellis annua</i>	Akbubeçlik	-	-	NE	-	-	Mediterranean	3	inside+outside	Obs./Lit.
Asteraceae	<i>Carduus pycnocephalus</i>	Soymaç	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Asteraceae	<i>Lactuca tuberosa</i>	Topar Marul	-	-	LC	-	-	-	3	inside+outside	Obs./Lit.
Asteraceae	<i>Picnomon acarna</i>	Kılıçkaldiken	-	-	NE	-	-	Mediterranean	2	outside	Obs./Lit.
Asteraceae	<i>Xanthium spinosum</i>	Pıtrak	-	-	NE	-	-	-	2	outside	Obs./Lit.
Boraginaceae	<i>Anchusa azurea</i> var. <i>azurea</i>	-	-	-	NE	-	-	-	2	outside	Obs./Lit.
Brassicaceae	<i>Capsella rubella</i>	Ayşecik	-	-	NE	-	-	Mediterranean	3	inside+outside	Obs./Lit.
Brassicaceae	<i>Lepidium spinosum</i>	Dikentere	-	-	DD	-	-	-	3	inside+outside	Obs./Lit.
Capparaceae	<i>Capparis spinosa</i>	Kebere	-	-	NE	-	-	-	2	outside	Obs./Lit.
Convolvulaceae	<i>Calystegia sepium</i>	Çit Sarmaşığı	-	-	LC	-	-	-	3	inside+outside	Obs./Lit.
Convolvulaceae	<i>Convolvulus arvensis</i>	Tarla Sarmaşığı	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Fabaceae	<i>Lupinus angustifolius</i>	Acıbakla	-	-	LC	-	-	-	3	outside	Obs./Lit.
Lamiaceae	<i>Ballota saxatilis</i>	Nemnemotu	-	-	NE	-	-	-	2	outside	Obs./Lit.
Plantaginaceae	<i>Veronica cymbalaria</i>	Venüsçiçeği	-	-	NE	-	-	Mediterranean	2	inside+outside	Obs./Lit.
Poaceae	<i>Catapodium rigidum</i>	Telekotu	Fern-grass	-	NE	-	-	Mediterranean	2	outside	Lit.
Ranunculaceae	<i>Nigella stellaris</i>	Otçam	-	-	NE	-	-	E.Mediterranean	2	outside	Lit.
Xanthorrhoeaceae	<i>Asphodeline lutea</i>	Sarı Çiriş	King's Spear	-	NE	-	-	Mediterranean	2	outside	Lit.

IUCN
EX : Extinct
EW : Extinct in the Wild
CR : Critically Endangered
EN : Endangered
VU : Vulnerable
NT : Near Threatened
LC : Least Concern
DD : Data Deficient
NE : Not Evaluated

RELATIVE ABUNDANCES
1: Extremely rare
2: Rare
3: Moderate density
4: Abundant
5: Very abundant

The areas along the BSA, where the project will be implemented, exhibit a vegetation structure shaped by Mediterranean and Continental climates. The BSA consists of modified habitats.

According to the surveys a total of 18 species and taxa at or below the level of family, belonging to 12 families (see Table 98) were observed.

Among the plant species detected in the BSA, 3 species are in the "LC" category, 1 species is in "DD" category, and the remaining 14 species are in the "NE" category, according to IUCN. Among the species found in the BSA, there are no species in the annexes of the Bern Convention and CITES.

Hatay Airport Road and Deep Soil Mixing Stations

Two different sample locations representing various habitats were identified along the BSA. When selecting sample points, priority was given to natural habitats and areas where critical species are distributed. The survey locations where the study was conducted, the habitat types of the stations, and their coordinates are given in Table 99 and the maps showing the locations are provided in Appendix-3.5.

Table 99. Survey locations along the project route, their coordinates, and habitat types

Location	X	Y	Habitat
Location 1	36.234427	36.371201	I1.2 - Mixed crops of market gardens and horticulture
Location 2	36.258686	36.369680	I1.2 - Mixed crops of market gardens and horticulture

During the fieldwork, habitats at each identified point were thoroughly examined, and field notes were recorded in the field diary. The floristic list provided habitat-based species based on findings and observations obtained during the field trip.

The floristic list is presented in the order of ferns (Pteridophyta), gymnosperms (Gymnospermae), and angiosperms (Angiospermae), respectively. Families within each group are listed in alphabetical order. When listing species, the following details are provided sequentially: Turkish names (if available), common names (if available), plant geography region, endemism status, threat level for endemics, inclusion in the Bern and CITES lists, and abundance, which are detailed in Table 100.

Table 100. The Flora List of the Project Route and Surrounding Areas

Family	Species	Turkish Name	Common Name	Endemism	IUCN	CITES	BERN	Phyto-Region	Relative Abundance	inside/outside BSA	Obs./Lit.
Fabaceae	<i>Glycyrrhiza glabra</i> var. <i>glandulifera</i>	-	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Brassicaceae	<i>Alyssum desertorum</i>	Dumanotu	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Asteraceae	<i>Cichorium intybus</i>	Hindiba	Chicory, Common chicory	-	LC	-	-	-	4	inside+outside	Obs./Lit.
<p>IUCN EX : Extinct EW : Extinct in the Wild CR : Critically Endangered EN : Endangered VU : Vulnerable NT : Near Threatened LC : Least Concern DD : Data Deficient NE : Not Evaluated</p> <p>RELATIVE ABUNDANCES 1: Extremely rare 2: Rare 3: Moderate density 4: Abundant 5: Very abundant</p>											

The areas along the BSA, where the project will be implemented, exhibit a vegetation structure shaped by Mediterranean and Continental climates. The BSA consists of modified habitats.

According to the surveys a total of 3 species and taxa at or below the level of family, belonging to 3 families (see Table 100) were observed.

Among the plant species detected in the BSA, 2 species are in the "LC" category and the remaining 2 species are in the "NE" category, according to IUCN. Among the species found in the BSA, there are no species in the annexes of the Bern Convention and CITES.

Antakya-Reyhanlı Road

Two different sample locations representing various habitats were identified along the BSA, which also includes the Demirköprü construction section. When selecting sample points, priority was given to natural habitats and areas where critical species are distributed. The survey locations where the study was conducted, the habitat types of the stations, and their coordinates are given in Table 101 and the maps showing the locations are provided in Appendix-3.5.

Table 101. Survey locations along the project route, their coordinates, and habitat types

Location	X	Y	Habitat
Location 1	36.245750	36.2499878	G2.9 - Evergreen orchards and groves
Location 2	36.535514	36.246644	G5.6 - Early-stage natural and semi-natural woodlands and regrowth

During the fieldwork, habitats at each identified point were thoroughly examined, and field notes were recorded in the field diary. The floristic list provided habitat-based species based on findings and observations obtained during the field trip.

The floristic list is presented in the order of ferns (Pteridophyta), gymnosperms (Gymnospermae), and angiosperms (Angiospermae), respectively. Families within each group are listed in alphabetical order. When listing species, the following details are provided sequentially: Turkish names (if available), common names (if available), plant geography region, endemism status, threat level for endemics, inclusion in the Bern and CITES lists, and abundance, which are detailed in Table 102.

Table 102. The Flora List of the Project Route and Surrounding Areas

Family	Species	Turkish Name	Common Name	Endemism	IUCN	CITES	BERN	Phyto-Region	Relative Abundance	inside/outside BSA	Obs./Lit.
Amaryllidaceae	<i>Allium nigrum</i>	Kara Soğan	Broad-leaved leek	-	LC	-	-	Mediterranean	3	inside+outside	Obs./Lit.
Asteraceae	<i>Achillea kotschyi</i> subsp. <i>kotschyi</i>	Ayvadana	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Asteraceae	<i>Anacyclus clavatus</i>	Nezle Otu	-	-	NE	-	-	Mediterranean	3	inside+outside	Obs./Lit.
Asteraceae	<i>Anthemis haussknechtii</i>	Çöl Papatyası	-	-	NE	-	-	-	4	inside+outside	Obs./Lit.
Asteraceae	<i>Bellis annua</i>	Akbubeçlik	-	-	NE	-	-	Mediterranean	3	inside+outside	Obs./Lit.
Asteraceae	<i>Bellis perennis</i>	Koyungözü	Double daisy	-	NE	-	-	European-Siberian	3	inside+outside	Obs./Lit.
Asteraceae	<i>Calendula arvensis</i>	Portakal Nergisi	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Asteraceae	<i>Carduus pycnocephalus</i>	Soymaç	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Asteraceae	<i>Carduus pycnocephalus</i> subsp. <i>pycnocephalus</i>	Soymaç	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Asteraceae	<i>Carthamus dentatus</i>	Kınadiken	-	-	NE	-	-	-	4	inside+outside	Obs./Lit.
Asteraceae	<i>Centaurea aggregata</i>	Kümedüğme	-	-	NE	-	-	-	4	inside+outside	Obs./Lit.
Asteraceae	<i>Cichorium intybus</i>	Hindiba	Chicory, Common chicory	-	LC	-	-	-	2	inside+outside	Obs./Lit.
Asteraceae	<i>Conyza canadensis</i>	Selviotu	Horseweed, Blood stanch	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Asteraceae	<i>Crepis sancta</i>	Yaban Kiskısı	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Asteraceae	<i>Filago pyramidata</i>	Ateşpamuğu	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Asteraceae	<i>Inula viscosa</i>	Sümenit	-	-	NE	-	-	Mediterranean	3	inside+outside	Obs./Lit.
Asteraceae	<i>Notobasis syriaca</i>	Yavan Kenger	-	-	NE	-	-	Mediterranean	2	inside+outside	Obs./Lit.
Asteraceae	<i>Rhagadiolus stellatus</i>	Çatlakçanak	-	-	NE	-	-	Mediterranean	3	inside+outside	Obs./Lit.
Asteraceae	<i>Senecio vernalis</i>	Kanaryaotu	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Asteraceae	<i>Senecio vulgaris</i>	Taşakçilotu	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Asteraceae	<i>Siebera pungens</i>	Fezaçiçeği	-	-	NE	-	-	Irano-Turanian	4	inside+outside	Obs./Lit.
Asteraceae	<i>Sonchus asper</i>	Eşekgevreği	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Asteraceae	<i>Tripleurospermum decipiens</i>	Sarı Papatya	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Asteraceae	<i>Urospermum picroides</i>	Acıyemlik	-	-	NE	-	-	Mediterranean	2	inside+outside	Obs./Lit.
Asteraceae	<i>Xanthium strumarium</i>	Koca Pıtrak	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Brassicaceae	<i>Arabidopsis thaliana</i>	Fenotu	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Brassicaceae	<i>Biscutella didyma</i>	Çitçitotu	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Brassicaceae	<i>Calepina irregularis</i>	Top Hardal	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Brassicaceae	<i>Clypeola jonthlaspi</i>	Akçeotu	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Brassicaceae	<i>Draba bruniifolia</i> subsp. <i>bruniifolia</i>	Kaya Dolaması	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Campanulaceae	<i>Campanula stricta</i>	Gür Çançiçeği	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Caryophyllaceae	<i>Silene italica</i>	Yuğuşyüreği	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Cornaceae	<i>Cornus sanguinea</i>	Kiren	Dogwood	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Fabaceae	<i>Astragalus hamosus</i>	Koçboynuzu	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Fabaceae	<i>Calicotome villosa</i>	Keçiboğan	-	-	NE	-	-	Mediterranean	3	inside+outside	Obs./Lit.
Fabaceae	<i>Cercis siliquastrum</i>	Erguvan	Judas tree, Redbud	-	LC	-	-	-	3	inside+outside	Obs./Lit.
Fabaceae	<i>Cytisopsis dorycniifolia</i>	Keditırmağı	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Fabaceae	<i>Glycyrrhiza glabra</i> var. <i>glandulifera</i>	-	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Fabaceae	<i>Lathyrus variabilis</i>	Bayır Burçağı	-	-	NE	-	-	E.Mediterranean	2	inside+outside	Obs./Lit.
Fabaceae	<i>Medicago orbicularis</i>	Paralık	-	-	LC	-	-	-	2	inside+outside	Obs./Lit.
Fabaceae	<i>Ononis viscosa</i>	Siyek Dikeni	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Fabaceae	<i>Sophora alopecuroides</i>	Acımeyan	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Fabaceae	<i>Tetragonolobus purpureus</i>	Al Canavardışi	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.

Family	Species	Turkish Name	Common Name	Endemism	IUCN	CITES	BERN	Phyto-Region	Relative Abundance	inside/outside BSA	Obs./Lit.
Fabaceae	<i>Trifolium arvense</i>	Tavşanayağı	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Fabaceae	<i>Trifolium cherleri</i>	Tokalı Dücük	-	-	NE	-	-	Mediterranean	3	inside+outside	Obs./Lit.
Fabaceae	<i>Trifolium scabrum</i>	Hıyar Dücük	-	-	NE	-	-	Mediterranean	2	inside+outside	Obs./Lit.
Lamiaceae	<i>Thymus leucotrichus</i>	Dağ Kekiği	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Oxalidaceae	<i>Oxalis pes-caprae</i>	Koca Ekşiyonca	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Poaceae	<i>Poa timoleontis</i>	Gür Salkımotu	-	-	NE	-	-	E.Mediterranean	3	inside+outside	Obs./Lit.
Solanaecae	<i>Datura stramonium</i>	Boru Çiçeği	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.

IUCN

EX : Extinct
EW : Extinct in the Wild
CR : Critically Endangered
EN : Endangered
VU : Vulnerable
NT : Near Threatened
LC : Least Concern
DD : Data Deficient
NE : Not Evaluated

RELATIVE ABUNDANCES

1: Extremely rare
2: Rare
3: Moderate density
4: Abundant
5: Very abundant

The areas along the BSA, where the project will be implemented, exhibit a vegetation structure shaped by Mediterranean and Continental climates. A significant portion of the BSA consists of modified habitats. The natural habitat covers approximately 4.23% of the total area along the BSA.

According to the surveys a total of 50 species and taxa at or below the level of family, belonging to 11 families (see Table 102) were observed.

Among the plant species detected in the BSA, 4 species are in the "LC" category and the remaining 46 species are in the "NE" category, according to IUCN. Among the species found in the BSA, there are no species in the annexes of the Bern Convention and CITES.

Kuruyer Construction and Accommodation Site

Three different sample locations representing various habitats were identified along the BSA. When selecting sample points, priority was given to natural habitats and areas where critical species are distributed. The survey locations where the study was conducted, the habitat types of the stations, and their coordinates are given in Table 103 and the maps showing the locations are provided in Appendix-3.5.

Table 103. Survey locations along the project route, their coordinates, and habitat types

Location	X	Y	Habitat
Location 1	36.199838	36.209340	E1.D - Unmanaged xeric grassland
Location 2	36.201072	36.206714	E1.D - Unmanaged xeric grassland
Location 3	36.197791	36.207861	G2.9 - Evergreen orchards and groves

During the fieldwork, habitats at each identified point were thoroughly examined, and field notes were recorded in the field diary. The floristic list provided habitat-based species based on findings and observations obtained during the field trip.

The floristic list is presented in the order of ferns (Pteridophyta), gymnosperms (Gymnospermae), and angiosperms (Angiospermae), respectively. Families within each group are listed in alphabetical order. When listing species, the following details are provided sequentially: Turkish names (if available), common names (if available), plant geography region, endemism status, threat level for endemics, inclusion in the Bern and CITES lists, and abundance, which are detailed in Table 104.



Table 104. The Flora List of the Project Route and Surrounding Areas

Family	Species	Turkish Name	Common Name	Endemism	IUCN	CITES	BERN	Phyto-Region	Relative Abundance	inside/outside BSA	Obs./Lit.
Alismataceae	<i>Alisma plantago-aquatica</i> subsp. <i>plantago-aquatica</i>	Çobandüdüğü	-	-	NE	-	-	European-Siberian	3	inside+outside	Obs./Lit.
Amaranthaceae	<i>Amaranthus retroflexus</i>	Tilkikuyruğu	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Apiaceae	<i>Lecokia cretica</i>	Eşek Baldıranı	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Apiaceae	<i>Smyrniolum connatum</i>	Yabani Kereviz	-	-	NE	-	-	Mediterranean	3	inside+outside	Obs./Lit.
Apocynaceae	<i>Nerium oleander</i>	Zakkum	East Indian oleander, Jamaica South Sea rose, Rose bay	-	LC	-	-	-	3	inside+outside	Obs./Lit.
Araceae	<i>Arum dioscoridis</i> var. <i>dioscoridis</i>	Tirşik Pancarı	-	-	NE	-	-	E.Mediterranean	3	inside+outside	Obs./Lit.
Asteraceae	<i>Bellis sylvestris</i>	Nineotu	-	-	NE	-	-	Mediterranean	2	inside+outside	Obs./Lit.
Asteraceae	<i>Calendula arvensis</i>	Portakal Nergisi	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Asteraceae	<i>Carduus pycnocephalus</i>	Soymaç	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Asteraceae	<i>Carthamus dentatus</i>	Kınadiken	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Asteraceae	<i>Centaurea urvillei</i> subsp. <i>armata</i>	Kötürüm	-	-	NE	-	-	E.Mediterranean	3	inside+outside	Obs./Lit.
Asteraceae	<i>Conyza canadensis</i>	Selviotu	Horseweed, Blood stanch	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Asteraceae	<i>Crepis sancta</i>	Yaban Kiskısı	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Asteraceae	<i>Cyanus pichleri</i> subsp. <i>pichleri</i>	Düğmeli Ot	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Asteraceae	<i>Inula viscosa</i>	Sümenit	-	-	NE	-	-	Mediterranean	2	inside+outside	Obs./Lit.
Asteraceae	<i>Lactuca mulgedioides</i>	Muş Marulu	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Asteraceae	<i>Notobasis syriaca</i>	Yavan Kenger	-	-	NE	-	-	Mediterranean	2	inside+outside	Obs./Lit.
Asteraceae	<i>Rhagadiolus stellatus</i>	Çatlakçanak	-	-	NE	-	-	Mediterranean	4	inside+outside	Obs./Lit.
Asteraceae	<i>Sonchus asper</i>	Eşekgevreği	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Asteraceae	<i>Sonchus oleraceus</i>	Kuzugevreği	-	-	NE	-	-	-	4	inside+outside	Obs./Lit.
Boraginaceae	<i>Echium plantagineum</i>	Kırkbatıran	-	-	NE	-	-	Mediterranean	4	inside+outside	Obs./Lit.
Brassicaceae	<i>Aethionema heterocarpum</i>	Çarşakgülü	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Brassicaceae	<i>Biscutella didyma</i>	Çitçitotu	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Brassicaceae	<i>Lepidium draba</i>	Diğnik	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Brassicaceae	<i>Raphanus raphanistrum</i>	Eşek Turpu	-	-	LC	-	-	-	3	inside+outside	Obs./Lit.
Brassicaceae	<i>Sinapis arvensis</i>	Hardal	-	-	LC	-	-	-	3	inside+outside	Obs./Lit.
Caprifoliaceae	<i>Lonicera etrusca</i> var. <i>hispidula</i>	-	-	-	NE	-	-	E.Mediterranean	3	inside+outside	Obs./Lit.
Caprifoliaceae	<i>Valeriana vesicaria</i>	Kuzugevreği	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Caryophyllaceae	<i>Cerastium gracile</i>	Küçük Boynuzotu	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Caryophyllaceae	<i>Dianthus zonatus</i> var. <i>zonatus</i>	-	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Caryophyllaceae	<i>Holosteum umbellatum</i>	Şeytan Küpesi	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Caryophyllaceae	<i>Petrorhagia alpina</i>	Dağferacesi	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Caryophyllaceae	<i>Silene colorata</i>	Kum Nakılı	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Caryophyllaceae	<i>Silene vulgaris</i> var. <i>commutata</i>	-	-	-	NE	-	-	-	4	inside+outside	Obs./Lit.
Caryophyllaceae	<i>Vaccaria hispanica</i>	Ekin Ebesi	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Euphorbiaceae	<i>Euphorbia helioscopia</i>	Feribanotu	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Euphorbiaceae	<i>Euphorbia peplus</i> var. <i>peplus</i>	-	-	-	NE	-	-	-	3	outside	Lit.
Fabaceae	<i>Lathyrus blepharicarpus</i>	Kirpikli İmirdik	-	-	NE	-	-	Irano-Turanian	2	inside+outside	Obs./Lit.
Fabaceae	<i>Medicago orbicularis</i>	Paralık	-	-	LC	-	-	-	3	inside+outside	Obs./Lit.
Fabaceae	<i>Trifolium arvense</i>	Tavşanayağı	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Fabaceae	<i>Trifolium cherleri</i>	Tokalı Düçük	-	-	NE	-	-	Mediterranean	3	inside+outside	Obs./Lit.
Fabaceae	<i>Trifolium scabrum</i>	Hıyar Düçük	-	-	NE	-	-	Mediterranean	3	inside+outside	Obs./Lit.
Fabaceae	<i>Vicia peregrina</i>	Kavli	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.

Family	Species	Turkish Name	Common Name	Endemism	IUCN	CITES	BERN	Phyto-Region	Relative Abundance	inside/outside BSA	Obs./Lit.
Geraniaceae	<i>Erodium cicutarium</i>	İğnelik	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Geraniaceae	<i>Erodium gruinum</i>	Kargadıdağı	-	-	NE	-	-	E.Mediterranean	2	inside+outside	Obs./Lit.
Geraniaceae	<i>Geranium columbinum</i>	Güvercin İtiri	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Geraniaceae	<i>Geranium dissectum</i>	Dilimli İtir	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Geraniaceae	<i>Geranium molle</i>	Yumuşak İtir	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Hypericaceae	<i>Hypericum thymifolium</i>	Çam Kantaronu	-	-	NE	-	-	E.Mediterranean	3	inside+outside	Obs./Lit.
Lamiaceae	<i>Ajuga chamaepitys</i>	Acıgıcı	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Lamiaceae	<i>Melissa officinalis</i>	Oğulotu	Lemon balm	-	LC	-	-	-	2	inside+outside	Obs./Lit.
Lamiaceae	<i>Stachys annua</i>	Haciosmanotu	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Lamiaceae	<i>Stachys pumila</i>	Sarı Karabaş	-	-	NE	-	-	E.Mediterranean	2	inside+outside	Obs./Lit.
Lamiaceae	<i>Thymbra spicata</i>	Zahter	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Oxalidaceae	<i>Oxalis corniculata</i>	Sarı Ekşiyonca	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Papaveraceae	<i>Fumaria densiflora</i>	Ergendöşeği	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Pinaceae	<i>Pinus brutia</i>	Kızılcım	-	-	LC	-	-	-	3	inside+outside	Obs./Lit.
Plantaginaceae	<i>Anarrhinum orientale</i>	Süpürgeotu	-	-	NE	-	-	Irano-Turanian	2	inside+outside	Obs./Lit.
Plantaginaceae	<i>Plantago cretica</i>	Bağayaprağı	-	-	NE	-	-	E.Mediterranean	2	inside+outside	Obs./Lit.
Plantaginaceae	<i>Plantago lagopus</i>	Kırkdamarotu	-	-	NE	-	-	Mediterranean	2	inside+outside	Obs./Lit.
Plantaginaceae	<i>Plantago maritima</i>	Yılandili	-	-	LC	-	-	-	3	inside+outside	Obs./Lit.
Poaceae	<i>Briza maxima</i>	Kuşyüreği	Greater quaking-grass	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Poaceae	<i>Bromus tectorum</i>	Kır Bromu	Drooping brome	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Poaceae	<i>Melica ciliata</i>	Kirpikli İnci	Silky-spike Melick, Silky-spike Melic	-	NE	-	-	European-Siberian	3	inside+outside	Obs./Lit.
Polygonaceae	<i>Polygonum maritimum</i>	Sicimlik	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Polygonaceae	<i>Rumex acetosella</i>	Kuzukulağı	-	-	LC	-	-	-	2	inside+outside	Obs./Lit.
Portulacaceae	<i>Portulaca oleracea</i>	Semizotu	Purslane, Common purslane, Pigweed, Pursley	-	LC	-	-	-	3	inside+outside	Obs./Lit.
Primulaceae	<i>Androsace maxima</i>	Tavukursağı	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Ranunculaceae	<i>Anemone coronaria</i>	Manisalâlesi	-	-	NE	-	-	Mediterranean	3	inside+outside	Obs./Lit.
Ranunculaceae	<i>Ranunculus asiaticus</i>	Şakayıklâlesi	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Ranunculaceae	<i>Ranunculus millefolius</i>	Bin Dügünççeği	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Ranunculaceae	<i>Ranunculus sprunerianus</i>	Duvar Dügünççeği	-	-	NE	-	-	Mediterranean	3	inside+outside	Obs./Lit.
Rubiaceae	<i>Asperula orientalis</i>	Gökçe Belumotu	-	-	NE	-	-	Irano-Turanian	3	inside+outside	Obs./Lit.
Rubiaceae	<i>Galium canum</i>	İt İplikçığı	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Styracaceae	<i>Styrax officinalis</i>	Ayıfındığı	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.

IUCN

EX : Extinct
EW : Extinct in the Wild
CR : Critically Endangered
EN : Endangered
VU : Vulnerable
NT : Near Threatened
LC : Least Concern
DD : Data Deficient
NE : Not Evaluated
RELATIVE ABUNDANCES
1: Extremely rare
2: Rare
3: Moderate density
4: Abundant
5: Very abundant

The areas along the BSA, where the project will be implemented, exhibit a vegetation structure shaped by Mediterranean and Continental climates. A significant portion of the BSA consists of modified habitats. The natural habitat covers approximately 39.18% of the total area along the BSA.

According to the surveys a total of 75 species and taxa at or below the level of family, belonging to 26 families (see Table 104) were observed.

Among the plant species detected in the BSA, 9 species are in the "LC" category and the remaining 66 species are in the "NE" category, according to IUCN. Among the species found in the BSA, there are no species in the annexes of the Bern Convention and CITES.

Antakya-Samandağ Road

Four different sample locations representing various habitats were identified along the BSA. When selecting sample points, priority was given to natural habitats and areas where critical species are distributed. The survey locations where the study was conducted, the habitat types of the stations, and their coordinates are given in Table 105 and the maps showing the locations are provided in Appendix-3.5.

Table 105. Survey locations along the project route, their coordinates, and habitat types

Location	X	Y	Habitat
Location 1	35.930812	36.111709	FB.3 - Shrub plantations for ornamental purposes or for fruit, other than vineyards
Location 2	36.016499	36.102430	FB.3 - Shrub plantations for ornamental purposes or for fruit, other than vineyards
Location 3	36.042119	36.135750	C2.3 - Permanent non-tidal, smooth-flowing watercourses
Location 4	36.066311	36.146992	J1.1 - Residential buildings of city and town centres

During the fieldwork, habitats at each identified point were thoroughly examined, and field notes were recorded in the field diary. The floristic list provided habitat-based species based on findings and observations obtained during the field trip.

The floristic list is presented in the order of ferns (Pteridophyta), gymnosperms (Gymnospermae), and angiosperms (Angiospermae), respectively. Families within each group are listed in alphabetical order. When listing species, the following details are provided sequentially: Turkish names (if available), common names (if available), plant geography region, endemism status, threat level for endemics, inclusion in the Bern and CITES lists, and abundance, which are detailed in Table 106.

Table 106. The Flora List of the Project Route and Surrounding Areas

Family	Species	Turkish Name	Common Name	Endemism	IUCN	CITES	BERN	Phyto-Region	Relative Abundance	inside/outside BSA	Obs./Lit.
Anacardiaceae	<i>Pistacia lentiscus</i>	Sakız Ağacı	-	-	LC	-	-	Mediterranean	2	inside+outside	Obs./Lit.
Apiaceae	<i>Crithmum maritimum</i>	Deniz Teresi	Rock samphire, Samphire, Sea fennel	-	LC	-	-	-	3	inside+outside	Obs./Lit.
Apiaceae	<i>Eryngium maritimum</i>	Kum Boğadikeni	-	-	LC	-	-	-	3	inside+outside	Obs./Lit.
Arecaceae	<i>Phoenix dactylifera</i>	Hurma	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Asteraceae	<i>Anthemis pauciloba</i>	Bol Papatya	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Brassicaceae	<i>Cakile maritima</i>	Kumteresi	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Caryophyllaceae	<i>Spergularia rubra</i>	Remilotu	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Euphorbiaceae	<i>Euphorbia terracina</i>	Topuklu Sütleşen	-	-	NE	-	-	Mediterranean	3	inside+outside	Obs./Lit.
Fabaceae	<i>Ononis spinosa</i>	Kayışkiran	-	-	LC	-	-	-	3	inside+outside	Obs./Lit.
Fabaceae	<i>Spartium junceum</i>	Katırtırnağı	-	-	NE	-	-	Mediterranean	3	inside+outside	Obs./Lit.
Fabaceae	<i>Vicia hybrida</i>	Melez Bakla	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Fabaceae	<i>Vicia villosa</i>	Tüylü Fiğ	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Iridaceae	<i>Gladiolus italicus</i>	Kılıçotu	-	-	LC	-	-	-	3	inside+outside	Obs./Lit.
Meliaceae	<i>Melia azedarach</i>	Tesbih Ağacı	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Myrtaceae	<i>Myrtus communis</i>	Mersin	Common myrtle, Myrtle	-	LC	-	-	-	2	inside+outside	Obs./Lit.
Oleaceae	<i>Olea europaea</i>	Zeytin	-	-	DD	-	-	-	3	inside+outside	Obs./Lit.
Orchidaceae	<i>Ophrys bornmuelleri</i>	Ebem Salebi	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Oxalidaceae	<i>Oxalis pes-caprae</i>	Koca Ekşiyonca	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Plumbaginaceae	<i>Limonium angustifolium</i>	Sahil Karanfili	-	-	NE	-	-	Mediterranean	2	inside+outside	Obs./Lit.
Rhamnaceae	<i>Ziziphus jujuba</i>	Hünnap	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Simaroubaceae	<i>Ailanthus altissima</i>	Kokarağaç	Tree of Heaven	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Smilacaceae	<i>Smilax aspera</i>	Gıcırdikeni	-	-	LC	-	-	-	3	inside+outside	Obs./Lit.
Styracaceae	<i>Styrax officinalis</i>	Ayıfındığı	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.

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LC : Least Concern
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NE : Not Evaluated

RELATIVE ABUNDANCES

1: Extremely rare
2: Rare
3: Moderate density
4: Abundant
5: Very abundant

The areas along the BSA, where the project will be implemented, exhibit a vegetation structure shaped by Mediterranean and Continental climates. A significant portion of the BSA consists of modified habitats. The natural habitat covers approximately 0.06% of the total area along the BSA.

According to the surveys a total of 23 species and taxa at or below the level of family, belonging to 19 families (see Table 106) were observed.

Among the plant species detected in the BSA, 7 species are in the "LC" category, 1 species is in "DD" category, and the remaining 15 species are in the "NE" category, according to IUCN. Among the species found in the BSA, there are no species in the annexes of the Bern Convention and CITES.

Beylerderesi Bridge

Two different sample locations representing various habitats were identified along the BSA. When selecting sample points, priority was given to natural habitats and areas where critical species are distributed. The survey locations where the study was conducted, the habitat types of the stations, and their coordinates are given in Table 107 and the maps showing the locations are provided in Appendix-3.5.

Table 107. Survey locations along the project route, their coordinates, and habitat types

Location	X	Y	Habitat
Location 1	38.208329	38.338236	E2.5 - Meadows of the steppe zone
Location 2	38.210048	38.339258	E2.5 - Meadows of the steppe zone

During the fieldwork, habitats at each identified point were thoroughly examined, and field notes were recorded in the field diary. The floristic list provided habitat-based species based on findings and observations obtained during the field trip.

The floristic list is presented in the order of ferns (Pteridophyta), gymnosperms (Gymnospermae), and angiosperms (Angiospermae), respectively. Families within each group are listed in alphabetical order. When listing species, the following details are provided sequentially: Turkish names (if available), common names (if available), plant geography region, endemism status, threat level for endemics, inclusion in the Bern and CITES lists, and abundance, which are detailed in Table 108.



Table 108. The Flora List of the Project Route and Surrounding Areas

Family	Species	Turkish Name	Common Name	Endemism	IUCN	CITES	BERN	Phyto-Region	Relative Abundance	inside/outside BSA	Obs./Lit.
Euphorbiaceae	<i>Chrozophora tinctoria</i>	Siğilotu	-	-	LC	-	-	-	3	inside+outside	Obs./Lit.
Euphorbiaceae	<i>Euphorbia aleppica</i>	Haşul	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Euphorbiaceae	<i>Euphorbia falcata</i>	Eğri Sütleğen	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Euphorbiaceae	<i>Euphorbia petiolata</i>	Ayaklı Sütleğen	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Ixioliriaceae	<i>Ixiolirion tataricum</i>	Köpekotu	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Lamiaceae	<i>Salvia sclarea</i>	Paskulak	Clary sage	-	LC	-	-	-	3	inside+outside	Obs./Lit.
Poaceae	<i>Aegilops biuncialis</i>	İkikilçık	-	-	LC	-	-	-	3	inside+outside	Obs./Lit.
Poaceae	<i>Aegilops cylindrica</i>	Kırpıklı Ot	-	-	LC	-	-	Irano-Turanian	3	inside+outside	Obs./Lit.
Poaceae	<i>Avena sterilis</i>	Şifan	Winter wild oat	-	LC	-	-	-	3	inside+outside	Obs./Lit.
Ranunculaceae	<i>Nigella unguicularis</i>	Şehniz	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
IUCN EX : Extinct EW : Extinct in the Wild CR : Critically Endangered EN : Endangered VU : Vulnerable NT : Near Threatened LC : Least Concern DD : Data Deficient NE : Not Evaluated RELATIVE ABUNDANCES 1: Extremely rare 2: Rare 3: Moderate density 4: Abundant 5: Very abundant											

The areas along the BSA, where the project will be implemented, exhibit a vegetation structure shaped by Steppes. A significant portion of the BSA consists of natural habitats. The natural habitat covers approximately 58.67% of the total area along the BSA.

According to the surveys a total of 10 species and taxa at or below the level of family, belonging to 5 families (see Table 108) were observed.

Among the plant species detected in the BSA, 5 species are in the "LC" category and the remaining 4 species are in the "NE" category, according to IUCN. Among the species found in the BSA, there are no species in the annexes of the Bern Convention and CITES.

Tohma Bridge and Tohma Construction and Accommodation Site

Two different sample locations representing various habitats were identified along the BSA. When selecting sample points, priority was given to natural habitats and areas where critical species are distributed. The survey locations where the study was conducted, the habitat types of the stations, and their coordinates are given in Table 109 and the maps showing the locations are provided in Appendix-3.5.

Table 109. Survey locations along the project route, their coordinates, and habitat types

Location	X	Y	Habitat
Location 1	38.235297	38.503491	C3.4 - Species-poor beds of low-growing water-fringing or amphibious vegetation
Location 2	38.2395944	38.506139	C3.4 - Species-poor beds of low-growing water-fringing or amphibious vegetation

During the fieldwork, habitats at each identified point were thoroughly examined, and field notes were recorded in the field diary. The floristic list provided habitat-based species based on findings and observations obtained during the field trip.

The floristic list is presented in the order of ferns (Pteridophyta), gymnosperms (Gymnospermae), and angiosperms (Angiospermae), respectively. Families within each group are listed in alphabetical order. When listing species, the following details are provided sequentially: Turkish names (if available), common names (if available), plant geography region, endemism status, threat level for endemics, inclusion in the Bern and CITES lists, and abundance, which are detailed in Table 110.



Table 110. The Flora List of the Project Route and Surrounding Areas

Family	Species	Turkish Name	Common Name	Endemism	IUCN	CITES	BERN	Phyto-Region	Relative Abundance	inside/outside BSA	Obs./Lit.
Apiaceae	<i>Daucus carota</i>	Yabani Havuç	-	-	LC	-	-	-	3	inside+outside	Obs./Lit.
Asparagaceae	<i>Asparagus officinalis</i>	Kuşkonmaz	Asparagus	-	LC	-	-	-	3	inside+outside	Obs./Lit.
Fabaceae	<i>Lathyrus sativus</i>	Mürdümük	-	-	NE	-	-	Mediterranean	2	inside+outside	Obs./Lit.
Fabaceae	<i>Lens culinaris subsp. culinaris</i>	Mercimek	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Fabaceae	<i>Melilotus albus</i>	Ak Taşyoncası	-	-	LC	-	-	-	2	inside+outside	Obs./Lit.
Fabaceae	<i>Melilotus officinalis</i>	Kokulu Yonca	Yellow melilot	-	LC	-	-	-	3	inside+outside	Obs./Lit.
Fabaceae	<i>Trigonella spicata</i>	Başak Boyotu	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Geraniaceae	<i>Erodium cicutarium</i>	İğnelik	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Plantaginaceae	<i>Veronica persica</i>	Cırcamuk	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Poaceae	<i>Aegilops triuncialis</i>	Üçkılıçık	-	-	LC	-	-	-	3	inside+outside	Obs./Lit.
Poaceae	<i>Triticum monococcum</i>	Siyez	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Portulacaceae	<i>Portulaca oleracea</i>	Semizotu	Purslane, Common purslane, Pigweed, Pursley	-	LC	-	-	-	3	inside+outside	Obs./Lit.
Rosaceae	<i>Cerasus vulgaris</i>	Vişne	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.

IUCN
EX : Extinct
EW : Extinct in the Wild
CR : Critically Endangered
EN : Endangered
VU : Vulnerable
NT : Near Threatened
LC : Least Concern
DD : Data Deficient
NE : Not Evaluated

RELATIVE ABUNDANCES
1: Extremely rare
2: Rare
3: Moderate density
4: Abundant
5: Very abundant

The areas along the BSA, where the project will be implemented, exhibit a vegetation structure shaped by riparian zone. A significant portion of the BSA consists of natural habitats. The natural habitat covers approximately 55.12% of the total area along the BSA.

According to the surveys a total of 13 species and taxa at or below the level of family, belonging to 8 families (see Table 110) were observed.

Among the plant species detected in the BSA, 6 species are in the "LC" category and the remaining 7 species are in the "NE" category, according to IUCN. Among the species found in the BSA, there are no species in the annexes of the Bern Convention and CITES.

Ağın Bridge and Ağın Construction and Accommodation Site

Two different sample locations representing various habitats were identified along the BSA. When selecting sample points, priority was given to natural habitats and areas where critical species are distributed. The survey locations where the study was conducted, the habitat types of the stations, and their coordinates are given in Table 111 and the maps showing the locations are provided in Appendix-3.5.

Table 111. Survey locations along the project route, their coordinates, and habitat types

Location	X	Y	Habitat
Location 1	38.660665	38.913827	E1.9 - Open non-Mediterranean dry acid and neutral grassland, including inland dune grassland
Location 2	38.664893	38.916971	E1.9 - Open non-Mediterranean dry acid and neutral grassland, including inland dune grassland

During the fieldwork, habitats at each identified point were thoroughly examined, and field notes were recorded in the field diary. The floristic list provided habitat-based species based on findings and observations obtained during the field trip.

The floristic list is presented in the order of ferns (Pteridophyta), gymnosperms (Gymnospermae), and angiosperms (Angiospermae), respectively. Families within each group are listed in alphabetical order. When listing species, the following details are provided sequentially: Turkish names (if available), common names (if available), plant geography region, endemism status, threat level for endemics, inclusion in the Bern and CITES lists, and abundance, which are detailed in Table 112.

Table 112. The Flora List of the Project Route and Surrounding Areas

Family	Species	Turkish Name	Common Name	Endemism	IUCN	CITES	BERN	Phyto-Region	Relative Abundance	inside/outside BSA	Obs./Lit.
Apiaceae	<i>Daucus carota</i>	Yabani Havuç	-	-	LC	-	-	-	3	inside+outside	Obs./Lit.
Asparagaceae	<i>Asparagus officinalis</i>	Kuşkonmaz	Asparagus	-	LC	-	-	-	3	inside+outside	Obs./Lit.
Cyperaceae	<i>Carex pairae</i>	Çayır Ayakotu	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Fabaceae	<i>Melilotus albus</i>	Ak Taşyoncası	-	-	LC	-	-	-	2	inside+outside	Obs./Lit.
Poaceae	<i>Aegilops biuncialis</i>	İkikılıçık	-	-	LC	-	-	-	3	inside+outside	Obs./Lit.
Poaceae	<i>Aegilops neglecta</i>	Tüylü Buğday	-	-	LC	-	-	Mediterranean	3	inside+outside	Obs./Lit.
Poaceae	<i>Aegilops triuncialis</i>	Üçkılıçık	-	-	LC	-	-	-	2	inside+outside	Obs./Lit.
Poaceae	<i>Triticum monococcum</i>	Siyez	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.

IUCN
EX : Extinct
EW : Extinct in the Wild
CR : Critically Endangered
EN : Endangered
VU : Vulnerable
NT : Near Threatened
LC : Least Concern
DD : Data Deficient
NE : Not Evaluated
RELATIVE ABUNDANCES
1: Extremely rare
2: Rare
3: Moderate density
4: Abundant
5: Very abundant

The areas along the BSA, where the project will be implemented, exhibit a vegetation structure shaped by grassland. A significant portion of the BSA consists of natural habitats. The natural habitat covers approximately 88.94% of the total area along the BSA.

According to the surveys a total of 8 species and taxa at or below the level of family, belonging to 5 families (see Table 112) were observed.

Among the plant species detected in the BSA, 6 species are in the "LC" category and the remaining 2 species are in the "NE" category, according to IUCN. Among the species found in the BSA, there are no species in the annexes of the Bern Convention and CITES.

Malatya-Akçadağ-Gölbaşı Road & Erkenek Tunnel, Material Storage Areas and Erkenek Construction and Accommodation Site

Six different sample locations representing various habitats were identified along the BSA. When selecting sample points, priority was given to natural habitats and areas where critical species are distributed. The survey locations where the study was conducted, the habitat types of the stations, and their coordinates are given in Table 113 and the maps showing the locations are provided in Appendix-3.5.

Table 113. Survey locations along the project route, their coordinates, and habitat types

Location	X	Y	Habitat
Location 1	37.726339	37.852258	G4.E - Mixed mediterranean pine - evergreen oak woodland
Location 2	37.752912	37.860140	H5.3 - Sparsely- or un-vegetated habitats on mineral substrates not resulting from recent ice activity
Location 3	37.788295	37.883275	H5.3 - Sparsely- or un-vegetated habitats on mineral substrates not resulting from recent ice activity
Location 4	37.804810	37.898737	H5.3 - Sparsely- or un-vegetated habitats on mineral substrates not resulting from recent ice activity
Location 5	37.832893	37.911304	H5.3 - Sparsely- or un-vegetated habitats on mineral substrates not resulting from recent ice activity
Location 6	37.903111	37.925941	H5.3 - Sparsely- or un-vegetated habitats on mineral substrates not resulting from recent ice activity

During the fieldwork, habitats at each identified point were thoroughly examined, and field notes were recorded in the field diary. The floristic list provided habitat-based species based on findings and observations obtained during the field trip.

The floristic list is presented in the order of ferns (Pteridophyta), gymnosperms (Gymnospermae), and angiosperms (Angiospermae), respectively. Families within each group are listed in alphabetical order. When listing species, the following details are provided sequentially: Turkish names (if available), common names (if available), plant geography region, endemism status, threat level for endemics, inclusion in the Bern and CITES lists, and abundance, which are detailed in Table 114.

Table 114. The Flora List of the Project Route and Surrounding Areas

Family	Species	Turkish Name	Common Name	Endemism	IUCN	CITES	BERN	Phyto-Region	Relative Abundance	inside/outside BSA	Obs./Lit.
Amaranthaceae	<i>Chenopodium foliosum</i>	Cülek	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Apiaceae	<i>Bunium paucifolium</i>	Koçkuzu	-	-	NE	-	-	Irano-Turanian	2	inside+outside	Obs./Lit.
Apiaceae	<i>Eryngium campestre</i>	Kırsenet	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Apiaceae	<i>Scandix australis</i>	Kişkiş	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Apiaceae	<i>Torilis arvensis</i>	Dercikotu	-	-	NE	-	-	-	4	inside+outside	Obs./Lit.
Apiaceae	<i>Torilis leptophylla</i>	İnce Dercikotu	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Apiaceae	<i>Turgenia latifolia</i>	Karaheci	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Apocynaceae	<i>Cionura erecta</i>	Babrik	-	-	NE	-	-	E.Mediterranean	3	inside+outside	Obs./Lit.
Asparagaceae	<i>Prospero autumnale</i>	Güz Sümbülü	-	-	NE	-	-	Mediterranean	3	inside+outside	Obs./Lit.
Asteraceae	<i>Achillea vermicularis</i>	Puşan	-	-	NE	-	-	Irano-Turanian	2	inside+outside	Obs./Lit.
Asteraceae	<i>Anthemis pauciloba</i>	Bol Papatya	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Asteraceae	<i>Artemisia sieberi</i>	Mervent	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Asteraceae	<i>Centaurea iberica</i>	Deligözdikeni	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Asteraceae	<i>Centaurea rigida</i>	Gürbüzdikeni	-	-	NE	-	-	Irano-Turanian	3	inside+outside	Obs./Lit.
Asteraceae	<i>Centaurea solstitialis subsp. solstitialis</i>	Çakırdikeni	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Asteraceae	<i>Chardinia orientalis</i>	Çağlaotu	-	-	NE	-	-	Irano-Turanian	3	inside+outside	Obs./Lit.
Asteraceae	<i>Cota tinctoria</i>	Boyacı Papatyası	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Asteraceae	<i>Crepis sancta</i>	Yaban Kiskısı	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Asteraceae	<i>Crupina crupinastrum</i>	Gelindöndüren	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Asteraceae	<i>Filago anatolica</i>	Ana Keçeotu	-	-	NE	-	-	Irano-Turanian	3	inside+outside	Obs./Lit.
Asteraceae	<i>Filago palaestina</i>	Birecik Keçeotu	-	-	NE	-	-	Irano-Turanian	3	inside+outside	Obs./Lit.
Asteraceae	<i>Gundelia tournefortii</i>	Kenger	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Asteraceae	<i>Leontodon crispus subsp. asper</i>	Aslandişi	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Asteraceae	<i>Notobasis syriaca</i>	Yavan Kenger	-	-	NE	-	-	Mediterranean	3	inside+outside	Obs./Lit.
Asteraceae	<i>Picnoman acarna</i>	Kılçıkdişeni	-	-	NE	-	-	Mediterranean	3	inside+outside	Obs./Lit.
Asteraceae	<i>Picris kotschyi</i>	Arap Şirosu	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Asteraceae	<i>Picris strigosa</i>	Acışiro	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Asteraceae	<i>Pilosella echioides</i>	Mamık Tırnakotu	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Asteraceae	<i>Scolymus grandiflorus</i>	Çetmidikeni	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Asteraceae	<i>Senecio vernalis</i>	Kanaryaotu	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Asteraceae	<i>Senecio vulgaris</i>	Taşakçilotu	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Asteraceae	<i>Tragopogon porrifolius subsp. longirostris</i>	Helevan	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Asteraceae	<i>Xanthium spinosum</i>	Pıtrak	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Boraginaceae	<i>Anchusa azurea</i>	Sığırdili	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Boraginaceae	<i>Buglossoides tenuiflora</i>	İnce Taşkesen	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Boraginaceae	<i>Cynoglossum montanum</i>	Dağ Köpek dili	-	-	NE	-	-	European-Siberian	3	inside+outside	Obs./Lit.
Brassicaceae	<i>Capsella bursa-pastoris</i>	Çobançantası	Sheperd's purse	-	LC	-	-	-	4	inside+outside	Obs./Lit.
Brassicaceae	<i>Chrysochamela velutina</i>	Havlı Gillik	-	-	NE	-	-	Irano-Turanian	3	inside+outside	Obs./Lit.
Brassicaceae	<i>Clypeola jonthlaspi</i>	Akçeotu	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Brassicaceae	<i>Lepidium draba</i>	Diğnik	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Brassicaceae	<i>Matthiola longipetala</i>	Gecegündüz Çiçeği	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Brassicaceae	<i>Microthlaspi perfoliatum</i>	Giyle	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Campanulaceae	<i>Asyneuma virgatum subsp. virgatum</i>	Çiçeklideğnek	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Campanulaceae	<i>Campanula involucreta</i>	Sarım Çanı	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.

Family	Species	Turkish Name	Common Name	Endemism	IUCN	CITES	BERN	Phyto-Region	Relative Abundance	inside/outside BSA	Obs./Lit.
Capparaceae	<i>Capparis spinosa</i>	Kebere	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Caprifoliaceae	<i>Valerianella vesicaria</i>	Kuzugevreği	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Caryophyllaceae	<i>Acanthophyllum verticillatum</i>	Takacak	-	-	NE	-	-	Irano-Turanian	3	inside+outside	Obs./Lit.
Caryophyllaceae	<i>Dianthus orientalis</i>	Yar Karanfili	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Caryophyllaceae	<i>Silene aegyptiaca</i>	Balıca	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Caryophyllaceae	<i>Silene compacta</i>	Kanlıbasıra Otu	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Cleomaceae	<i>Cleome ornithopodioides</i>	Taş Saçakgülü	-	-	NE	-	-	E.Mediterranean	3	inside+outside	Obs./Lit.
Cucurbitaceae	<i>Ecballium elaterium</i>	Eşek Hıyarı	-	-	NE	-	-	Mediterranean	3	inside+outside	Obs./Lit.
Fabaceae	<i>Lathyrus gorgoni var. gorgoni</i>	-	-	-	NE	-	-	Mediterranean	3	inside+outside	Obs./Lit.
Fabaceae	<i>Lathyrus vinealis</i>	Bağ Burçağı	-	-	NE	-	-	Irano-Turanian	3	inside+outside	Obs./Lit.
Fabaceae	<i>Medicago orbicularis</i>	Paralık	-	-	LC	-	-	-	3	inside+outside	Obs./Lit.
Fabaceae	<i>Onobrychis caput-galli</i>	Pıtrak Korunga	-	-	NE	-	-	Mediterranean	3	inside+outside	Obs./Lit.
Fabaceae	<i>Trifolium grandiflorum</i>	Hanım Üçgülü	-	-	NE	-	-	E.Mediterranean	4	inside+outside	Obs./Lit.
Fagaceae	<i>Quercus brantii</i>	Karameşe	-	-	NE	-	-	Irano-Turanian	4	inside+outside	Obs./Lit.
Fagaceae	<i>Quercus infectoria subsp. infectoria</i>	Mazı Meşesi	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Geraniaceae	<i>Erodium cicutarium</i>	İğnelik	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Ixioliriaceae	<i>Ixiolirion tataricum</i>	Köpekotu	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Lamiaceae	<i>Ballota saxatilis subsp. saxatilis</i>	Nemnemotu	-	-	NE	-	-	E.Mediterranean	3	inside+outside	Obs./Lit.
Lamiaceae	<i>Clinopodium serpyllifolium subsp. brachycalyx</i>	Şarşarçayı	-	-	NE	-	-	Blacksea	3	inside+outside	Obs./Lit.
Lamiaceae	<i>Lallemantia iberica</i>	Ajdarbaşı	-	-	NE	-	-	Irano-Turanian	3	inside+outside	Obs./Lit.
Lamiaceae	<i>Mentha longifolia subsp. longifolia</i>	Pünk	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Lamiaceae	<i>Salvia multicaulis</i>	Kürt Reyhanı	-	-	NE	-	-	Irano-Turanian	3	inside+outside	Obs./Lit.
Lamiaceae	<i>Ziziphora capitata</i>	Anuk	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Liliaceae	<i>Gagea gageoides</i>	Tokalı Yıldız	-	-	NE	-	-	Irano-Turanian	3	inside+outside	Obs./Lit.
Linaceae	<i>Linum bienne</i>	Deli Keten	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Linaceae	<i>Linum mucronatum subsp. mucronatum</i>	Sarı Keten	-	-	NE	-	-	Irano-Turanian	3	inside+outside	Obs./Lit.
Malvaceae	<i>Alcea digitata</i>	Boylu Hatmi	-	-	NE	-	-	Irano-Turanian	3	inside+outside	Obs./Lit.
Papaveraceae	<i>Papaver rhoeas</i>	Gelincik	Corn poppy, Shirley poppy, Common poppy, Poppy	-	LC	-	-	-	3	inside+outside	Obs./Lit.
Pinaceae	<i>Pinus brutia</i>	Kızılçam	-	-	LC	-	-	-	2	inside+outside	Obs./Lit.
Plantaginaceae	<i>Linaria chalcensis</i>	Halep Nevruzotu	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Plantaginaceae	<i>Plantago cretica</i>	Bağayaprağı	-	-	NE	-	-	E.Mediterranean	3	inside+outside	Obs./Lit.
Plantaginaceae	<i>Veronica orientalis subsp. orientalis</i>	Gözmumcuğu	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Poaceae	<i>Briza minor</i>	Küçükzembil	Lesser quaking-grass	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Poaceae	<i>Echinaria capitata</i>	Dikenbaşotu	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Poaceae	<i>Melica persica</i>	Acem İnciotu	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Poaceae	<i>Poa bulbosa</i>	Yumrulu Salkım	Bulbous meadow grass	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Primulaceae	<i>Androsace maxima</i>	Tavukursağı	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Ranunculaceae	<i>Ceratocephala testiculata</i>	Düğün Yelotu	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Ranunculaceae	<i>Consolida axilliflora</i>	Salkım Mahmuz	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Resedaceae	<i>Reseda lutea</i>	Muhabet Çiçeği	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Rhamnaceae	<i>Paliurus spina-christi</i>	Karaçalı	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Rosaceae	<i>Amygdalus arabica</i>	Arap Bademi	-	-	NE	-	-	Irano-Turanian	3	inside+outside	Obs./Lit.
Rosaceae	<i>Cerasus microcarpa</i>	Yaban Kirazı	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Rubiaceae	<i>Asperula orientalis</i>	Gökçe Belmotu	-	-	NE	-	-	Irano-Turanian	3	inside+outside	Obs./Lit.
Rubiaceae	<i>Cruciata taurica</i>	Kırım Güzeli	-	-	NE	-	-	Irano-Turanian	3	inside+outside	Obs./Lit.

Family	Species	Turkish Name	Common Name	Endemism	IUCN	CITES	BERN	Phyto-Region	Relative Abundance	inside/outside BSA	Obs./Lit.
IUCN EX : Extinct EW : Extinct in the Wild CR : Critically Endangered EN : Endangered VU : Vulnerable NT : Near Threatened LC : Least Concern DD : Data Deficient NE : Not Evaluated RELATIVE ABUNDANCES 1: Extremely rare 2: Rare 3: Moderate density 4: Abundant 5: Very abundant											

The areas along the BSA, where the project will be implemented, exhibit a vegetation structure shaped by forest and sparsely vegetated areas. A significant portion of the BSA consists of natural habitats. The natural habitat covers approximately 65.58% of the total area along the BSA.

According to the surveys a total of 89 species and taxa at or below the level of family, belonging to 32 families (see Table 114) were observed.

Among the plant species detected in the BSA, 4 species are in the "LC" category and the remaining 85 species are in the "NE" category, according to IUCN. Among the species found in the BSA, there are no species in the annexes of the Bern Convention and CITES.

Reşadiye Limestone Quarry

One sample location representing natural habitat was identified along the BSA. When selecting sample points, priority was given to natural habitats and areas where critical species are distributed. The survey locations where the study was conducted, the habitat types of the stations, and their coordinates are given in Table 115 and the maps showing the locations are provided in Appendix-3.5.

Table 115. Survey locations along the project route, their coordinates, and habitat types

Location	X	Y	Habitat
Location 1	38.002559	37.974655	H3.5 - Almost bare rock pavements, including limestone pavements

During the fieldwork, habitat at identified point was thoroughly examined, and field notes were recorded in the field diary. The floristic list provided habitat-based species based on findings and observations obtained during the field trip.

The floristic list is presented in the order of ferns (Pteridophyta), gymnosperms (Gymnospermae), and angiosperms (Angiospermae), respectively. Families within each group are listed in alphabetical order. When listing species, the following details are provided sequentially: Turkish names (if available), common names (if available), plant geography region, endemism status, threat level for endemics, inclusion in the Bern and CITES lists, and abundance, which are detailed in Table 116.



Table 116. The Flora List of the Project Route and Surrounding Areas

Family	Species	Turkish Name	Common Name	Endemism	IUCN	CITES	BERN	Phyto-Region	Relative Abundance	inside/outside BSA	Obs./Lit.
Anacardiaceae	<i>Cotinus coggygria</i>	Boyacı Sumağı	Smoke bush	-	LC	-	-	-	3	inside+outside	Obs./Lit.
Apocynaceae	<i>Cynanchum acutum</i>	Bacırgan	-	-	LC	-	-	-	3	inside+outside	Obs./Lit.
Fabaceae	<i>Medicago polymorpha</i>	Kırkyonca	-	-	LC	-	-	-	3	inside+outside	Obs./Lit.
Fabaceae	<i>Medicago rigidula</i>	Kaba Yonca	-	-	LC	-	-	-	3	inside+outside	Obs./Lit.
Fabaceae	<i>Medicago sativa</i>	Karayonca	-	-	LC	-	-	-	3	inside+outside	Obs./Lit.
Fabaceae	<i>Phaseolus vulgaris</i>	Fasülye	French bean, Fine bean	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Fabaceae	<i>Vicia hirsuta</i>	Bozfiğ	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Poaceae	<i>Poa bulbosa</i>	Yumrulu Salkım	Bulbous meadow grass	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Poaceae	<i>Poa timoleontis</i>	Gür Salkımotu	-	-	NE	-	-	Mediterranean	3	inside+outside	Obs./Lit.
Poaceae	<i>Saccharum ravennae</i>	Uslu Şekerkamışı	-	-	LC	-	-	-	3	inside+outside	Obs./Lit.
IUCN EX : Extinct EW : Extinct in the Wild CR : Critically Endangered EN : Endangered VU : Vulnerable NT : Near Threatened LC : Least Concern DD : Data Deficient NE : Not Evaluated RELATIVE ABUNDANCES 1: Extremely rare 2: Rare 3: Moderate density 4: Abundant 5: Very abundant											

The areas along the BSA, where the project will be implemented, exhibit a vegetation structure shaped by sparsely vegetated areas. A significant portion of the BSA consists of natural habitats.

According to the surveys a total of 10 species and taxa at or below the level of family, belonging to 4 families (see Table 116) were observed.

Among the plant species detected in the BSA, 6 species are in the "LC" category and the remaining 4 species are in the "NE" category, according to IUCN. Among the species found in the BSA, there are no species in the annexes of the Bern Convention and CITES.

Erkenek Gravel-Sand Quarry

Two sample location representing natural habitat was identified along the BSA. When selecting sample points, priority was given to natural habitats and areas where critical species are distributed. The survey locations where the study was conducted, the habitat types of the stations, and their coordinates are given in Table 117 and the maps showing the locations are provided in Appendix-3.5.

Table 117. Survey locations along the project route, their coordinates, and habitat types

Location	X	Y	Habitat
Location 1	37.994.831	37.926.604	E1.D - Unmanaged xeric grassland
Location 2	37.995.506	37.927.839	E1.D - Unmanaged xeric grassland

During the fieldwork, habitat at identified point was thoroughly examined, and field notes were recorded in the field diary. The floristic list provided habitat-based species based on findings and observations obtained during the field trip.

The floristic list is presented in the order of ferns (Pteridophyta), gymnosperms (Gymnospermae), and angiosperms (Angiospermae), respectively. Families within each group are listed in alphabetical order. When listing species, the following details are provided sequentially: Turkish names (if available), common names (if available), plant geography region, endemism status, threat level for endemics, inclusion in the Bern and CITES lists, and abundance, which are detailed in Table 118.

Table 118. The Flora List of the Project Route and Surrounding Areas

Family	Species	Turkish Name	Common Name	Endemism	IUCN	CITES	BERN	Phyto-Region	Relative Abundance	inside/outside BSA	Obs./Lit.
Amaranthaceae	<i>Chenopodium foliosum</i>	Cülek	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Amaryllidaceae	<i>Allium cardiostemon</i>	Yamaç Körmeni	-	-	NE	-	-	Irano-Turanian	3	inside+outside	Obs./Lit.
Amaryllidaceae	<i>Allium chrysantherum</i>	Sarı Kafa	-	-	NE	-	-	Irano-Turanian	2	inside+outside	Obs./Lit.
Anacardiaceae	<i>Cotinus coggygria</i>	Boyacı Sumağı	Smoke bush	-	LC	-	-	-	3	inside+outside	Obs./Lit.
Apocynaceae	<i>Cynanchum acutum</i>	Bacırgan	-	-	LC	-	-	-	3	inside+outside	Obs./Lit.
Asteraceae	<i>Cichorium intybus</i>	Hindiba	Chicory, Common chicory	-	LC	-	-	-	4	inside+outside	Obs./Lit.
Asteraceae	<i>Cota altissima</i>	Köpek Papatyası	-	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Asteraceae	<i>Echinops orientalis</i>	Dağşekeri	-	-	NE	-	-	Irano-Turanian	3	inside+outside	Obs./Lit.
Caryophyllaceae	<i>Moehringia trinervia</i>	Keleşot	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Fabaceae	<i>Coronilla scorpioides</i>	Akrep Burçağı	-	-	NE	-	-	-	2	inside+outside	Obs./Lit.
Juncaceae	<i>Juncus compressus</i>	Karahasırlık	Round fruited rush	-	LC	-	-	-	2	inside+outside	Obs./Lit.
Poaceae	<i>Poa bulbosa</i>	Yumrulu Salkım	Bulbous meadow grass	-	NE	-	-	-	3	inside+outside	Obs./Lit.
Poaceae	<i>Poa timoleontis</i>	Gür Salkımotu	-	-	NE	-	-	E.Mediterranean	3	inside+outside	Obs./Lit.
Polygonaceae	<i>Rumex acetosella</i>	Kuzukulağı	-	-	LC	-	-	-	3	inside+outside	Obs./Lit.

IUCN

EX : Extinct
EW : Extinct in the Wild
CR : Critically Endangered
EN : Endangered
VU : Vulnerable
NT : Near Threatened
LC : Least Concern
DD : Data Deficient
NE : Not Evaluated

RELATIVE ABUNDANCES
1: Extremely rare
2: Rare
3: Moderate density
4: Abundant
5: Very abundant

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The areas along the BSA, where the project will be implemented, exhibit a vegetation structure shaped by forest and sparsely vegetated areas. A significant portion of the BSA consists of natural habitats. The natural habitat covers approximately 65.58% of the total area along the BSA.

According to the surveys a total of 14 species and taxa at or below the level of family, belonging to 9 families (see Table 118) were observed.

Among the plant species detected in the BSA, 5 species are in the "LC" category and the remaining 9 species are in the "NE" category, according to IUCN. Among the species found in the BSA, there are no species in the annexes of the Bern Convention and CITES.

Terrestrial Fauna

The aim of the survey was to identify the fauna species of the route and structures, determine any critical fauna species and habitats along the BSA, and minimize the impact of the activities on these species and habitats. Initially, a sufficient number of sample points representing each habitat were determined using Google Earth. Considering the potential effects on both sides of the road during the activities, a zone of 100 meters to the right and left of the road was included in the study. Also, 100 meters buffer zone was determined for the related facilities, quarries and construction areas. Amphibians, reptiles, birds and mammal species were identified and assessed according to sub-section below. In every table family, species, Turkish name, Common name, endemism, IUCN, CITES, Bern Convention, MAKK (Hunting Law), relative abundance, and detection method is given.

TAG Highway-Aslanlı Tunnel-Nurdağı Junction

Species observed and added due to literature review for TAG Highway-Aslanlı Tunnel-Nurdağı Junction (Ceyhan Construction and Accommodation Site, Bahçe (Ayran) Concrete Plant, Tatarlı Basalt Quarry, Başpınar Limestone Quarry) is given in Table 119.



Table 119. Fauna species at TAG Highway-Aslanlı Tunnel-Nurdağı Junction

Family	Species	Turkish Name	Common Name	Endemizm	IUCN	CITES	BERN	MAKK	Statue	Red Data Book	Relative Abundance	inside/outside BSA	Obs./Lit.
Hylidae	<i>Hyla savignyi</i>	Levanten Ağaç Kurbağası, Yeşil Kurbağa	Levantine Tree/Green Frog	-	LC	-	III	-	-	-	1	outside	Lit.
Ranidae	<i>Pelophylax ridibundus</i>	Ova Kurbağası, Bataklık Kurbağası	Euroasian Marsh Frog, Marsh Frog	-	LC	-	III	-	-	-	1	outside	Lit.
Colubridae	<i>Eirenis barani</i>	Baran Cüce Yılanı	Baran Dwarf Racer	+	LC	-	III	-	-	-	1	outside	Lit.
Lacertidae	<i>Ophisops elegans</i>	Tarla Kertenkelesi, Yılan Gözlü Kertenkele	Snake-Eyed Lizard	-	NE	-	II	-	-	-	3	inside+outside	Obs./Lit.
Accipitridae	<i>Buteo buteo</i>	Şahin	Eurasian Buzzard	-	LC	II	III	-	Native	A.3	2	inside+outside	Obs./Lit.
Accipitridae	<i>Buteo rufinus</i>	Kızıl Şahin	Long-Legged Buzzard	-	LC	II	III	-	Native	A.3	2	inside+outside	Obs./Lit.
Accipitridae	<i>Circus aeruginosus</i>	Saz Delicesi	Western Marsh-Harrier	-	LC	II	III	-	Native	A.3	1	outside	Lit.
Accipitridae	<i>Circus cyaneus</i>	Gökçe Delice	Hen Harrier	-	LC	II	III	-	Winter Visitor	A.1.2	1	outside	Lit.
Accipitridae	<i>Clanga pomarina</i>	Küçük Orman Kartalı	Lesser Spotted Eagle	-	LC	-	III	-	Transit, Summer Visitor	A.3	1	outside	Lit.
Alaudidae	<i>Galerida cristata</i>	Tepeli Toygar	Crested Lark	-	LC	-	III	I	Native	A.3	5	inside+outside	Obs./Lit.
Alaudidae	<i>Melanocorypha bimaculata</i>	Küçük Boğmaklı Toygar	Bimaculated Lark	-	LC	-	II	-	Native	A.3	1	outside	Lit.
Alaudidae	<i>Melanocorypha calandra</i>	Boğmaklı Toygar	Calandra Lark	-	LC	-	II	-	Native	A.5	1	outside	Lit.
Apodidae	<i>Apus apus</i>	Ebabil	Common Swift	-	LC	-	III	-	Transit	A.3.1	2	inside+outside	Obs./Lit.
Columbidae	<i>Streptopelia decaocto</i>	Kumru	Eurasian Collared-Dove	-	LC	-	III	I	Native	A.5	1	outside	Lit.
Corvidae	<i>Corvus cornix</i>	Leş Kargası	Hooded Crow	-	NE	-	III	-	Native	A.5	1	outside	Lit.
Emberizidae	<i>Emberiza calandra</i>	Tarla Çintesi	Corn Bunting	-	LC	-	III	I	Native	A.4	3	inside+outside	Obs./Lit.
Emberizidae	<i>Emberiza melanocephala</i>	Karabaşlı Çinte	Black-Headed Bunting	-	LC	-	II	-	Summer Visitor	A.4	1	outside	Lit.
Falconidae	<i>Falco tinnunculus</i>	Kerkenez	Common Kestrel	-	LC	II	II	-	Native	A.2	4	inside+outside	Obs./Lit.
Fringillidae	<i>Carduelis carduelis</i>	Saka	European Goldfinch	-	LC	-	II	-	Native	A.3.1	1	outside	Lit.
Fringillidae	<i>Fringilla coelebs</i>	İspinoz	Common Chaffinch	-	LC	-	III	I	Native	A.4	1	outside	Lit.
Hirundinidae	<i>Hirundo rustica</i>	Kır Kırlangıcı	Barn Swallow	-	LC	-	II	-	Summer Visitor	A.5	4	inside+outside	Obs./Lit.
Motacillidae	<i>Anthus campestris</i>	Kır İncirkuşu	Tawny Pipit	-	LC	-	II	-	Summer Visitor	A.2	1	outside	Lit.
Motacillidae	<i>Motacilla alba</i>	Akkuyruksallayan	White Wagtail	-	LC	-	II	-	Native	A.3.1	3	inside+outside	Obs./Lit.
Motacillidae	<i>Motacilla cinerea</i>	Dağ Kuyruksallayanı	Grey Wagtail	-	LC	-	II	-	Winter Visitor	A.2	1	outside	Lit.
Motacillidae	<i>Motacilla flava</i>	Sarı Kuyruksallayan	Western Yellow Wagtail	-	LC	-	II	-	Summer Visitor	A.3.1	1	outside	Lit.
Muscicapidae	<i>Oenanthe hispanica</i>	Karakulaklı Kuyrukkakan	Black-Eared Wheatear	-	LC	-	II	-	Summer Visitor	A.2	2	inside+outside	Obs./Lit.
Muscicapidae	<i>Oenanthe oenanthe</i>	Kuyrukkakan	Northern Wheatear	-	LC	-	II	I	Transit	A.3	3	inside+outside	Obs./Lit.
Passeridae	<i>Passer domesticus</i>	Serçe	House Sparrow	-	LC	-	-	II	Native	A.5	3	inside+outside	Obs./Lit.
Passeridae	<i>Passer hispaniolensis</i>	Söğüt Serçesi	Spanish Sparrow	-	LC	-	III	I	Native	A.3	1	outside	Lit.
Phasianidae	<i>Coturnix coturnix</i>	Bıldırcın	Common Quail	-	LC	-	III	II	Transit	A.3	1	outside	Lit.
Sittidae	<i>Sitta neumayer</i>	Kaya Sivacısı	Western Rock Nuthatch	-	LC	-	II	-	Native	A.2	1	outside	Lit.
Strigidae	<i>Athene noctua</i>	Kukumav	Little Owl	-	LC	II	II	-	Native	A.2	1	outside	Lit.
Upupidae	<i>Upupa epops</i>	İbibik	Common Hoopoe	-	LC	-	II	-	Summer Visitor	A.2	1	outside	Lit.
Canidae	<i>Canis lupus</i>	Kurt	Grey Wolf	-	LC	I/II	II	-	-	-	1	outside	Lit.
Canidae	<i>Vulpes vulpes</i>	Kızıl Tilki	Red Fox	-	LC	-	-	II	-	-	1	outside	Lit.
Cervidae	<i>Capreolus capreolus</i>	Karaca	Roe Deer	-	LC	-	III	-	-	-	1	outside	Lit.
Erinaceidae	<i>Erinaceus concolor</i>	Kirpi	Southern White-Breasted Hedgehog	-	LC	-	-	-	-	-	1	outside	Lit.
Hystricidae	<i>Hystrix indica</i>	Oklukirpi	Indian Crested Porcupine	-	LC	-	-	-	-	-	1	outside	Lit.
Leporidae	<i>Lepus europaeus</i>	Yabani Tavşan	European Hare	-	LC	-	III	II	-	-	2	outside	Obs./Lit.
Spalacidae	<i>Nannospalax ehrenbergi</i>	Filistin Körfaresi	Palestine Mole Rat	-	DD	-	-	-	-	-	1	outside	Lit.

IUCN

DD: Data Deficient

LC: Least Concern

NE: Not Evaluated

CITES



I: Includes species threatened with extinction. Trade in specimens of these species is permitted only in exceptional circumstances.
 II: Includes species that, although currently not threatened, with extinction, may become so without trade controls.

Bern Convention
 II: Special protection ('appropriate and necessary legislative and administrative measures') for the animal taxa listed, including all forms of deliberate capture and keeping and deliberate killing; the deliberate damage to or destruction of breeding or resting sites; the deliberate disturbance of wild fauna, particularly during the period of breeding, rearing and hibernation.
 III: Special protection through 'appropriate and necessary legislative and administrative measures', of the listed wild fauna species.

MAKK
 I: Protected by the Ministry of Forestry and Agriculture
 II: Hunting animals that are allowed to be hunted within certain periods of time.

RELATIVE ABUNDANCES
 1: Extremely rare
 2: Rare
 3: Moderate density
 4: Abundant
 5: Very abundant



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According to Table 119, 2 amphibians, 2 reptiles, 29 birds, and 7 mammal species were determined. *Eirenis barani* (Baran Dwarf Racer) is an endemic species, which was added according to literature and outside BSA. According to the IUCN 1 species is in DD, 37 species in LC, and 2 species in NE category.

İslahiye-Hassa Kırıkhan Road

Species observed and added due to literature review for İslahiye-Hassa Kırıkhan Road (Kızılkaya Limestone Quarry and Kızılkaya Construction and Accommodation Site) is given in Table 120.



Table 120. Fauna species at İslahiye-Hassa Kırkhan Road

Family	Species	Turkish Name	Common Name	Endemizm	IUCN	CITES	BERN	MAK	Statue	Red Data Book	Relative Abundance	inside/outside BSA	Obs./Lit.
Bufo	<i>Bufo variabilis</i>	Değişken Desenli Gece Kurbağası	Variable Toad	-	DD	-	III	-	-		outside	1	Lit.
Hyla	<i>Hyla savignyi</i>	Levanten Ağaç Kurbağası, Yeşil Kurbağa	Levantine Tree/Green Frog	-	LC	-	III	-	-		outside	1	Lit.
Rana	<i>Pelophylax bedriagae</i>	Levanten Ova Kurbağası, Levant Bataklık Kurbağası	Levantine Frog, Levantine Marsh Frog	-	LC	-	III	-	-		outside	1	Lit.
Agama	<i>Stellagama stellio</i>	Dikenli Keler	Roughtail Rock Agama	-	LC	-	II	-	-		inside+outside	5	Obs./Lit.
Blanus	<i>Blanus strauchi</i>	Kör Kertenkele	Anatolian Worm Lizard	-	LC	-	III	-	-		outside	1	Lit.
Eryx	<i>Eryx jaculus</i>	Mahmuzlu Yılan, İki Başlı Yılan	Sand Boa	-	NE	II	III	-	-		outside	1	Lit.
Dolichophis	<i>Dolichophis jugularis</i>	Kara Yılan	Large Whip Snake	-	LC	-	II	-	-		outside	1	Lit.
Mediodactylus	<i>Mediodactylus kotschy</i>	İnce Parmaklı Keler	Kotschy's Gecko	-	LC	-	II	-	-		outside	1	Lit.
Lacerta	<i>Lacerta media</i>	Doğu Yeşil Kertenkelesi, Ortanca Yeşil Kertenkele	Levant Green Lizard, Medium-Sized Green Lizard	-	LC	-	III	-	-		inside+outside	3	Obs./Lit.
Ophisops	<i>Ophisops elegans</i>	Tarla Kertenkelesi, Yılan Gözlü Kertenkele	Snake-Eyed Lizard	-	NE	-	II	-	-		inside+outside	4	Obs./Lit.
Testudo	<i>Testudo graeca</i>	Tosbağa	Mediterranean Spur-Thighed Tortoise	-	VU	II	II	-	-		inside+outside	2	Obs./Lit.
Accipiter	<i>Accipiter brevipes</i>	Yaz Atmacası	Levant Sparrowhawk	-	LC	II	III	-	Native	A.2	outside	1	Lit.
Accipiter	<i>Accipiter nisus</i>	Atmaca	Eurasian Sparrowhawk	-	LC	II	III	-	Native	A.3	inside+outside	2	Obs./Lit.
Aquila	<i>Aquila nipalensis</i>	Bozkır Kartalı	Steppe Eagle	-	EN	II	III	-	Native	A.1.2	outside	1	Lit.
Buteo	<i>Buteo buteo</i>	Şahin	Eurasian Buzzard	-	LC	II	III	-	Native	A.3	inside+outside	3	Obs./Lit.
Buteo	<i>Buteo rufinus</i>	Kızıl Şahin	Long-Legged Buzzard	-	LC	II	III	-	Native	A.3	inside+outside	2	Obs./Lit.
Circaetus	<i>Circaetus gallicus</i>	Yılan Kartalı	Short-Toed Snake-Eagle	-	LC	II	III	-	Summer Visitor	A.4	outside	1	Lit.
Pernis	<i>Pernis apivorus</i>	Arı Şahini	European Honey-Buzzard	-	LC	II	III	-	Native	A.3	outside	1	Lit.
Alauda	<i>Alauda arvensis</i>	Tarlakuşu	Eurasian Skylark	-	LC	-	III	I	Wintor Visitor	A.4	inside+outside	3	Obs./Lit.
Calandrella	<i>Calandrella brachydactyla</i>	Bozkır Toygarı	Greater Short-Toed Lark	-	LC	-	II	-	Native	A.3	inside+outside	4	Obs./Lit.
Galerida	<i>Galerida cristata</i>	Tepeli Toygar	Crested Lark	-	LC	-	III	I	Native	A.3	inside+outside	3	Obs./Lit.
Melanocorypha	<i>Melanocorypha bimaculata</i>	Küçük Boğmaklı Toygar	Bimaculated Lark	-	LC	-	II	-	Native	A.3	outside	1	Lit.
Apus	<i>Apus apus</i>	Ebabil	Common Swift	-	LC	-	III	-	Transit	A.3.1	inside+outside	2	Obs./Lit.
Tachymarptis	<i>Tachymarptis melba</i>	Akkarınlı Ebabil	Alpine Swift	-	LC	-	II	-	Transit	A.3.1	outside	1	Lit.
Ciconia	<i>Ciconia ciconia</i>	Leylek	White Stork	-	LC	-	II	-	Summer Visitor	A.3.1	inside+outside	3	Obs./Lit.
Ciconia	<i>Ciconia nigra</i>	Kara Leylek	Black Stork	-	LC	II	II	-	Transit	A.3	outside	1	Lit.
Columba	<i>Columba livia</i>	Kaya Güvercini	Rock Dove	-	LC	-	III	II	Native	A.5	inside+outside	3	Obs./Lit.
Spilopelia	<i>Spilopelia senegalensis</i>	Küçük Kumru	Laughing Dove	-	LC	-	III	I	Native	A.4	inside+outside	3	Obs./Lit.
Streptopelia	<i>Streptopelia decaocto</i>	Kumru	Eurasian Collared-Dove	-	LC	-	III	I	Native	A.5	inside+outside	4	Obs./Lit.
Streptopelia	<i>Streptopelia turtur</i>	Üveyik	European Turtle-Dove	-	VU	-	III	II	Summer Visitor	A.3.1	outside	1	Lit.
Coracias	<i>Coracias garrulus</i>	Gökkuzgun	European Roller	-	LC	-	II	-	Transit	A.2	outside	1	Lit.
Corvus	<i>Corvus corax</i>	Kuzgun	Common Raven	-	LC	-	III	I	Native	A.5	outside	1	Lit.
Corvus	<i>Corvus frugilegus</i>	Ekin Kargası	Rook	-	LC	-	-	II	Native	A.5	inside+outside	2	Obs./Lit.
Corvus	<i>Corvus monedula</i>	Küçük Karga	Eurasian Jackdaw	-	LC	-	-	II	Native	A.5	inside+outside	3	Obs./Lit.
Garrulus	<i>Garrulus glandarius</i>	Alakarga	Eurasian Jay	-	LC	-	-	II	Native	A.3.1	outside	1	Lit.
Pica	<i>Pica pica</i>	Saksağan	Eurasian Magpie	-	LC	-	-	II	Native	A.5	inside+outside	2	Obs./Lit.
Cuculus	<i>Cuculus canorus</i>	Guguk	Common Cuckoo	-	LC	-	III	-	Summer Visitor	A.2	outside	1	Lit.
Emberiza	<i>Emberiza hortulana</i>	Kirazkuşu	Ortolan Bunting	-	LC	-	III	I	Summer Visitor	A.3	inside+outside	3	Obs./Lit.
Emberiza	<i>Emberiza melanocephala</i>	Karabaşlı Çinte	Black-Headed Bunting	-	LC	-	II	-	Summer Visitor	A.4	outside	1	Lit.
Falco	<i>Falco eleonora</i>	Ada Doğanı	Eleonora's Falcon	-	LC	II	II	-	Native	A.1.2	outside	1	Lit.
Falco	<i>Falco subbuteo</i>	Delice Doğan	Eurasian Hobby	-	LC	II	II	-	Native	A.3.1	outside	1	Lit.
Falco	<i>Falco tinnunculus</i>	Kerkenez	Common Kestrel	-	LC	II	II	-	Native	A.2	outside	1	Lit.

Family	Species	Turkish Name	Common Name	Endemizm	IUCN	CITES	BERN	MAK	Statue	Red Data Book	Relative Abundance	inside/outside BSA	Obs./Lit.
Fringillidae	<i>Carduelis carduelis</i>	Saka	European Goldfinch	-	LC	-	II	-	Native	A.3.1	outside	1	Lit.
Fringillidae	<i>Fringilla coelebs</i>	İspinoz	Common Chaffinch	-	LC	-	III	I	Native	A.4	inside+outside	2	Obs./Lit.
Fringillidae	<i>Serinus serinus</i>	Küçük İskete	European Serin	-	LC	-	II	-	Native	A.3	inside+outside	4	Obs./Lit.
Hirundinidae	<i>Delichon urbicum</i>	Ev Kırılancığı	Northern House Martin	-	LC	-	II	-	Summer Visitor	A.3	inside+outside	2	Obs./Lit.
Hirundinidae	<i>Hirundo rustica</i>	Kır Kırılancığı	Barn Swallow	-	LC	-	II	-	Summer Visitor	A.5	inside+outside	3	Obs./Lit.
Hirundinidae	<i>Riparia riparia</i>	Kum Kırılancığı	Collared Sand Martin	-	LC	-	II	-	Summer Visitor	A.5	outside	1	Lit.
Laniidae	<i>Lanius collurio</i>	Kızılsırtlı Örümcekkuşu	Red-Backed Shrike	-	LC	-	II	I	Summer Visitor	A.3	outside	1	Lit.
Laniidae	<i>Lanius excubitor</i>	Büyük Örümcekkuşu	Great Grey Shrike	-	LC	-	II	-	Summer Visitor, Wintor Visitor	A.1.2	outside	1	Lit.
Laniidae	<i>Lanius minor</i>	Karaalınlı Örümcekkuşu	Lesser Grey Shrike	-	LC	-	II	-	Transit	A.3	outside	1	Lit.
Laniidae	<i>Lanius nubicus</i>	Maskeli Örümcekkuşu	Masked Shrike	-	LC	-	II	-	Summer Visitor	A.2	outside	1	Lit.
Laniidae	<i>Lanius senator</i>	Kızılbaşlı Örümcekkuşu	Woodchat Shrike	-	LC	-	II	-	Transit	A.2	outside	1	Lit.
Meropidae	<i>Merops apiaster</i>	Arikuşu	European Bee-Eater	-	LC	-	II	-	Transit	A.3.1	outside	1	Lit.
Motacillidae	<i>Anthus campestris</i>	Kır İncirkuşu	Tawny Pipit	-	LC	-	II	-	Summer Visitor	A.2	outside	1	Lit.
Motacillidae	<i>Anthus spinoletta</i>	Dağ İncirkuşu	Water Pipit	-	LC	-	II	-	Native	A.3	outside	1	Lit.
Motacillidae	<i>Motacilla alba</i>	Akkuyruksallayan	White Wagtail	-	LC	-	II	-	Native	A.3.1	outside	1	Lit.
Motacillidae	<i>Motacilla cinerea</i>	Dağ Kuyruksallayanı	Grey Wagtail	-	LC	-	II	-	Wintor Visitor	A.2	outside	1	Lit.
Motacillidae	<i>Motacilla citreola</i>	Sarıbaşlı Kuyruksallayan	Citrine Wagtail	-	LC	-	II	-	Native, Summer Visitor	A.2	outside	1	Lit.
Motacillidae	<i>Motacilla flava</i>	Sarı Kuyruksallayan	Western Yellow Wagtail	-	LC	-	II	-	Summer Visitor	A.3.1	outside	1	Lit.
Muscicapidae	<i>Erithacus rubecula</i>	Kızılgerdan	European Robin	-	LC	-	II	-	Wintor Visitor	A.3	inside+outside	2	Obs./Lit.
Muscicapidae	<i>Ficedula parva</i>	Küçük Sinekapan	Red-Breasted Flycatcher	-	LC	-	II	-	Transit	A.2	outside	1	Lit.
Muscicapidae	<i>Muscicapa striata</i>	Benekli Sinekapan	Spotted Flycatcher	-	LC	-	II	-	Transit	A.3	outside	1	Lit.
Muscicapidae	<i>Oenanthe finschii</i>	Aksırtlı Kuyrukkakan	Finsch's Wheatear	-	LC	-	II	-	Native, Summer Visitor	A.1.2	outside	1	Lit.
Muscicapidae	<i>Oenanthe hispanica</i>	Karakulaklı Kuyrukkakan	Black-Eared Wheatear	-	LC	-	II	-	Summer Visitor	A.2	inside+outside	3	Obs./Lit.
Muscicapidae	<i>Oenanthe isabellina</i>	Boz Kuyrukkakan	Isabelline Wheatear	-	LC	-	II	I	Summer Visitor	A.3	inside+outside	2	Obs./Lit.
Muscicapidae	<i>Oenanthe oenanthe</i>	Kuyrukkakan	Northern Wheatear	-	LC	-	II	I	Transit	A.3	inside+outside	3	Obs./Lit.
Muscicapidae	<i>Phoenicurus ochruros</i>	Kara Kızılkuyruk	Black Redstart	-	LC	-	II	-	Wintor Visitor	A.2	outside	1	Lit.
Muscicapidae	<i>Phoenicurus phoenicurus</i>	Kızılkuyruk	Common Redstart	-	LC	-	II	-	Summer Visitor	A.3	outside	1	Lit.
Muscicapidae	<i>Saxicola torquatus</i>	Taşkuşu	Common Stonechat	-	LC	-	II	-	Wintor Visitor	A.3	inside+outside	2	Obs./Lit.
Paridae	<i>Parus major</i>	Büyük Baştankara	Great Tit	-	LC	-	II	-	Native	A.3.1	inside+outside	2	Obs./Lit.
Passeridae	<i>Passer domesticus</i>	Serçe	House Sparrow	-	LC	-	-	II	Native	A.5	inside+outside	4	Obs./Lit.
Passeridae	<i>Passer hispaniolensis</i>	Söğüt Serçesi	Spanish Sparrow	-	LC	-	III	I	Native	A.3	outside	1	Lit.
Phylloscopidae	<i>Phylloscopus bonelli</i>	Boz Söğütbülbülü	Western Bonelli's Warbler	-	LC	-	III	-	Native	A.2	outside	1	Lit.
Phylloscopidae	<i>Phylloscopus collybita</i>	Çıvgın	Common Chiffchaff	-	LC	-	III	-	Native	A.3.1	outside	1	Lit.
Phylloscopidae	<i>Phylloscopus trochilus</i>	Söğütbülbülü	Willow Warbler	-	LC	-	III	-	Transit	A.3.1	outside	1	Lit.
Prunellidae	<i>Prunella modularis</i>	Dağbülbülü	Dunnock	-	LC	-	II	-	Native	A.1.2	outside	1	Lit.
Pycnonotidae	<i>Pycnonotus xanthopygos</i>	Arapbülbülü	White-Spectacled Bulbul	-	LC	-	III	-	Native	A.2	outside	1	Lit.
Remizidae	<i>Remiz pendulinus</i>	Çulhakuşu	Eurasian Penduline-Tit	-	LC	-	III	-	Native	A.2	outside	1	Lit.
Strigidae	<i>Asio otus</i>	Kulaklı Orman Baykuşu	Northern Long-Eared Owl	-	LC	II	II	-	Native	A.2	outside	1	Lit.
Strigidae	<i>Athene noctua</i>	Kukumav	Little Owl	-	LC	II	II	-	Native	A.2	outside	1	Lit.
Sturnidae	<i>Sturnus vulgaris</i>	Siğircık	Common Starling	-	LC	-	-	I	Wintor Visitor	A.5	inside+outside	2	Obs./Lit.
Sylviidae	<i>Sylvia communis</i>	Akgerdanlı Ötleğen	Common Whitethroat	-	LC	-	II	-	Transit	A.3	inside+outside	3	Obs./Lit.
Sylviidae	<i>Sylvia curruca</i>	Küçük Akgerdanlı Ötleğen	Lesser Whitethroat	-	LC	-	II	-	Summer Visitor	A.2	outside	1	Lit.
Sylviidae	<i>Sylvia melanocephala</i>	Maskeli Ötleğen	Sardinian Warbler	-	LC	-	II	-	Wintor Visitor	A.3	outside	1	Lit.
Sylviidae	<i>Sylvia nisoria</i>	Çizgili Ötleğen	Barred Warbler	-	LC	-	II	-	Summer Visitor	A.2	outside	1	Lit.

Family	Species	Turkish Name	Common Name	Endemizm	IUCN	CITES	BERN	MAKK	Statue	Red Data Book	Relative Abundance	inside/outside BSA	Obs./Lit.
Turdidae	<i>Turdus merula</i>	Karataşuk	Eurasian Blackbird	-	LC	-	III	II	Native	A.3	inside+outside	2	Obs./Lit.
Upupidae	<i>Upupa epops</i>	İbibik	Common Hoopoe	-	LC	-	II	-	Summer Visitor	A.2	outside	1	Lit.
Bovidae	<i>Gazella gazella</i>	Dağ Ceylanı	Mountain Gazelle	-	EN	-	-	-	-		outside	1	Lit.
Canidae	<i>Vulpes vulpes</i>	Kızıl Tilki	Red Fox	-	LC	-	-	II	-		inside+outside	3	Obs./Lit.
Cricetidae	<i>Microtus guentheri</i>	Akdeniz Tarlafaresi	Günther's Vole	-	LC	-	-	-	-		outside	1	Lit.
Erinaceidae	<i>Erinaceus concolor</i>	Kırpi	Southern White-Breasted Hedgehog	-	LC	-	-	-	-		inside+outside	4	Obs./Lit.
Hyaenidae	<i>Hyaena hyaena</i>	Çizgili Sirtlan	Striped Hyaena	-	NT	III	-	-	-		outside	1	Lit.
Leporidae	<i>Lepus europaeus</i>	Yabani Tavşan	European Hare	-	LC	-	III	II	-		outside	1	Lit.
Muridae	<i>Apodemus mystacinus</i>	Kaya Faresi	Broad-Toothed Field Mouse	-	LC	-	-	-	-		outside	1	Lit.
Muridae	<i>Mus macedonicus</i>	Sarı Evfaresi	Macedonian Mouse	-	LC	-	-	-	-		inside+outside	2	Obs./Lit.
Rhinolophidae	<i>Rhinolophus euryale</i>	Akdeniz Nalburunlu Yarasa	Mediterranean Horseshoe Bat	-	NT	-	II	-	-		outside	1	Lit.
Rhinolophidae	<i>Rhinolophus ferrumequinum</i>	Büyük Nalburunlu Yarasa	Greater Horseshoe Bat	-	LC	-	II	-	-		outside	1	Lit.
Rhinolophidae	<i>Rhinolophus hipposideros</i>	Küçük Nalburunlu Yarasa	Lesser Horseshoe Bat	-	LC	-	II	-	-		outside	1	Lit.
Soricidae	<i>Crocidura suaveolens</i>	Küçük Beyazdişli Böcekçil	Lesser White-Toothed Shrew	-	LC	-	III	-	-		outside	1	Lit.
Spalacidae	<i>Nannospalax ehrenbergi</i>	Filistin Körfaresi	Palestine Mole Rat	-	DD	-	-	-	-		outside	1	Lit.
Suidae	<i>Sus scrofa</i>	Yabandomuzu	Wild Boar	-	LC	-	-	II	-		inside+outside	4	Obs./Lit.
Vespertilionidae	<i>Myotis blythii</i>	Küçük Farekulaklı Yarasa	Lesser Mouse-Eared Myotis	-	LC	-	II	-	-		outside	1	Lit.
Vespertilionidae	<i>Myotis capaccinii</i>	Uzun Ayaklı Yarasa	Long-Fingered Bat	-	VU	-	II	-	-		outside	1	Lit.
Vespertilionidae	<i>Myotis myotis</i>	Büyük Fare Kulaklı Yarasa	Greater Mouse-Eared Bat	-	LC	-	II	-	-		outside	1	Lit.

IUCN

EN : Endangered
VU : Vulnerable
NT : Near Threatened
DD: Data Deficient
LC: Least Concern
NE: Not Evaluated

CITES

I: Includes species threatened with extinction. Trade in specimens of these species is permitted only in exceptional circumstances.
II: Includes species that, although currently not threatened. with extinction, may become so without trade controls.

Bern Convention

II: ecial protection ('appropriate and necessary legislative and administrative measures') for the animal taxa listed, including all forms of deliberate capture and keeping and deliberate killing; the deliberate damage to or destruction of breeding or resting sites; the deliberate disturbance of wild fauna, particularly during the period of breeding, rearing and hibernation.

III: Special protection through 'appropriate and necessary legislative and administrative measures', of the listed wild fauna species.

MAKK

I: Protected by the Ministry of Forestry and Agriculture
II: Hunting animals that are allowed to be hunted within certain periods of time.

RELATIVE ABUNDANCES

1: Extremely rare
2: Rare
3: Moderate density
4: Abundant
5: Very abundant

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According to Table 120Table 119, 3 amphibians, 8 reptiles, 77 birds, and 17 mammal species were determined. According to the IUCN 2 species are in EN, 3 species in VU, 2 species in NT, 2 species in DD, 94 species in LC, and 2 species in NE category.

Hatay Airport Road and Deep Soil Mixing Stations

Species observed and added due to literature review for Hatay Airport Road (Kızılkaya Limestone Quarry and Kızılkaya Construction and Accommodation Site) is given in Table 121.



Table 121. Fauna species at Hatay Airport Road

Family	Species	Turkish Name	Common Name	Endemizm	IUCN	CITES	BERN	MAKK	Statue	Red Data Book	Relative Abundance	inside/outside BSA	Obs./Lit.
Hylidae	<i>Hyla savignyi</i>	Levanten Ağaç Kurbağası, Yeşil Kurbağa	Levantine Tree/Green Frog	-	LC	-	III	-	Native	-	1	outside	Lit.
Ranidae	<i>Pelophylax bedriagae</i>	Levanten Ova Kurbağası, Levant Bataklık Kurbağası	Levantine Frog, Levantine Marsh Frog	-	LC	-	III	-	Native	-	4	inside+outside	Obs./Lit.
Agamidae	<i>Stellagama stellio</i>	Dikenli Keler	Roughtail Rock Agama	-	LC	-	II	-	Native	-	2	inside+outside	Obs./Lit.
Geoemydidae	<i>Mauremys rivulata</i>	Çizgili Kaplumbağa	Western Caspian Turtle	-	NE	-	III	-	Native	-	1	outside	Lit.
Lacertidae	<i>Phoenicolacerta laevis</i>	Hatay Kertenkelesi, Suriye Kertenkelesi	Syrian Lizard, Hatay Lizard	-	LC	-	III	-	Native	-	1	outside	Lit.
Acrocephalidae	<i>Acrocephalus scirpaceus</i>	Saz Kamışçını	Common Reed-Warbler	-	LC	-	III	-	Summer Visitor	A.2	1	outside	Lit.
Alaudidae	<i>Galerida cristata</i>	Tepeli Toygar	Crested Lark	-	LC	-	III	I	Native	A.3	3	inside+outside	Obs./Lit.
Apodidae	<i>Apus apus</i>	Ebabil	Common Swift	-	LC	-	III	-	Transit	A.3.1	3	inside+outside	Obs./Lit.
Charadriidae	<i>Vanellus vanellus</i>	Kızkuşu	Northern Lapwing	-	NT	-	III	I	Wintor Visitor	A.5	1	outside	Lit.
Cisticolidae	<i>Prinia gracilis</i>	Dikkuyruklu Ötleğen	Graceful Prinia	-	LC	-	III	-	Native	A.3	1	outside	Lit.
Columbidae	<i>Streptopelia decaocto</i>	Kumru	Eurasian Collared-Dove	-	LC	-	III	I	Native	A.5	3	inside+outside	Obs./Lit.
Emberizidae	<i>Emberiza melanocephala</i>	Karabaşlı Çinte	Black-Headed Bunting	-	LC	-	II	-	Summer Visitor	A.4	1	outside	Lit.
Fringillidae	<i>Carduelis carduelis</i>	Saka	European Goldfinch	-	LC	-	II	-	Native	A.3.1	3	inside+outside	Obs./Lit.
Hirundinidae	<i>Delichon urbicum</i>	Ev Kırılancığı	Northern House Martin	-	LC	-	II	-	Summer Visitor	A.3	3	inside+outside	Obs./Lit.
Hirundinidae	<i>Hirundo rustica</i>	Kır Kırılancığı	Barn Swallow	-	LC	-	II	-	Summer Visitor	A.5	3	inside+outside	Obs./Lit.
Motacillidae	<i>Motacilla cinerea</i>	Dağ Kuyruksallayanı	Grey Wagtail	-	LC	-	II	-	Wintor Visitor	A.2	1	outside	Lit.
Motacillidae	<i>Motacilla flava</i>	Sarı Kuyruksallayan	Western Yellow Wagtail	-	LC	-	II	-	Summer Visitor	A.3.1	3	inside+outside	Obs./Lit.
Muscicapidae	<i>Oenanthe isabellina</i>	Boz Kuyrukkakan	Isabelline Wheatear	-	LC	-	II	I	Summer Visitor	A.3	2	inside+outside	Obs./Lit.
Muscicapidae	<i>Erithacus rubecula</i>	Kızılgerdan	European Robin	-	LC	-	II	-	Wintor Visitor	A.3	1	outside	Lit.
Paridae	<i>Parus major</i>	Büyük Baştankara	Great Tit	-	LC	-	II	-	Native	A.3.1	2	inside+outside	Obs./Lit.
Passeridae	<i>Passer domesticus</i>	Serçe	House Sparrow	-	LC	-	-	II	Native	A.5	4	inside+outside	Obs./Lit.
Pycnonotidae	<i>Pycnonotus xanthopygos</i>	Arapbülbulü	White-Spectacled Bulbul	-	LC	-	III	-	Native	A.2	2	inside+outside	Obs./Lit.
Scolopacidae	<i>Tringa ochropus</i>	Yeşil Düdükçün	Green Sandpiper	-	LC	-	II	-	Wintor Visitor	B.2	1	outside	Lit.
Sylviidae	<i>Sylvia melanocephala</i>	Maskeli Ötleğen	Sardinian Warbler	-	LC	-	II	-	Wintor Visitor	A.3	1	outside	Lit.
Cricetidae	<i>Microtus guentheri</i>	Akdeniz Tarla faresi	Günther's Vole	-	LC	-	-	-	Native	-	1	outside	Lit.
Cricetidae	<i>Microtus socialis</i>	Küçük Tarla faresi	Social Vole	-	LC	-	-	-	Native	-	1	outside	Lit.
Miniopteridae	<i>Miniopterus schreibersii</i>	Uzunkanatlı Yarasa	Schreiber's Bent-Winged Bat	-	NT	-	II	-	Native	-	1	outside	Lit.
Muridae	<i>Apodemus witherbyi</i>	Orman Faresi	Steppe Field Mouse	-	LC	-	-	-	Native	-	1	outside	Lit.
Muridae	<i>Meriones libycus</i>	Libya Çöl faresi	Libyan Jird	-	LC	-	-	-	Native	-	1	outside	Lit.
Vespertilionidae	<i>Myotis emarginatus</i>	Kırpıklı Yarasa	Geoffroy's Bat	-	LC	-	II	-	Native	-	1	outside	Lit.
Vespertilionidae	<i>Myotis schaubi</i>	İran Saçaklı Yarasası	Schaub's Myotis	-	DD	-	II	-	Native	-	1	outside	Lit.
Vespertilionidae	<i>Pipistrellus nathusii</i>	Sert Derili Yarasa	Nathusius' Pipistrelle	-	LC	-	II	-	Native	-	1	outside	Lit.

IUCN

NT : Near Threatened

DD: Data Deficient

LC: Least Concern

NE: Not Evaluated

CITES

I: Includes species threatened with extinction. Trade in specimens of these species is permitted only in exceptional circumstances.

II: Includes species that, although currently not threatened. with extinction, may become so without trade controls.

Bern Convention

II: ecial protection ('appropriate and necessary legislative and administrative measures') for the animal taxa listed, including all forms of deliberate capture and keeping and deliberate killing; the deliberate damage to or destruction of breeding or resting sites; the deliberate disturbance of wild fauna, particularly during the period of breeding, rearing and hibernation.

III: Special protection through 'appropriate and necessary legislative and administrative measures', of the listed wild fauna species.

MAKK

I: Protected by the Ministry of Forestry and Agriculture

II: Hunting animals that are allowed to be hunted within certain periods of time.

RELATIVE ABUNDANCES

1: Extremely rare

- 2: Rare
- 3: Moderate density
- 4: Abundant
- 5: Very abundant



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According to Table 121, 2 amphibians, 3 reptiles, 19 birds, and 8 mammal species were determined. According to the IUCN 2 species are in NT, 1 species in DD, 28 species in LC, and 1 species in NE category.

Antakya-Samandağ Road

Species observed and added due to literature review for Antakya-Samandağ Road (Kuruyer Construction and Accommodation Site) is given in Table 122.



Table 122. Fauna species at Antakya-Samandağ Road

Family	Species	Turkish Name	Common Name	Endemizm	IUCN	CITES	BERN	MAKK	Statue	Red Data Book	Relative Abundance	inside/outside BSA	Obs./Lit.
Hylidae	<i>Hyla savignyi</i>	Levanten Ağaç Kurbağası, Yeşil Kurbağa	Levantine Tree/Green Frog	-	LC	-	III	-		-	1	outside	Lit.
Ranidae	<i>Pelophylax bedriagae</i>	Levanten Ova Kurbağası, Levant Bataklik Kurbağası	Levantine Frog, Levantine Marsh Frog	-	LC	-	III	-		-	3	inside+outside	Obs./Lit.
Agamidae	<i>Stellagama stellio</i>	Dikenli Keler	Roughtail Rock Agama	-	LC	-	II	-		-	4	inside+outside	Obs./Lit.
Blanidae	<i>Blanus strauchi</i>	Kör Kertenkele	Anatolian Worm Lizard	-	LC	-	III	-		-	1	outside	Lit.
Chamaeleonidae	<i>Chamaeleo chamaeleon</i>	Bukalemun	Common Chameleon	-	LC	II	II	-		-	1	outside	Lit.
Lacertidae	<i>Phoenicolacerta laevis</i>	Hatay Kertenkelesi, Suriye Kertenkelesi	Syrian Lizard, Hatay Lizard	-	LC	-	III	-		-	1	outside	Lit.
Natricidae	<i>Natrix tessellata</i>	Su Yılanı	Dice Snake, Tessellated Water Snake	-	LC	-	III	-		-	2	inside+outside	Obs./Lit.
Testudinidae	<i>Testudo graeca</i>	Tosbağa	Mediterranean Spur-Thighed Tortoise	-	VU	II	II	-		-	3	inside+outside	Obs./Lit.
Accipitridae	<i>Accipiter nisus</i>	Atmaca	Eurasian Sparrowhawk	-	LC	II	III	-	Native	A.3	1	outside	Lit.
Accipitridae	<i>Aquila chrysaetos</i>	Kaya Kartalı	Golden Eagle	-	LC	II	III	-	Native	A.1.2	1	outside	Lit.
Accipitridae	<i>Buteo buteo</i>	Şahin	Eurasian Buzzard	-	LC	II	III	-	Native	A.3	2	inside+outside	Obs./Lit.
Accipitridae	<i>Circus aeruginosus</i>	Saz Delicesi	Western Marsh-Harrier	-	LC	II	III	-	Native	A.3	1	outside	Lit.
Accipitridae	<i>Hieraaetus pennatus</i>	Küçük Kartal	Booted Eagle	-	LC	II	III	-	Native	A.3	1	outside	Lit.
Accipitridae	<i>Pernis apivorus</i>	Arı Şahini	European Honey-Buzzard	-	LC	II	III	-	Native	A.3	1	outside	Lit.
Alaudidae	<i>Alauda arvensis</i>	Tarlakuşu	Eurasian Skylark	-	LC	-	III	I	Winter Visitor	A.4	3	inside+outside	Obs./Lit.
Alaudidae	<i>Calandrella brachydactyla</i>	Bozkır Toygarı	Greater Short-Toed Lark	-	LC	-	II	-	Native	A.3	2	inside+outside	Obs./Lit.
Alaudidae	<i>Galerida cristata</i>	Tepeli Toygar	Crested Lark	-	LC	-	III	I	Native	A.3	4	inside+outside	Obs./Lit.
Apodidae	<i>Apus affinis</i>	Küçük Ebabil	Little Swift	-	LC	-	III	-	Native, Summer Visitor	A.3	2	inside+outside	Obs./Lit.
Apodidae	<i>Apus apus</i>	Ebabil	Common Swift	-	LC	-	III	-	Transit	A.3.1	4	inside+outside	Obs./Lit.
Apodidae	<i>Apus pallidus</i>	Boz Ebabil	Pallid Swift	-	LC	-	II	-	Summer Visitor	A.2	1	outside	Lit.
Columbidae	<i>Streptopelia decaocto</i>	Kumru	Eurasian Collared-Dove	-	LC	-	III	I	Native	A.5	3	inside+outside	Obs./Lit.
Corvidae	<i>Garrulus glandarius</i>	Alakarga	Eurasian Jay	-	LC	-	-	II	Native	A.3.1	1	outside	Lit.
Corvidae	<i>Pica pica</i>	Saksağan	Eurasian Magpie	-	LC	-	-	II	Native	A.5	3	inside+outside	Obs./Lit.
Emberizidae	<i>Emberiza cia</i>	Kaya Çintesi	Rock Bunting	-	LC	-	II	-	Summer Visitor	A.2	2	inside+outside	Obs./Lit.
Emberizidae	<i>Emberiza schoeniclus</i>	Bataklik Çintesi	Reed Bunting	-	LC	-	II	-	Native	A.3	3	inside+outside	Obs./Lit.
Falconidae	<i>Falco peregrinus</i>	Kızılenseli Doğan	Peregrine Falcon	-	LC	I	II	-	Raslantısal	A.6	1	outside	Lit.
Falconidae	<i>Falco tinnunculus</i>	Kerkenez	Common Kestrel	-	LC	II	II	-	Native	A.2	1	outside	Lit.
Fringillidae	<i>Carduelis carduelis</i>	Saka	European Goldfinch	-	LC	-	II	-	Native	A.3.1	2	inside+outside	Obs./Lit.
Fringillidae	<i>Fringilla coelebs</i>	İspinoz	Common Chaffinch	-	LC	-	III	I	Native	A.4	3	inside+outside	Obs./Lit.
Fringillidae	<i>Serinus serinus</i>	Küçük İskete	European Serin	-	LC	-	II	-	Native	A.3	4	inside+outside	Obs./Lit.
Hirundinidae	<i>Delichon urbicum</i>	Ev Kırılancısı	Northern House Martin	-	LC	-	II	-	Summer Visitor	A.3	2	inside+outside	Obs./Lit.
Hirundinidae	<i>Hirundo rustica</i>	Kır Kırılancısı	Barn Swallow	-	LC	-	II	-	Summer Visitor	A.5	3	inside+outside	Obs./Lit.
Hirundinidae	<i>Riparia riparia</i>	Kum Kırılancısı	Collared Sand Martin	-	LC	-	II	-	Summer Visitor	A.5	1	outside	Lit.
Laniidae	<i>Lanius collurio</i>	Kızılırtlı Örümcekkuşu	Red-Backed Shrike	-	LC	-	II	I	Summer Visitor	A.3	1	outside	Lit.
Laniidae	<i>Lanius senator</i>	Kızılbaşlı Örümcekkuşu	Woodchat Shrike	-	LC	-	II	-	Transit	A.2	1	outside	Lit.
Laridae	<i>Larus armenicus</i>	Van Gölü Martısı	Armenian Gull	-	NT	-	III	I	Native	A.3	1	outside	Lit.
Meropidae	<i>Merops apiaster</i>	Arıkuşu	European Bee-Eater	-	LC	-	II	-	Transit	A.3.1	3	inside+outside	Obs./Lit.
Motacillidae	<i>Anthus cervinus</i>	Kızılgerdanlı İncirkuşu	Red-Throated Pipit	-	LC	-	II	-	Summer Visitor	A.2	1	outside	Lit.
Motacillidae	<i>Anthus pratensis</i>	Çayır İncirkuşu	Meadow Pipit	-	NT	-	II	-	Winter Visitor	A.3	1	outside	Lit.
Motacillidae	<i>Anthus richardi</i>	Mahmuzlu İncirkuşu	Richard's Pipit	-	LC	-	II	-	Summer Visitor	A.2	1	outside	Lit.
Motacillidae	<i>Anthus rubescens</i>	Pasifik İncirkuşu	Buff-Bellied Pipit	-	LC	-	II	-	Raslantısal	-	1	outside	Lit.
Motacillidae	<i>Anthus spinoletta</i>	Dağ İncirkuşu	Water Pipit	-	LC	-	II	-	Native	A.3	1	outside	Lit.
Motacillidae	<i>Anthus trivialis</i>	Ağaç İncirkuşu	Tree Pipit	-	LC	-	II	-	Transit	A.3	1	outside	Lit.

Family	Species	Turkish Name	Common Name	Endemizm	IUCN	CITES	BERN	MAKK	Statue	Red Data Book	Relative Abundance	inside/outside BSA	Obs./Lit.
Motacillidae	<i>Motacilla alba</i>	Akkuyruksallayan	White Wagtail	-	LC	-	II	-	Native	A.3.1	4	inside+outside	Obs./Lit.
Motacillidae	<i>Motacilla cinerea</i>	Dağ Kuyruksallayanı	Grey Wagtail	-	LC	-	II	-	Winter Visitor	A.2	1	outside	Lit.
Motacillidae	<i>Motacilla flava</i>	Sarı Kuyruksallayan	Western Yellow Wagtail	-	LC	-	II	-	Summer Visitor	A.3.1	1	outside	Lit.
Muscicapidae	<i>Cyanecula svecica</i>	Mavigerdan	Bluethroat	-	LC	-	II	-	Native, Summer Visitor	A.2	1	outside	Lit.
Muscicapidae	<i>Erithacus rubecula</i>	Kızılgerdan	European Robin	-	LC	-	II	-	Winter Visitor	A.3	1	outside	Lit.
Muscicapidae	<i>Ficedula parva</i>	Küçük Sinekkapan	Red-Breasted Flycatcher	-	LC	-	II	-	Transit	A.2	2	inside+outside	Obs./Lit.
Muscicapidae	<i>Monticola solitarius</i>	Gökardıç	Blue Rock-Thrush	-	LC	-	II	-	Native	A.1.2	1	outside	Lit.
Muscicapidae	<i>Muscicapa striata</i>	Benekli Sinekkapan	Spotted Flycatcher	-	LC	-	II	-	Transit	A.3	3	inside+outside	Obs./Lit.
Muscicapidae	<i>Oenanthe hispanica</i>	Karakulaklı Kuyrukkakan	Black-Eared Wheatear	-	LC	-	II	-	Summer Visitor	A.2	1	outside	Lit.
Muscicapidae	<i>Oenanthe oenanthe</i>	Kuyrukkakan	Northern Wheatear	-	LC	-	II	I	Transit	A.3	1	outside	Lit.
Muscicapidae	<i>Phoenicurus ochruros</i>	Kara Kızılkuyruk	Black Redstart	-	LC	-	II	-	Winter Visitor	A.2	1	outside	Lit.
Muscicapidae	<i>Saxicola torquatus</i>	Taşkuşu	Common Stonechat	-	LC	-	II	-	Winter Visitor	A.3	2	inside+outside	Obs./Lit.
Paridae	<i>Parus major</i>	Büyük Baştankara	Great Tit	-	LC	-	II	-	Native	A.3.1	2	inside+outside	Obs./Lit.
Passeridae	<i>Passer domesticus</i>	Serçe	House Sparrow	-	LC	-	-	II	Native	A.5	4	inside+outside	Obs./Lit.
Phylloscopidae	<i>Phylloscopus collybita</i>	Çıvgın	Common Chiffchaff	-	LC	-	III	-	Native	A.3.1	1	outside	Lit.
Phylloscopidae	<i>Phylloscopus trochilus</i>	Söğütbülbülü	Willow Warbler	-	LC	-	III	-	Transit	A.3.1	1	outside	Lit.
Pycnonotidae	<i>Pycnonotus xanthopygos</i>	Arapbülbülü	White-Spectacled Bulbul	-	LC	-	III	-	Native	A.2	1	outside	Lit.
Scotocercidae	<i>Cettia cetti</i>	Kamışbülbülü	Cetti's Warbler	-	LC	-	III	-	Native	A.2	1	outside	Lit.
Sittidae	<i>Sitta neumayer</i>	Kaya Sivacısı	Western Rock Nuthatch	-	LC	-	II	-	Native	A.2	1	outside	Lit.
Sturnidae	<i>Sturnus vulgaris</i>	Siğircık	Common Starling	-	LC	-	-	I	Winter Visitor	A.5	4	inside+outside	Obs./Lit.
Sylviidae	<i>Sylvia melanocephala</i>	Maskeli Ötleğen	Sardinian Warbler	-	LC	-	II	-	Winter Visitor	A.3	1	outside	Lit.
Canidae	<i>Canis aureus</i>	Çakal	Golden Jackal	-	LC	III	-	II	-	-	1	outside	Lit.
Canidae	<i>Vulpes vulpes</i>	Kızıl Tilki	Red Fox	-	LC	-	-	II	-	-	2	inside+outside	Obs./Lit.
Cricetidae	<i>Cricetulus migratorius</i>	Cüce Avurtlak	Migratory Hamster	-	LC	-	-	-	-	-	1	outside	Lit.
Pteropodidae	<i>Rousettus aegyptiacus</i>	Mısır Meyve Yarasası	Egyptian Fruit Bat	-	LC	-	-	-	-	-	1	outside	Lit.
Rhinolophidae	<i>Rhinolophus mehelyi</i>	Mehely Nalburunlu Yarasası	Mehely's Horseshoe Bat	-	VU	-	II	-	-	-	1	outside	Lit.
Soricidae	<i>Crocidura suaveolens</i>	Küçük Beyazdişli Böcekçil	Lesser White-Toothed Shrew	-	LC	-	III	-	-	-	1	outside	Lit.
Suidae	<i>Sus scrofa</i>	Yabandomuzu	Wild Boar	-	LC	-	-	II	-	-	3	inside+outside	Obs./Lit.

IUCN

VU : Vulnerable
NT : Near Threatened
DD: Data Deficient
LC: Least Concern
NE: Not Evaluated

CITES

I: Includes species threatened with extinction. Trade in specimens of these species is permitted only in exceptional circumstances.
II: Includes species that, although currently not threatened. with extinction, may become so without trade controls.

Bern Convention

II: ecial protection ('appropriate and necessary legislative and administrative measures') for the animal taxa listed, including all forms of deliberate capture and keeping and deliberate killing; the deliberate damage to or destruction of breeding or resting sites; the deliberate disturbance of wild fauna, particularly during the period of breeding, rearing and hibernation.

III: Special protection through 'appropriate and necessary legislative and administrative measures', of the listed wild fauna species.

MAKK

I: Protected by the Ministry of Forestry and Agriculture
II: Hunting animals that are allowed to be hunted within certain periods of time.

RELATIVE ABUNDANCES

1: Extremely rare
2: Rare
3: Moderate density
4: Abundant
5: Very abundant

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According to Table 122, 2 amphibians, 6 reptiles, 56 birds, and 7 mammal species were determined. According to the IUCN 2 species are in VU, 2 species in NT, and 67 species in LC category.

Antakya-Reyhanlı Road

Species observed and added due to literature review for Antakya-Reyhanlı Road is given in Table 123.



Table 123. Fauna species at Antakya-Reyhanlı Road

Family	Species	Turkish Name	Common Name	Endemizm	IUCN	CITES	BERN	MAKK	Statue	Red Data Book	Relative Abundance	inside/outside BSA	Obs./Lit.	XXX
Bufonidae	<i>Bufo variabilis</i>	Değişken Desenli Gece Kurbağası	Variable Toad	-	DD		III	-		-	1	outside	Lit.	1
Hylidae	<i>Hyla savignyi</i>	Levanten Ağaç Kurbağası, Yeşil Kurbağa	Levantine Tree/Green Frog	-	LC		III	-		-	1	outside	Lit.	1
Ranidae	<i>Pelophylax bedriagae</i>	Levanten Ova Kurbağası, Levant Batakılık Kurbağası	Levantine Frog, Levantine Marsh Frog	-	LC		III	-		-	1	outside	Lit.	1
Agamidae	<i>Stellagama stellio</i>	Dikenli Keler	Roughtail Rock Agama	-	LC		II	-		-	3	inside+outside	Obs./Lit.	2
Lacertidae	<i>Ophisops elegans</i>	Tarla Kertenkelesi, Yılan Gözlü Kertenkele	Snake-Eyed Lizard	-	NE		II	-		-	4	inside+outside	Obs./Lit.	2
Natricidae	<i>Natrix tessellata</i>	Su Yılanı	Dice Snake, Tessellated Water Snake	-	LC		III	-		-	2	inside+outside	Obs./Lit.	2
Testudinidae	<i>Testudo graeca</i>	Tosbağa	Mediterranean Spur-Thighed Tortoise	-	VU	II	II	-		-	3	inside+outside	Obs./Lit.	2
Accipitridae	<i>Buteo rufinus</i>	Kızıl Şahin	Long-Legged Buzzard	-	LC	II	III	-	Native	A.3	2	inside+outside	Obs./Lit.	3
Alaudidae	<i>Galerida cristata</i>	Tepeli Toygar	Crested Lark	-	LC		III	I	Native	A.3	4	inside+outside	Obs./Lit.	3
Apodidae	<i>Apus apus</i>	Ebabil	Common Swift	-	LC		III	-	Transit	A.3.1	2	inside+outside	Obs./Lit.	3
Charadriidae	<i>Vanellus vanellus</i>	Kızkuşu	Northern Lapwing	-	NT		III	I	Winter Visitor	A.5	1	outside	Lit.	3
Columbidae	<i>Streptopelia decaocto</i>	Kumru	Eurasian Collared-Dove	-	LC		III	I	Native	A.5	3	inside+outside	Obs./Lit.	3
Corvidae	<i>Corvus frugilegus</i>	Ekin Kargası	Rook	-	LC			II	Native	A.5	4	inside+outside	Obs./Lit.	3
Corvidae	<i>Pica pica</i>	Saksağan	Eurasian Magpie	-	LC			II	Native	A.5	3	inside+outside	Obs./Lit.	3
Emberizidae	<i>Emberiza melanocephala</i>	Karabaşlı Çinte	Black-Headed Bunting	-	LC		II	-	Summer Visitor	A.4	3	inside+outside	Obs./Lit.	3
Fringillidae	<i>Carduelis carduelis</i>	Saka	European Goldfinch	-	LC		II	-	Native	A.3.1	2	inside+outside	Obs./Lit.	3
Fringillidae	<i>Fringilla coelebs</i>	İspinoz	Common Chaffinch	-	LC		III	I	Native	A.4	3	inside+outside	Obs./Lit.	3
Hirundinidae	<i>Delichon urbicum</i>	Ev Kırılancısı	Northern House Martin	-	LC		II	-	Summer Visitor	A.3	3	inside+outside	Obs./Lit.	3
Hirundinidae	<i>Hirundo rustica</i>	Kır Kırılancısı	Barn Swallow	-	LC		II	-	Summer Visitor	A.5	2	inside+outside	Obs./Lit.	3
Laniidae	<i>Lanius collurio</i>	Kızılsırtlı Örümcekkuşu	Red-Backed Shrike	-	LC		II	I	Summer Visitor	A.3	1	outside	Lit.	3
Motacillidae	<i>Motacilla cinerea</i>	Dağ Kuyruksallayanı	Grey Wagtail	-	LC		II	-	Winter Visitor	A.2	1	outside	Lit.	3
Muscicapidae	<i>Erithacus rubecula</i>	Kızılgerdan	European Robin	-	LC		II	-	Winter Visitor	A.3	3	inside+outside	Obs./Lit.	3
Muscicapidae	<i>Oenanthe isabellina</i>	Boz Kuyrukkakan	Isabelline Wheatear	-	LC		II	I	Summer Visitor	A.3	1	outside	Lit.	3
Paridae	<i>Parus major</i>	Büyük Baştankara	Great Tit	-	LC		II	-	Native	A.3.1	3	inside+outside	Obs./Lit.	3
Passeridae	<i>Passer domesticus</i>	Serçe	House Sparrow	-	LC			II	Native	A.5	4	inside+outside	Obs./Lit.	3
Phasianidae	<i>Coturnix coturnix</i>	Bıldırcın	Common Quail	-	LC		III	II	Transit	A.3	1	outside	Lit.	3
Pycnonotidae	<i>Pycnonotus xanthopygos</i>	Arapbübülü	White-Spectacled Bulbul	-	LC		III	-	Native	A.2	2	inside+outside	Obs./Lit.	3
Strigidae	<i>Athene noctua</i>	Kukumav	Little Owl	-	LC	II	II	-	Native	A.2	1	outside	Lit.	3
Cricetidae	<i>Cricetulus migratorius</i>	Cüce Avurtlak	Migratory Hamster	-	LC					-				4
Cricetidae	<i>Microtus guentheri</i>	Akdeniz Tarla faresi	Günther's Vole	-	LC					-				4
Erinaceidae	<i>Erinaceus concolor</i>	Kirpi	Southern White-Breasted Hedgehog	-	LC					-				4
Muridae	<i>Meriones tristrami</i>	Anadolu Çöl faresi	Tristram's Jird	-	LC					-				4
Pteropodidae	<i>Rousettus aegyptiacus</i>	Mısır Meyve Yarasası	Egyptian Fruit Bat	-	LC					-				4
Spalacidae	<i>Nannospalax ehrenbergi</i>	Filistin Körfaresi	Palestine Mole Rat	-	DD					-				4

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According to Table 123, 3 amphibians, 4 reptiles, 21 birds, and 6 mammal species were determined. According to the IUCN 1 species is in VU, 1 species in NT, 2 species in DD, 29 species in LC, and 1 species in NE category.

Malatya-Akçadağ-Gölbaşı Road & Erkenek Tunnel

Species observed and added due to literature review for Malatya-Akçadağ-Gölbaşı Road & Erkenek Tunnel (Reşadiye Limestone Quarry, Erkenek Gravel-Sand Quarry, Material Storage Area-1, Material Storage Area-2, Material Storage Area-3, Erkenek Construction and Accommodation Site) is given in Table 124.



Table 124. Fauna species at Malatya-Akçadağ-Gölbasi Road & Erkenek Tunnel

Family	Species	Turkish Name	Common Name	Endemizm	IUCN	CITES	BERN	MAKK	Statue	Red Data Book	Relative Abundance	inside/outside BSA	Obs./Lit.
Bufo	<i>Bufo variabilis</i>	Değişken Desenli Gece Kurbağası	Variable Toad	-	DD	-	III	-	Native	-	1	outside	Lit.
Rana	<i>Pelophylax ridibundus</i>	Ova Kurbağası, Bataklik Kurbağası	Euroasian Marsh Frog, Marsh Frog	-	LC	-	III	-	Native	-	1	outside	Lit.
Agama	<i>Stellagama stellio</i>	Dikenli Keler	Roughtail Rock Agama	-	LC	-	II	-	Native	-	4	inside+outside	Obs./Lit.
Colubridae	<i>Dolichophis jugularis</i>	Kara Yılan	Large Whip Snake	-	LC	-	II	-	Native	-	1	outside	Lit.
Gekkonidae	<i>Mediodactylus kotschyi</i>	İnce Parmaklı Keler	Kotschy's Gecko	-	LC	-	II	-	Native	-	1	outside	Lit.
Lacertidae	<i>Apathya cappadocica</i>	Kayseri Kertenkelesi	Anatolian Lizard	-	LC	-	III	-	Native	-	1	outside	Lit.
Lacertidae	<i>Lacerta media</i>	Doğu Yeşil Kertenkelesi, Ortanca Yeşil Kertenkele	Levant Green Lizard, Medium-Sized Green Lizard	-	LC	-	III	-	Native	-	3	inside+outside	Obs./Lit.
Natricidae	<i>Natrix tessellata</i>	Su Yılanı	Dice Snake, Tessellated Water Snake	-	LC	-	III	-	Native	-	1	outside	Lit.
Testudinidae	<i>Testudo graeca</i>	Tosbağa	Mediterranean Spur-Thighed Tortoise	-	VU	II	II	-	Native	-	3	inside+outside	Obs./Lit.
Viperidae	<i>Macrovipera lebetina</i>	Koca Engerek	Levantine Viper, Blunt-Nosed Viper	-	NE	-	II	-	Native	-	1	outside	Lit.
Accipitridae	<i>Buteo rufinus</i>	Kızıl Şahin	Long-Legged Buzzard	-	LC	II	III	-	Native	A.3	2	inside+outside	Obs./Lit.
Alaudidae	<i>Galerida cristata</i>	Tepeli Toygar	Crested Lark	-	LC	-	III	I	Native	A.3	4	inside+outside	Obs./Lit.
Columbidae	<i>Columba livia</i>	Kaya Güvercini	Rock Dove	-	LC	-	III	II	Native	A.5	3	inside+outside	Obs./Lit.
Columbidae	<i>Streptopelia decaocto</i>	Kumru	Eurasian Collared-Dove	-	LC	-	III	I	Native	A.5	2	inside+outside	Obs./Lit.
Corvidae	<i>Corvus cornix</i>	Leş Kargası	Hooded Crow	-	NE	-	III	-	Native	A.5	3	inside+outside	Obs./Lit.
Emberizidae	<i>Emberiza cia</i>	Kaya Çintesi	Rock Bunting	-	LC	-	II	-	Summer Visitor	A.2	1	outside	Lit.
Emberizidae	<i>Emberiza melanocephala</i>	Karabaşlı Çinte	Black-Headed Bunting	-	LC	-	II	-	Summer Visitor	A.4	3	inside+outside	Obs./Lit.
Fringillidae	<i>Carduelis carduelis</i>	Saka	European Goldfinch	-	LC	-	II	-	Native	A.3.1	2	inside+outside	Obs./Lit.
Hirundinidae	<i>Delichon urbicum</i>	Ev Kirlangıcı	Northern House Martin	-	LC	-	II	-	Summer Visitor	A.3	4	inside+outside	Obs./Lit.
Hirundinidae	<i>Hirundo rustica</i>	Kır Kirlangıcı	Barn Swallow	-	LC	-	II	-	Summer Visitor	A.5	2	inside+outside	Obs./Lit.
Laniidae	<i>Lanius collurio</i>	Kızılsırtlı Örümcekuşu	Red-Backed Shrike	-	LC	-	II	I	Summer Visitor	A.3	2	inside+outside	Obs./Lit.
Laniidae	<i>Lanius senator</i>	Kızılbaşlı Örümcekuşu	Woodchat Shrike	-	LC	-	II	-	Transit	A.2	1	outside	Lit.
Muscicapidae	<i>Oenanthe finschii</i>	Aksırtlı Kuyrukkakan	Finsch's Wheatear	-	LC	-	II	-	Native, Summer Visitor	A.1.2	1	outside	Lit.
Muscicapidae	<i>Oenanthe hispanica</i>	Karakulaklı Kuyrukkakan	Black-Eared Wheatear	-	LC	-	II	-	Summer Visitor	A.2	1	outside	Lit.
Muscicapidae	<i>Oenanthe isabellina</i>	Boz Kuyrukkakan	Isabelline Wheatear	-	LC	-	II	I	Summer Visitor	A.3	1	outside	Lit.
Passeridae	<i>Passer domesticus</i>	Serçe	House Sparrow	-	LC	-	-	II	Native	A.5	4	inside+outside	Obs./Lit.
Scotocercidae	<i>Cettia cetti</i>	Kamışbülbulü	Cetti's Warbler	-	LC	-	III	-	Native	A.2	1	outside	Lit.
Sylviidae	<i>Sylvia curruca</i>	Küçük Akgerdanlı Ötleğen	Lesser Whitethroat	-	LC	-	II	-	Summer Visitor	A.2	1	outside	Lit.
Turdidae	<i>Turdus merula</i>	Karatavuk	Eurasian Blackbird	-	LC	-	III	II	Native	A.3	1	outside	Lit.
Upupidae	<i>Upupa epops</i>	İbibik	Common Hoopoe	-	LC	-	II	-	Summer Visitor	A.2	1	outside	Lit.
Canidae	<i>Vulpes vulpes</i>	Kızıl Tilki	Red Fox	-	LC	-	-	II	Native	-	3	inside+outside	Obs./Lit.
Leporidae	<i>Lepus europaeus</i>	Yabani Tavşan	European Hare	-	LC	-	III	II	Native	-	2	inside+outside	Obs./Lit.
Spalacidae	<i>Nannospalax ehrenbergi</i>	Filistin Körfaresi	Palestine Mole Rat	-	DD	-	-	-	Native	-	1	outside	Lit.
Suidae	<i>Sus scrofa</i>	Yabandomuzu	Wild Boar	-	LC	-	-	II	Native	-	3	inside+outside	Obs./Lit.

IUCN

VU : Vulnerable
DD: Data Deficient
LC: Least Concern
NE: Not Evaluated

CITES

I: Includes species threatened with extinction. Trade in specimens of these species is permitted only in exceptional circumstances.
II: Includes species that, although currently not threatened. with extinction, may become so without trade controls.

Bern Convention

II: Special protection ('appropriate and necessary legislative and administrative measures') for the animal taxa listed, including all forms of deliberate capture and keeping and deliberate killing; the deliberate damage to or destruction of breeding or resting sites; the deliberate disturbance of wild fauna, particularly during the period of breeding, rearing and hibernation.

III: Special protection through 'appropriate and necessary legislative and administrative measures', of the listed wild fauna species.

MAKK

I: Protected by the Ministry of Forestry and Agriculture
II: Hunting animals that are allowed to be hunted within certain periods of time.

RELATIVE ABUNDANCES

1: Extremely rare
2: Rare
3: Moderate density
4: Abundant
5: Very abundant

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According to Table 124, 2 amphibians, 8 reptiles, 20 birds, and 4 mammal species were determined. According to the IUCN 1 species is in VU, 2 species in DD, 29 species in LC, and 2 species in NE category.

Beylerderesi Bridge

Species observed and added due to literature review for Beylerderesi Bridge is given in Table 125.



Table 125. Fauna species at Beylerderesi Bridge

Family	Species	Turkish Name	Common Name	Endemizm	IUCN	CITES	BERN	MAKK	Statue	Red Data Book	Relative Abundance	inside/outside BSA	Obs./Lit.
Bufoidea	<i>Bufo variabilis</i>	Değişken Desenli Gece Kurbağası	Variable Toad	-	DD	-	III	-	-	-	1	outside	Lit.
Ranidae	<i>Pelophylax ridibundus</i>	Ova Kurbağası, Bataklik Kurbağası	Euroasian Marsh Frog, Marsh Frog	-	LC	-	III	-	-	-	1	outside	Lit.
Agamidae	<i>Stellagama stellio</i>	Dikenli Keler	Roughtail Rock Agama	-	LC	-	II	-	-	-	4	inside+outside	Obs./Lit.
Colubridae	<i>Dolichophis jugularis</i>	Kara Yılan	Large Whip Snake	-	LC	-	II	-	-	-	1	outside	Lit.
Gekkonidae	<i>Mediodactylus kotschyi</i>	İnce Parmaklı Keler	Kotschy's Gecko	-	LC	-	II	-	-	-	1	outside	Lit.
Lacertidae	<i>Apathya cappadocica</i>	Kayseri Kertenkelesi	Anatolian Lizard	-	LC	-	III	-	-	-	1	outside	Lit.
Lacertidae	<i>Lacerta media</i>	Doğu Yeşil Kertenkelesi, Ortanca Yeşil Kertenkele	Levant Green Lizard, Medium-Sized Green Lizard	-	LC	-	III	-	-	-	3	inside+outside	Obs./Lit.
Natricidae	<i>Natrix tessellata</i>	Su Yılanı	Dice Snake, Tessellated Water Snake	-	LC	-	III	-	-	-	1	outside	Lit.
Testudinidae	<i>Testudo graeca</i>	Tosbağa	Mediterranean Spur-Thighed Tortoise	-	VU	II	II	-	-	-	3	inside+outside	Obs./Lit.
Viperidae	<i>Macrovipera lebetina</i>	Koca Engerek	Levantine Viper, Blunt-Nosed Viper	-	NE	-	II	-	-	-	1	outside	Lit.
Accipitridae	<i>Buteo rufinus</i>	Kızıl Şahin	Long-Legged Buzzard	-	LC	II	III	-	Native	A.3	2	inside+outside	Obs./Lit.
Alaudidae	<i>Alauda arvensis</i>	Tarlakuşu	Eurasian Skylark	-	LC	-	III	I	Winter Visitor	A.4	3	inside+outside	Obs./Lit.
Alaudidae	<i>Calandrella brachydactyla</i>	Bozkır Toygarı	Greater Short-Toed Lark	-	LC	-	II	-	Native	A.3	1	outside	Lit.
Alaudidae	<i>Galerida cristata</i>	Tepeli Toygar	Crested Lark	-	LC	-	III	I	Native	A.3	3	inside+outside	Obs./Lit.
Alaudidae	<i>Melanocorypha bimaculata</i>	Küçük Boğmaklı Toygar	Bimaculated Lark	-	LC	-	II	-	Native	A.3	1	outside	Lit.
Anatidae	<i>Anas crecca</i>	Çamurcun	Common Teal	-	LC	-	III	II	Native	A.5	1	outside	Lit.
Anatidae	<i>Tadorna ferruginea</i>	Angıt	Ruddy Shelduck	-	LC	-	II	-	Native	A.4	1	outside	Lit.
Anatidae	<i>Tadorna tadorna</i>	Suna	Common Shelduck	-	LC	-	II	-	Native	A.3.1	1	outside	Lit.
Ardeidae	<i>Ardea alba</i>	Büyük Ak Balıkçıl	Great White Egret	-	LC	-	II	-	Native	A.3	1	outside	Lit.
Ardeidae	<i>Ardea cinerea</i>	Gri Balıkçıl	Grey Heron	-	LC	-	III	I	Native	A.3.1	1	outside	Lit.
Ardeidae	<i>Egretta garzetta</i>	Küçük Ak Balıkçıl	Little Egret	-	LC	-	II	-	Winter Visitor	A.3.1	1	outside	Lit.
Ciconiidae	<i>Ciconia ciconia</i>	Leylek	White Stork	-	LC	-	II	-	Summer Visitor	A.3.1	1	outside	Lit.
Ciconiidae	<i>Ciconia nigra</i>	Kara Leylek	Black Stork	-	LC	II	II	-	Transit	A.3	1	outside	Lit.
Columbidae	<i>Columba livia</i>	Kaya Güvercini	Rock Dove	-	LC	-	III	II	Native	A.5	3	inside+outside	Obs./Lit.
Columbidae	<i>Streptopelia decaocto</i>	Kumru	Eurasian Collared-Dove	-	LC	-	III	I	Native	A.5	3	inside+outside	Obs./Lit.
Corvidae	<i>Corvus cornix</i>	Leş Kargası	Hooded Crow	-	NE	-	III	-	Native	A.5	2	inside+outside	Obs./Lit.
Corvidae	<i>Corvus frugilegus</i>	Ekin Kargası	Rook	-	LC	-	-	II	Native	A.5	3	inside+outside	Obs./Lit.
Corvidae	<i>Garrulus glandarius</i>	Alakarga	Eurasian Jay	-	LC	-	-	II	Native	A.3.1	1	outside	Lit.
Corvidae	<i>Pica pica</i>	Saksağan	Eurasian Magpie	-	LC	-	-	II	Native	A.5	4	inside+outside	Obs./Lit.
Emberizidae	<i>Emberiza calandra</i>	Tarla Çintesi	Corn Bunting	-	LC	-	III	I	Native	A.4	3	inside+outside	Obs./Lit.
Emberizidae	<i>Emberiza melanocephala</i>	Karabaşlı Çinte	Black-Headed Bunting	-	LC	-	II	-	Summer Visitor	A.4	1	outside	Lit.
Falconidae	<i>Falco naumanni</i>	Küçük Kerkenez	Lesser Kestrel	-	LC	II	II	-	Transit	A.2	1	outside	Lit.
Falconidae	<i>Falco tinnunculus</i>	Kerkenez	Common Kestrel	-	LC	II	II	-	Native	A.2	1	outside	Lit.
Fringillidae	<i>Carduelis carduelis</i>	Saka	European Goldfinch	-	LC	-	II	-	Native	A.3.1	2	inside+outside	Obs./Lit.
Fringillidae	<i>Linaria cannabina</i>	Ketenkuşu	Common Linnet	-	LC	-	II	-	Winter Visitor	A.3	1	outside	Lit.
Hirundinidae	<i>Hirundo rustica</i>	Kır Kirlangıcı	Barn Swallow	-	LC	-	II	-	Summer Visitor	A.5	1	outside	Lit.
Laniidae	<i>Lanius collurio</i>	Kızılırtlı Örümcekkuşu	Red-Backed Shrike	-	LC	-	II	I	Summer Visitor	A.3	1	outside	Lit.
Laniidae	<i>Lanius minor</i>	Karaalınlı Örümcekkuşu	Lesser Grey Shrike	-	LC	-	II	-	Transit	A.3	2	inside+outside	Obs./Lit.
Laniidae	<i>Lanius nubicus</i>	Maskeli Örümcekkuşu	Masked Shrike	-	LC	-	II	-	Summer Visitor	A.2	1	outside	Lit.
Laridae	<i>Chlidonias leucopterus</i>	Akkanatlı Sumru	White-Winged Tern	-	LC	-	II	-	Native	A.4	1	outside	Lit.
Laridae	<i>Hydroprogne caspia</i>	Hazar Sumrusu	Caspian Tern	-	LC	-	II	-	Native	A.2	1	outside	Lit.
Meropidae	<i>Merops apiaster</i>	Arıkuşu	European Bee-Eater	-	LC	-	II	-	Transit	A.3.1	1	outside	Lit.
Motacillidae	<i>Anthus campestris</i>	Kır İncirkuşu	Tawny Pipit	-	LC	-	II	-	Summer Visitor	A.2	1	outside	Lit.

Family	Species	Turkish Name	Common Name	Endemizm	IUCN	CITES	BERN	MAKK	Statue	Red Data Book	Relative Abundance	inside/outside BSA	Obs./Lit.
Motacillidae	<i>Motacilla alba</i>	Akkuyruksallayan	White Wagtail	-	LC	-	II	-	Native	A.3.1	3	inside+outside	Obs./Lit.
Motacillidae	<i>Motacilla flava</i>	Sarı Kuyruksallayan	Western Yellow Wagtail	-	LC	-	II	-	Summer Visitor	A.3.1	1	outside	Lit.
Muscicapidae	<i>Oenanthe isabellina</i>	Boz Kuyrukkakan	Isabelline Wheatear	-	LC	-	II	I	Summer Visitor	A.3	1	outside	Lit.
Muscicapidae	<i>Saxicola rubetra</i>	Çayır Taşkuşu	Whinchat	-	LC	-	II	-	Transit	A.3	1	outside	Lit.
Pandionidae	<i>Pandion haliaetus</i>	Balık Kartalı	Osprey	-	LC	II	III	-	Native	A.1.2	1	outside	Lit.
Paridae	<i>Parus major</i>	Büyük Baştankara	Great Tit	-	LC	-	II	-	Native	A.3.1	2	inside+outside	Obs./Lit.
Passeridae	<i>Passer domesticus</i>	Serçe	House Sparrow	-	LC	-	-	II	Native	A.5	3	inside+outside	Obs./Lit.
Passeridae	<i>Passer hispaniolensis</i>	Söğüt Serçesi	Spanish Sparrow	-	LC	-	III	I	Native	A.3	1	outside	Lit.
Passeridae	<i>Petronia petronia</i>	Kaya Serçesi	Rock Sparrow	-	LC	-	II	-	Native	A.3	1	outside	Lit.
Phalacrocoracidae	<i>Phalacrocorax carbo</i>	Karabatak	Great Cormorant	-	LC	-	III	I	Winter Visitor	A.3	1	outside	Lit.
Phasianidae	<i>Coturnix coturnix</i>	Bıldırcın	Common Quail	-	LC	-	III	II	Transit	A.3	1	outside	Lit.
Phylloscopidae	<i>Phylloscopus trochilus</i>	Söğütbülbülü	Willow Warbler	-	LC	-	III	-	Transit	A.3.1	1	outside	Lit.
Podicipedidae	<i>Tachybaptus ruficollis</i>	Küçük Batağan	Little Grebe	-	LC	-	II	-	Native	A.3.1	1	outside	Lit.
Pteroclididae	<i>Pterocles orientalis</i>	Bağırtlak	Black-Bellied Sandgrouse	-	LC	-	II	I	Native	A.3	1	outside	Lit.
Rallidae	<i>Gallinula chloropus</i>	Sutavağu	Common Moorhen	-	LC	-	III	I	Native	A.3.1	1	outside	Lit.
Recurvirostridae	<i>Himantopus himantopus</i>	Uzunbacak	Black-Winged Stilt	-	LC	-	II	-	Native	A.3	1	outside	Lit.
Scolopacidae	<i>Actitis hypoleucos</i>	Dere Dündükünü	Common Sandpiper	-	LC	-	III	-	Summer Visitor	A.3	1	outside	Lit.
Scolopacidae	<i>Scolopax rusticola</i>	Çulluk	Eurasian Woodcock	-	LC	-	III	II	Winter Visitor	B.3	1	outside	Lit.
Scolopacidae	<i>Tringa glareola</i>	Orman Dündükünü	Wood Sandpiper	-	LC	-	II	-	Transit	B.3	1	outside	Lit.
Scolopacidae	<i>Tringa ochropus</i>	Yeşil Dündükün	Green Sandpiper	-	LC	-	II	-	Winter Visitor	B.2	1	outside	Lit.
Strigidae	<i>Athene noctua</i>	Kukumav	Little Owl	-	LC	II	II	-	Native	A.2	1	outside	Lit.
Sturnidae	<i>Pastor roseus</i>	Alasığırık	Rosy Starling	-	LC	-	II	-	Summer Visitor	A.4	1	outside	Lit.
Sturnidae	<i>Sturnus vulgaris</i>	Siğircık	Common Starling	-	LC	-	-	I	Winter Visitor	A.5	3	inside+outside	Obs./Lit.
Threskiornithidae	<i>Platalea leucorodia</i>	Kaşıklı	Eurasian Spoonbill	-	LC	II	II	-	Native	A.3	1	outside	Lit.
Canidae	<i>Vulpes vulpes</i>	Kızıl Tilki	Red Fox	-	LC	-	-	II	-	-	3	inside+outside	Obs./Lit.
Leporidae	<i>Lepus europaeus</i>	Yabani Tavşan	European Hare	-	LC	-	III	II	-	-	2	inside+outside	Obs./Lit.
Spalacidae	<i>Nannospalax ehrenbergi</i>	Filistin Körfesi	Palestine Mole Rat	-	DD	-	-	-	-	-	1	outside	Lit.
Suidae	<i>Sus scrofa</i>	Yabandomuzu	Wild Boar	-	LC	-	-	II	-	-	3	inside+outside	Obs./Lit.

IUCN

VU : Vulnerable
DD: Data Deficient
LC: Least Concern
NE: Not Evaluated

CITES

I: Includes species threatened with extinction. Trade in specimens of these species is permitted only in exceptional circumstances.

II: Includes species that, although currently not threatened. with extinction, may become so without trade controls.

Bern Convention

II: ecial protection ('appropriate and necessary legislative and administrative measures') for the animal taxa listed, including all forms of deliberate capture and keeping and deliberate killing; the deliberate damage to or destruction of breeding or resting sites; the deliberate disturbance of wild fauna, particularly during the period of breeding, rearing and hibernation.

III: Special protection through 'appropriate and necessary legislative and administrative measures', of the listed wild fauna species.

MAKK

I: Protected by the Ministry of Forestry and Agriculture

II: Hunting animals that are allowed to be hunted within certain periods of time.

RELATIVE ABUNDANCES

1: Extremely rare
2: Rare
3: Moderate density
4: Abundant
5: Very abundant

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According to Table 125, 2 amphibians, 8 reptiles, 57 birds, and 4 mammal species were determined. According to the IUCN 1 species is in VU, 2 species in DD, 66 species in LC, and 2 species in NE category.

Tohma Bridge

Species observed and added due to literature review for Tohma Bridge (Tohma Construction and Accommodation Site) is given in Table 126.



Table 126. Fauna species at Tohma Bridge

Family	Species	Turkish Name	Common Name	Endemizm	IUCN	CITES	BERN	MAKK	Statue	Red Data Book	Relative Abundance	inside/outside BSA	Obs./Lit.
Bufo	<i>Bufo variabilis</i>	Değişken Desenli Gece Kurbağası	Variable Toad	-	DD	-	III	-	-	-	1	outside	Lit.
Rana	<i>Pelophylax ridibundus</i>	Ova Kurbağası, Bataklık Kurbağası	Euroasian Marsh Frog, Marsh Frog	-	LC	-	III	-	-	-	1	outside	Lit.
Agama	<i>Stellagama stellio</i>	Dikenli Keler	Roughtail Rock Agama	-	LC	-	II	-	-	-	4	inside+outside	Obs./Lit.
Coluber	<i>Dolichophis jugularis</i>	Kara Yılan	Large Whip Snake	-	LC	-	II	-	-	-	1	outside	Lit.
Gekko	<i>Mediodactylus kotschyi</i>	İnce Parmaklı Keler	Kotschy's Gecko	-	LC	-	II	-	-	-	1	outside	Lit.
Lacerta	<i>Apathya cappadocica</i>	Kayseri Kertenkelesi	Anatolian Lizard	-	LC	-	III	-	-	-	1	outside	Lit.
Lacerta	<i>Lacerta media</i>	Doğu Yeşil Kertenkelesi, Ortanca Yeşil Kertenkele	Levant Green Lizard, Medium-Sized Green Lizard	-	LC	-	III	-	-	-	3	inside+outside	Obs./Lit.
Natrix	<i>Natrix tessellata</i>	Su Yılanı	Dice Snake, Tessellated Water Snake	-	LC	-	III	-	-	-	1	outside	Lit.
Testudo	<i>Testudo graeca</i>	Tosbağa	Mediterranean Spur-Thighed Tortoise	-	VU	II	II	-	-	-	3	inside+outside	Obs./Lit.
Viper	<i>Macrovipera lebetina</i>	Koca Engerek	Levantine Viper, Blunt-Nosed Viper	-	NE	-	II	-	-	-	1	outside	Lit.
Buteo	<i>Buteo rufinus</i>	Kızıl Şahin	Long-Legged Buzzard	-	LC	II	III	-	Native	A.3	2	inside+outside	Obs./Lit.
Alauda	<i>Alauda arvensis</i>	Tarlakuşu	Eurasian Skylark	-	LC	-	III	I	Winter Visitor	A.4	3	inside+outside	Obs./Lit.
Galerida	<i>Galerida cristata</i>	Tepeli Toygar	Crested Lark	-	LC	-	III	I	Native	A.3	3	inside+outside	Obs./Lit.
Melanocorypha	<i>Melanocorypha bimaculata</i>	Küçük Boğmaklı Toygar	Bimaculated Lark	-	LC	-	II	-	Native	A.3	1	outside	Lit.
Anas	<i>Anas crecca</i>	Çamurcun	Common Teal	-	LC	-	III	II	Native	A.5	1	outside	Lit.
Ardea	<i>Ardea alba</i>	Büyük Ak Balıkçıl	Great White Egret	-	LC	-	II	-	Native	A.3	1	outside	Lit.
Ardea	<i>Ardea cinerea</i>	Gri Balıkçıl	Grey Heron	-	LC	-	III	I	Native	A.3.1	1	outside	Lit.
Egretta	<i>Egretta garzetta</i>	Küçük Ak Balıkçıl	Little Egret	-	LC	-	II	-	Winter Visitor	A.3.1	1	outside	Lit.
Ciconia	<i>Ciconia ciconia</i>	Leylek	White Stork	-	LC	-	II	-	Summer Visitor	A.3.1	1	outside	Lit.
Ciconia	<i>Ciconia nigra</i>	Kara Leylek	Black Stork	-	LC	II	II	-	Transit	A.3	1	outside	Lit.
Columba	<i>Columba livia</i>	Kaya Güvercini	Rock Dove	-	LC	-	III	II	Native	A.5	3	inside+outside	Obs./Lit.
Streptopelia	<i>Streptopelia decaocto</i>	Kumru	Eurasian Collared-Dove	-	LC	-	III	I	Native	A.5	3	inside+outside	Obs./Lit.
Corvus	<i>Corvus cornix</i>	Leş Kargası	Hooded Crow	-	NE	-	III	-	Native	A.5	2	inside+outside	Obs./Lit.
Corvus	<i>Corvus frugilegus</i>	Ekin Kargası	Rook	-	LC	-	-	II	Native	A.5	3	inside+outside	Obs./Lit.
Pica	<i>Pica pica</i>	Saksağan	Eurasian Magpie	-	LC	-	-	II	Native	A.5	4	inside+outside	Obs./Lit.
Emberiza	<i>Emberiza calandra</i>	Tarla Çintesi	Corn Bunting	-	LC	-	III	I	Native	A.4	3	inside+outside	Obs./Lit.
Emberiza	<i>Emberiza melanocephala</i>	Karabaşlı Çinte	Black-Headed Bunting	-	LC	-	II	-	Summer Visitor	A.4	1	outside	Lit.
Falco	<i>Falco tinnunculus</i>	Kerkenez	Common Kestrel	-	LC	II	II	-	Native	A.2	1	outside	Lit.
Carduelis	<i>Carduelis carduelis</i>	Saka	European Goldfinch	-	LC	-	II	-	Native	A.3.1	2	inside+outside	Obs./Lit.
Linaria	<i>Linaria cannabina</i>	Ketenkuşu	Common Linnet	-	LC	-	II	-	Winter Visitor	A.3	1	outside	Lit.
Hirundo	<i>Hirundo rustica</i>	Kır Kırangıcı	Barn Swallow	-	LC	-	II	-	Summer Visitor	A.5	1	outside	Lit.
Lanius	<i>Lanius collurio</i>	Kızılsırtlı Örümcekuşu	Red-Backed Shrike	-	LC	-	II	I	Summer Visitor	A.3	1	outside	Lit.
Lanius	<i>Lanius minor</i>	Karaalınlı Örümcekuşu	Lesser Grey Shrike	-	LC	-	II	-	Transit	A.3	2	inside+outside	Obs./Lit.
Chlidonias	<i>Chlidonias leucopterus</i>	Akkanatlı Sumru	White-Winged Tern	-	LC	-	II	-	Native	A.4	1	outside	Lit.
Hydroprogne	<i>Hydroprogne caspia</i>	Hazar Sumrusu	Caspian Tern	-	LC	-	II	-	Native	A.2	1	outside	Lit.
Merops	<i>Merops apiaster</i>	Arıkuşu	European Bee-Eater	-	LC	-	II	-	Transit	A.3.1	1	outside	Lit.
Anthus	<i>Anthus campestris</i>	Kır İncirkuşu	Tawny Pipit	-	LC	-	II	-	Summer Visitor	A.2	1	outside	Lit.
Motacilla	<i>Motacilla alba</i>	Akkuyruksallayan	White Wagtail	-	LC	-	II	-	Native	A.3.1	3	inside+outside	Obs./Lit.
Oenanthe	<i>Oenanthe isabellina</i>	Boz Kuyrukkakan	Isabelline Wheatear	-	LC	-	II	I	Summer Visitor	A.3	1	outside	Lit.
Saxicola	<i>Saxicola rubetra</i>	Çayır Taşkuşu	Whinchat	-	LC	-	II	-	Transit	A.3	1	outside	Lit.
Pandion	<i>Pandion haliaetus</i>	Balık Kartalı	Osprey	-	LC	II	III	-	Native	A.1.2	1	outside	Lit.
Parus	<i>Parus major</i>	Büyük Baştankara	Great Tit	-	LC	-	II	-	Native	A.3.1	2	inside+outside	Obs./Lit.
Passer	<i>Passer domesticus</i>	Serçe	House Sparrow	-	LC	-	-	II	Native	A.5	3	inside+outside	Obs./Lit.

Family	Species	Turkish Name	Common Name	Endemizm	IUCN	CITES	BERN	MAKK	Statue	Red Data Book	Relative Abundance	inside/outside BSA	Obs./Lit.
Passeridae	<i>Petronia petronia</i>	Kaya Serçesi	Rock Sparrow	-	LC	-	II	-	Native	A.3	1	outside	Lit.
Phalacrocoracidae	<i>Phalacrocorax carbo</i>	Karabatak	Great Cormorant	-	LC	-	III	I	Winter Visitor	A.3	1	outside	Lit.
Phasianidae	<i>Coturnix coturnix</i>	Bıldırcın	Common Quail	-	LC	-	III	II	Transit	A.3	1	outside	Lit.
Phylloscopidae	<i>Phylloscopus trochilus</i>	Söğütbülbülü	Willow Warbler	-	LC	-	III	-	Transit	A.3.1	1	outside	Lit.
Podicipedidae	<i>Tachybaptus ruficollis</i>	Küçük Batağan	Little Grebe	-	LC	-	II	-	Native	A.3.1	1	outside	Lit.
Pteroclididae	<i>Pterocles orientalis</i>	Bağırtlak	Black-Bellied Sandgrouse	-	LC	-	II	I	Native	A.3	1	outside	Lit.
Recurvirostridae	<i>Himantopus himantopus</i>	Uzunbacak	Black-Winged Stilt	-	LC	-	II	-	Native	A.3	1	outside	Lit.
Scolopacidae	<i>Actitis hypoleucos</i>	Dere Dődükünü	Common Sandpiper	-	LC	-	III	-	Summer Visitor	A.3	1	outside	Lit.
Scolopacidae	<i>Scolopax rusticola</i>	Çulluk	Eurasian Woodcock	-	LC	-	III	II	Winter Visitor	B.3	1	outside	Lit.
Scolopacidae	<i>Tringa glareola</i>	Orman Dödükünü	Wood Sandpiper	-	LC	-	II	-	Transit	B.3	1	outside	Lit.
Scolopacidae	<i>Tringa ochropus</i>	Yeşil Dödükünü	Green Sandpiper	-	LC	-	II	-	Winter Visitor	B.2	1	outside	Lit.
Sturnidae	<i>Pastor roseus</i>	Alasığırık	Rosy Starling	-	LC	-	II	-	Summer Visitor	A.4	1	outside	Lit.
Sturnidae	<i>Sturnus vulgaris</i>	Siğircık	Common Starling	-	LC	-	-	I	Winter Visitor	A.5	3	inside+outside	Obs./Lit.
Threskiornithidae	<i>Platalea leucorodia</i>	Kaşıkcı	Eurasian Spoonbill	-	LC	II	II	-	Native	A.3	1	outside	Lit.
Canidae	<i>Vulpes vulpes</i>	Kızıl Tilki	Red Fox	-	LC	-	-	II	-	-	3	inside+outside	Obs./Lit.
Leporidae	<i>Lepus europaeus</i>	Yabani Tavşan	European Hare	-	LC	-	III	II	-	-	2	inside+outside	Obs./Lit.
Spalacidae	<i>Nannospalax ehrenbergi</i>	Filistin Körfaresi	Palestine Mole Rat	-	DD	-	-	-	-	-	1	outside	Lit.
Suidae	<i>Sus scrofa</i>	Yabandomuzu	Wild Boar	-	LC	-	-	II	-	-	3	inside+outside	Obs./Lit.

IUCN

VU : Vulnerable
DD: Data Deficient
LC: Least Concern
NE: Not Evaluated

CITES

I: Includes species threatened with extinction. Trade in specimens of these species is permitted only in exceptional circumstances.
II: Includes species that, although currently not threatened. with extinction, may become so without trade controls.

Bern Convention

II: ecial protection ('appropriate and necessary legislative and administrative measures') for the animal taxa listed, including all forms of deliberate capture and keeping and deliberate killing; the deliberate damage to or destruction of breeding or resting sites; the deliberate disturbance of wild fauna, particularly during the period of breeding, rearing and hibernation.
III: Special protection through 'appropriate and necessary legislative and administrative measures', of the listed wild fauna species.

MAKK

I: Protected by the Ministry of Forestry and Agriculture
II: Hunting animals that are allowed to be hunted within certain periods of time.

RELATIVE ABUNDANCES

1: Extremely rare
2: Rare
3: Moderate density
4: Abundant
5: Very abundant

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According to Table 126, 2 amphibians, 8 reptiles, 47 birds, and 4 mammal species were determined. According to the IUCN 1 species is in VU, 2 species in DD, 56 species in LC, and 2 species in NE category.

Ağın Bridge

Species observed and added due to literature review for Ağın Bridge (Ağın Construction and Accommodation Site) is given in Table 127.



Table 127. Fauna species at Ağın Bridge

Family	Species	Turkish Name	Common Name	Endemizm	IUCN	CITES	BERN	MAKK	Statue	Red Data Book	Relative Abundance	inside/outside BSA	Obs./Lit.
Bufonidae	<i>Bufo variabilis</i>	Değişken Desenli Gece Kurbağası	Variable Toad	-	DD	-	III	-	-	-	1	outside	Lit.
Ranidae	<i>Pelophylax ridibundus</i>	Ova Kurbağası, Bataklık Kurbağası	Euroasian Marsh Frog, Marsh Frog	-	LC	-	III	-	-	-	1	outside	Lit.
Agamidae	<i>Stellagama stellio</i>	Dikenli Keler	Roughtail Rock Agama	-	LC	-	II	-	-	-	4	inside+outside	Obs./Lit.
Colubridae	<i>Dolichophis jugularis</i>	Kara Yılan	Large Whip Snake	-	LC	-	II	-	-	-	1	outside	Lit.
Gekkonidae	<i>Mediodactylus kotschyi</i>	İnce Parmaklı Keler	Kotschy's Gecko	-	LC	-	II	-	-	-	1	outside	Lit.
Lacertidae	<i>Apathya cappadocica</i>	Kayseri Kertenkelesi	Anatolian Lizard	-	LC	-	III	-	-	-	1	outside	Lit.
Lacertidae	<i>Lacerta media</i>	Doğu Yeşil Kertenkelesi, Ortanca Yeşil Kertenkele	Levant Green Lizard, Medium-Sized Green Lizard	-	LC	-	III	-	-	-	3	inside+outside	Obs./Lit.
Natricidae	<i>Natrix tessellata</i>	Su Yılanı	Dice Snake, Tessellated Water Snake	-	LC	-	III	-	-	-	1	outside	Lit.
Testudinidae	<i>Testudo graeca</i>	Tosbağa	Mediterranean Spur-Thighed Tortoise	-	VU	II	II	-	-	-	3	inside+outside	Obs./Lit.
Viperidae	<i>Macrovipera lebetina</i>	Koca Engerek	Levantine Viper, Blunt-Nosed Viper	-	NE	-	II	-	-	-	1	outside	Lit.
Accipitridae	<i>Buteo rufinus</i>	Kızıl Şahin	Long-Legged Buzzard	-	LC	II	III	-	Native	A.3	2	inside+outside	Obs./Lit.
Alaudidae	<i>Alauda arvensis</i>	Tarlakuşu	Eurasian Skylark	-	LC	-	III	I	Winter Visitor	A.4	3	inside+outside	Obs./Lit.
Alaudidae	<i>Galerida cristata</i>	Tepeli Toygar	Crested Lark	-	LC	-	III	I	Native	A.3	3	inside+outside	Obs./Lit.
Ardeidae	<i>Ardea alba</i>	Büyük Ak Balıkçıl	Great White Egret	-	LC	-	II	-	Native	A.3	1	outside	Lit.
Ardeidae	<i>Ardea cinerea</i>	Gri Balıkçıl	Grey Heron	-	LC	-	III	I	Native	A.3.1	1	outside	Lit.
Ardeidae	<i>Egretta garzetta</i>	Küçük Ak Balıkçıl	Little Egret	-	LC	-	II	-	Winter Visitor	A.3.1	1	outside	Lit.
Ciconiidae	<i>Ciconia ciconia</i>	Leylek	White Stork	-	LC	-	II	-	Summer Visitor	A.3.1	1	outside	Lit.
Ciconiidae	<i>Ciconia nigra</i>	Kara Leylek	Black Stork	-	LC	II	II	-	Transit	A.3	1	outside	Lit.
Columbidae	<i>Columba livia</i>	Kaya Güvercini	Rock Dove	-	LC	-	III	II	Native	A.5	3	inside+outside	Obs./Lit.
Columbidae	<i>Streptopelia decaocto</i>	Kumru	Eurasian Collared-Dove	-	LC	-	III	I	Native	A.5	3	inside+outside	Obs./Lit.
Corvidae	<i>Corvus cornix</i>	Leş Kargası	Hooded Crow	-	NE	-	III	-	Native	A.5	2	inside+outside	Obs./Lit.
Corvidae	<i>Corvus frugilegus</i>	Ekin Kargası	Rook	-	LC	-	-	II	Native	A.5	3	inside+outside	Obs./Lit.
Corvidae	<i>Pica pica</i>	Saksağan	Eurasian Magpie	-	LC	-	-	II	Native	A.5	4	inside+outside	Obs./Lit.
Emberizidae	<i>Emberiza calandra</i>	Tarla Çintesi	Corn Bunting	-	LC	-	III	I	Native	A.4	3	inside+outside	Obs./Lit.
Emberizidae	<i>Emberiza melanocephala</i>	Karabaşlı Çinte	Black-Headed Bunting	-	LC	-	II	-	Summer Visitor	A.4	1	outside	Lit.
Falconidae	<i>Falco tinnunculus</i>	Kerkenez	Common Kestrel	-	LC	II	II	-	Native	A.2	1	outside	Lit.
Fringillidae	<i>Carduelis carduelis</i>	Saka	European Goldfinch	-	LC	-	II	-	Native	A.3.1	2	inside+outside	Obs./Lit.
Hirundinidae	<i>Hirundo rustica</i>	Kır Kırangıcı	Barn Swallow	-	LC	-	II	-	Summer Visitor	A.5	1	outside	Lit.
Laniidae	<i>Lanius collurio</i>	Kızılsırtlı Örümcekkuşu	Red-Backed Shrike	-	LC	-	II	I	Summer Visitor	A.3	1	outside	Lit.
Laniidae	<i>Lanius minor</i>	Karaalınlı Örümcekkuşu	Lesser Grey Shrike	-	LC	-	II	-	Transit	A.3	2	inside+outside	Obs./Lit.
Laridae	<i>Chlidonias leucopterus</i>	Akkanatlı Sumru	White-Winged Tern	-	LC	-	II	-	Native	A.4	1	outside	Lit.
Laridae	<i>Hydroprogne caspia</i>	Hazar Sumrusu	Caspian Tern	-	LC	-	II	-	Native	A.2	1	outside	Lit.
Meropidae	<i>Merops apiaster</i>	Arıkuşu	European Bee-Eater	-	LC	-	II	-	Transit	A.3.1	1	outside	Lit.
Motacillidae	<i>Anthus campestris</i>	Kır İncirkuşu	Tawny Pipit	-	LC	-	II	-	Summer Visitor	A.2	1	outside	Lit.
Motacillidae	<i>Motacilla alba</i>	Akkuyruksallayan	White Wagtail	-	LC	-	II	-	Native	A.3.1	3	inside+outside	Obs./Lit.
Muscicapidae	<i>Oenanthe isabellina</i>	Boz Kuyrukkakan	Isabelline Wheatear	-	LC	-	II	I	Summer Visitor	A.3	1	outside	Lit.
Muscicapidae	<i>Saxicola rubetra</i>	Çayır Taşkuşu	Whinchat	-	LC	-	II	-	Transit	A.3	1	outside	Lit.
Pandionidae	<i>Pandion haliaetus</i>	Balık Kartalı	Osprey	-	LC	II	III	-	Native	A.1.2	1	outside	Lit.
Paridae	<i>Parus major</i>	Büyük Baştankara	Great Tit	-	LC	-	II	-	Native	A.3.1	2	inside+outside	Obs./Lit.
Passeridae	<i>Passer domesticus</i>	Serçe	House Sparrow	-	LC	-	-	II	Native	A.5	3	inside+outside	Obs./Lit.
Passeridae	<i>Petronia petronia</i>	Kaya Serçesi	Rock Sparrow	-	LC	-	II	-	Native	A.3	1	outside	Lit.
Phalacrocoracidae	<i>Phalacrocorax carbo</i>	Karabatak	Great Cormorant	-	LC	-	III	I	Winter Visitor	A.3	1	outside	Lit.

Family	Species	Turkish Name	Common Name	Endemizm	IUCN	CITES	BERN	MAKK	Statue	Red Data Book	Relative Abundance	inside/outside BSA	Obs./Lit.
Phasianidae	<i>Coturnix coturnix</i>	Bıldırcın	Common Quail	-	LC	-	III	II	Transit	A.3	1	outside	Lit.
Pteroclididae	<i>Pterocles orientalis</i>	Bağırtlak	Black-Bellied Sandgrouse	-	LC	-	II	I	Native	A.3	1	outside	Lit.
Recurvirostridae	<i>Himantopus himantopus</i>	Uzunbacak	Black-Winged Stilt	-	LC	-	II	-	Native	A.3	1	outside	Lit.
Scolopacidae	<i>Actitis hypoleucos</i>	Dere Düdükçünü	Common Sandpiper	-	LC	-	III	-	Summer Visitor	A.3	1	outside	Lit.
Scolopacidae	<i>Scolopax rusticola</i>	Çulluk	Eurasian Woodcock	-	LC	-	III	II	Winter Visitor	B.3	1	outside	Lit.
Scolopacidae	<i>Tringa glareola</i>	Orman Düdükçünü	Wood Sandpiper	-	LC	-	II	-	Transit	B.3	1	outside	Lit.
Scolopacidae	<i>Tringa ochropus</i>	Yeşil Düdükçün	Green Sandpiper	-	LC	-	II	-	Winter Visitor	B.2	1	outside	Lit.
Sturnidae	<i>Pastor roseus</i>	Alasığırıcık	Rosy Starling	-	LC	-	II	-	Summer Visitor	A.4	1	outside	Lit.
Sturnidae	<i>Sturnus vulgaris</i>	Sığırcık	Common Starling	-	LC	-	-	I	Winter Visitor	A.5	3	inside+outside	Obs./Lit.
Threskiornithidae	<i>Platalea leucorodia</i>	Kaşıkcı	Eurasian Spoonbill	-	LC	II	II	-	Native	A.3	1	outside	Lit.
Canidae	<i>Vulpes vulpes</i>	Kızıl Tilki	Red Fox	-	LC	-	-	II	-	-	3	inside+outside	Obs./Lit.
Leporidae	<i>Lepus europaeus</i>	Yabani Tavşan	European Hare	-	LC	-	III	II	-	-	2	inside+outside	Obs./Lit.
Spalacidae	<i>Nannospalax ehrenbergi</i>	Filistin Körfaresi	Palestine Mole Rat	-	DD	-	-	-	-	-	1	outside	Lit.
Suidae	<i>Sus scrofa</i>	Yabandomuzu	Wild Boar	-	LC	-	-	II	-	-	3	inside+outside	Obs./Lit.

IUCN

VU : Vulnerable
DD: Data Deficient
LC: Least Concern
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CITES

I: Includes species threatened with extinction. Trade in specimens of these species is permitted only in exceptional circumstances.
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Bern Convention

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III: Special protection through 'appropriate and necessary legislative and administrative measures', of the listed wild fauna species.

MAKK

I: Protected by the Ministry of Forestry and Agriculture
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RELATIVE ABUNDANCES

1: Extremely rare
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According to Table 127, 2 amphibians, 8 reptiles, 42 birds, and 4 mammal species were determined. According to the IUCN 1 species is in VU, 2 species in DD, 51 species in LC, and 2 species in NE category.

4.7.6 Invasive Alien Species

The Convention on Biological Diversity (CBD) defines invasive alien species (IAS) as “species whose introduction and/pr spread outside their natural past or present distribution threatens biological diversity. IAS occurs in all taxonomic group of organisms; including animals, plants, fungi and microorganisms, and can affect all types of ecosystems. Invasion by alien species is reported to have caused significant degradation with negative impacts on biological diversity and people’s livelihoods according to IUCN, which requires that all projects that may provide a key pathway for invasive species are screened for their potential to accidentally introduce invasive alien species. In line with provisions of ESS6 and PS6, projects that potentially cause introduction of alien species are subject to a risk assessment. Once established, eradication of IAS requires more effort and resource allocation, prevention is the first step in management.

The Global Invasive Species Programme (GISP) is an international partnership working to address the global threat of IAS, with the main objective of conserving biodiversity and sustain livelihoods by minimizing the spread and impact of invasive alien species with the implementation of Article 8(h) of the CBD. Furthermore, managed by the IUCN’s Species Survival Commission, there is an Invasive Species Database (GISD), which currently works on establishing a Global Register of Introduced and Invasive Species (GRIIS) to develop country-wise validated, verified and annotated inventories of introduced and invasive species.

Türkiye has a wide marine IAS dataset, while studies on terrestrial ones have been rather limited. With funding from the Global Environment Fund (GEF), a GEF VI project addressing invasive species threats at key marine biodiversity areas is being implemented by the General Directorate of Nature Conservation and National Parks (GEF, 2020). The project started in 2018, was planned to be completed in four years. The objective of the project is to ensure resilience of marine and coastal ecosystems through strengthened capacities and investment in prevention, detection, control and management of IAS. In line with the most recent European Union legislation (1143/2014) on IAS, which requires a mandatory response by all member states to the threats that invasive species pose to biodiversity and ecosystem services, a similar project will be undertaken also for inland water and terrestrial ecosystems.

Studies that have already been conducted reveal an estimated 1.9% of plant species in Türkiye being exotics (Arslan et al. 2015; Uludag et al. 2017), although a comprehensive list of alien plants is still lacking. Türkiye is a member of EPPO, an intergovernmental organization responsible for cooperation in plant health within the Euro-Mediterranean region, which aims to protect plants by developing international strategies against the introduction and spread of pests and by promoting safe and effective pest control methods through A1 and A2 lists of pests recommended for regulation. Arslan et. al. (2015) also report that species that have been recorded in the EPPO list of invasive alien plants that are present in Türkiye are; *Acroptilon repens*, *Ailanthus altissima*, *Ambrosia artemisiifolia* (= *A. elatior*), *Carpobrotus edulis*, *Cortaderia selloana*, *Cyperus esculentus*, *Paspalum distichum* (= *P. paspalodes*), *Oxalis pes-caprae* and *Sicyos angulatus*, while *Azolla filiculoides* and *Rhododendron ponticum* are listed in the EPPO Observation List of Invasive alien plants and *Miscanthus sinensis*, listed in the EPPO Alert List, are also recorded in the Turkish flora (Arslan et al., 2015).

According to Uludag et al. 2017, Türkiye’s alien flora includes representatives of 92 families and 251 genera. There are seven families with at least 10 aliens that together comprise 44.7% of the total alien taxa richness of the country; the richest are Asteraceae (38 taxa, corresponding to 11.2% of all aliens), Poaceae (30, 8.8%), Fabaceae (23, 6.8%) and Solanaceae (22, 6.5%). As for the naturalized alien plants, the highest species richness is



found in Asteraceae (31 taxa, 13.6% of the total number of naturalized aliens), Poaceae (22, 9.6%), Amaranthaceae (18, 7.9%) and Solanaceae. Over a half of the naturalized alien richness (51.8%) is concentrated in eight families that contain more than four naturalized taxa.

The most represented genus is *Amaranthus* with 13 taxa that are all naturalized, contributing thus 3.3% and 5.7% to all aliens and naturalized aliens, respectively. *Solanum* is also rather rich in aliens, but of the 11 taxa only five are naturalized. Other genera, that are represented by more than five species and the naturalization success of their representatives is high, are *Euphorbia* (88.9% of all aliens in the genus are naturalized), *Acacia* (83.3%) and *Oxalis* (100%). The 11 genera with at least four alien taxa in Türkiye together account for 17.6% of the total alien plant richness and 26.3% of the naturalized richness of the country.

Project biodiversity studies led by field experts did not yield any data on presence of IAS. However, given the datasets in Türkiye are still limited, and considering general risks associated in terms of introduction and spread of IAS, necessary measures will be taken. International guidelines and best practices will be followed to avoid intentional or accidental introduction of alien or non-native species, and if introduced necessary strategies and procedures will be developed to eradicate IAS.

4.7.7 Critical Habitat Assessment

Definition of Critical Habitat

Critical habitat (CH) is an area that contains features that are critical for the survival of a species or habitat of conservation concern and may necessitate targeted management and protection. Critical habitat may include an area that is currently unoccupied by a species but is required for its recovery. The following sections list the critical habitat triggers identified in each of the relevant performance standards used to define critical habitats, followed by the KGM project's consolidated list of critical habitat triggers.

Assessment against Critical Habitat Criteria

The CH determination refers to the evaluation of the area in question with respect to each of the five CH criteria defined in IFC PS 6 GN. Each criterion is described in detail in paragraphs GN70–GN83 of IFC PS 6 GN as summarized in table below.

Table 128. Critical Habitat Criteria as defined by IFC PS 6

Critical Habitat Criteria as defined by IFC PS 6	PS 6 Criterion Number
Critically Endangered (CR) and/or Endangered (EN) species	1
Endemic or restricted-range species	2
Migratory or congregatory species	3
Highly threatened and/or unique ecosystems	4
Key evolutionary processes	5

PS 6 Criterion 1: Critically Endangered (CR) and/or Endangered (EN) Species

Species or areas supporting species threatened with global extinction and listed as Critically Endangered (CR) and Endangered (EN) on the IUCN Red List or local equivalent trigger CH under these criteria. The principal thresholds for triggering CH are:

- the EAAA contains “globally important concentrations” of an IUCN CR or EN species, defined as at least 0.5% of the global population AND over 5 reproductive units.

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- b) areas that support globally important concentrations of an IUCN Red-listed Vulnerable (VU) species, the loss of which would result in the change of the IUCN Red List status to EN or CR and meet the thresholds in (a).
- c) is as appropriate, areas containing important concentrations of a nationally or regionally listed EN or CR species.

PS 6 Criterion 2: Endemic and/or Restricted-Range Species and Supporting Habitats

IFC GN6 - Paragraph 74 (2019) defines “endemic” as synonymous with “restricted range” species, and for terrestrial vertebrate and plant species, this criterion refers to species with a global range size of $\leq 50,000$ km². In order to trigger CH under these criteria, the EAAA must contain $\geq 10\%$ of the global population of such a species AND at least 10 reproductive units.

PS 6 Criterion 3: Migratory or Congregatory Species and Supporting Habitats

Migratory species are defined as any species of which a significant proportion of its members cyclically and predictably move from one geographical area to another (including within the same ecosystem). Congregatory species are defined as species whose individuals gather in large groups on a cyclical or otherwise regular and/or predictable basis. Examples of Congregatory species are:

- Species that form colonies.
- Species that form colonies for breeding purposes and/or where large numbers of individuals of a species gather at the same time for non-breeding purposes (for example, foraging and roosting).
- Species that utilize a bottleneck site where significant numbers of individuals of a species occur in a concentrated period of time (for example, for migration).
- Species with large but clumped distributions where a large number of individuals may be concentrated in a single or a few sites while the rest of the species is largely dispersed (for example, wildebeest or Argali distributions).
- Source populations where certain sites hold populations of species that make an inordinate contribution to recruitment of the species elsewhere (especially important for marine species) (IFC PS 6 GN76-77).

Thresholds for these criteria as per IFC PS 6 GN78 are the following:

- a) areas known to sustain, on a cyclical or otherwise regular basis, ≥ 1 percent of the global population of a migratory or congregatory species at any point of the species’ lifecycle.
- b) areas that predictably support ≥ 10 percent of the global population of a species during periods of environmental stress.

PS 6 Criterion 4: Highly Threatened or Unique Ecosystems

As per IFC PS 6 GN79, it is necessary to use the Red List of Ecosystems where formal IUCN assessments have been performed. Where formal IUCN assessments have not been performed, assessments may be made using systematic methods at the national/regional level, carried out by governmental bodies, recognized academic institutions and/or other relevant qualified organizations (including internationally recognized NGOs).

Thresholds for these criteria as per IFC PS 6 GN80 are the following:

- a) areas representing ≥ 5 percent of the global extent of an ecosystem type meeting the criteria for IUCN status of CR or EN.
- b) other areas, not yet assessed by IUCN, but determined to be of high priority for conservation by regional or national systematic conservation planning.



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PS 6 Criterion 5: Key Evolutionary Processes

According to the GN81 of IFC PS 6, the structural attributes of a region, such as its topography, geology, soil, temperature, and vegetation, and combinations of these variables, can influence the evolutionary processes that give rise to regional configurations of species and ecological properties. In some cases, spatial features that are unique or idiosyncratic of the landscape have been associated with genetically unique populations or subpopulations of plant and animal species. Physical or spatial features have been described as surrogates or spatial catalysts for evolutionary and ecological processes, and such features are often associated with species diversification. By conserving species diversity within a landscape, the processes that drive speciation, as well as the genetic diversity within species, ensures the evolutionary flexibility in a system, which is especially important in a rapidly changing climate.

It should be noted that the IFC PS 6 GN provides qualitative guidance for assessing the projects against these criteria rather than quantitative thresholds, unlike PS 6 Criteria 1-4.

Priority Biodiversity Features

The International Finance Corporation's Performance Standard 6 (IFC PS6) specifies criteria for identifying and managing critical habitats in order to conserve biodiversity in areas of high ecological value. Critical habitats are defined as areas with high concentrations of threatened species, such as those classified as Critically Endangered or Endangered by the International Union for Conservation of Nature (IUCN) or national legislation. These habitats also contain a high proportion of endemic species, which are unique to a particular area and cannot be found elsewhere.

Furthermore, critical habitats include areas that are important for migratory species' seasonal movements, dispersal, or breeding activities. Unique ecosystems with rare or unusual species assemblages, as well as regions critical to the maintenance of key evolutionary processes like gene flow and population dynamics, are also considered critical habitat. Furthermore, high biodiversity areas recognized internationally for their ecological importance, such as Key Biodiversity Areas (KBAs), Alliance for Zero Extinction (AZE) sites, and Ramsar Wetlands, are classified as critical habitats.

IFC PS6 emphasizes the importance of minimizing impacts on critical habitats whenever possible. If impacts are unavoidable, projects must implement stringent mitigation measures to reduce harm while aiming for a net increase in biodiversity values within critical habitats. This approach ensures that development projects contribute to the conservation and long-term management of the world's most valuable ecological areas.

Priority Biodiversity Features (PBFs) are critical components of biodiversity that require special attention due to their ecological, social, or cultural importance. The guidelines for identifying and managing PBFs require a thorough assessment of species and habitat. Species of concern are typically those that are globally or nationally threatened, endemic, or have limited ranges, as determined by the IUCN Red List, national conservation lists, or other authoritative sources. Habitats with high biodiversity, unique or rare ecosystems, and those critical to the survival of key species are also prioritized. Examples include primary forests, wetlands, coral reefs, and other delicate ecosystems.

In addition to species and habitats, PBF guidelines emphasize the importance of ecosystem services, which include clean water, air quality regulation, and pollination. Identifying areas that provide significant ecosystem services is critical to preserving biodiversity and human well-being. Effective PBF management entails avoiding or minimizing negative impacts from development projects, implementing strict mitigation measures when impacts are unavoidable, and aiming for a net gain in biodiversity. This holistic approach ensures that conservation



efforts focus on the most important aspects of biodiversity, preserving them for future generations.

All species/habitats within the background data search and recorded on site, or those considered to be potentially present, have been assessed against the Priority Biodiversity Features guidelines, which provide a qualitative approach to the assessment. All criteria were considered for each species/habitat.

Assessment against Critical Habitat was performed according to IFC PS6 5 Criterion, which were given above. Also, findings and cumulative assessment were performed in evaluating species and habitats. As a result species meeting the criteria for inclusion as Priority Biodiversity Features are presented in Table 129 and discussed below.

Table 129. Species considered to be Priority Biodiversity Features

Species	Status (IUCN)	Criterion
<i>Testudo graeca</i>	VU	Criterion 2

Criterion 1 Threatened habitat

No habitat types or ecosystems were present or identified as being potentially present, that would be considered as priority habitats as such Criterion 1: Threatened Habitat has not been triggered. In addition, threatened species are not locally endemic and are not at a level where their global population is threatened, so Criterion 1 is not triggered.

Criterion 2 Vulnerable species

As a result of the presence of many structures and the cumulative evaluation of the areas, sensitive species such as *Gazella gazella* (EN) and *Hyaena hyaena* (NT) were not evaluated within the scope of Criterion 2. Also, *Vanellus vanellus* (NT), *Larus armenicus* (NT), *Anthus pratensis* (NT), *Rhinolophus mehelyi* (VU), *Aquila nipalensis* (EN), *Streptopelia turtur* (VU), *Rhinolophus Euryale* (NT), *Myotis capaccinii* (VU), and *Miniopterus schreibersii* (NT) species, which were listed according to literature, were not evaluated within the scope of Criteria 2. The habitats where the project passes does not meet the habitat requirements of these species. Although *Testudo graeca* is listed as species considered to be PBF, it does not trigger critical habitat due to its wide distribution in Türkiye. Due to the sensitivity of the species, it should be removed from construction areas.

Criterion 3 Significant feature as identified by stakeholders or governments

Although a part of the Project related construction areas and some of the facilities are located in protected areas, it was not evaluated within the scope of Criterion 3. Although some existing structures and new structures are located in protected areas, the cumulative assessment of the Project components does not trigger critical habitat.

Criterion 4 Ecological structure and functions that are vital to maintaining the viability of priority biodiversity features

The Project Site does not contain areas of structure or function (e.g., major dispersal or migration corridors) vital for the maintenance of viable populations of Priority Biodiversity Features and as such Criterion 4 has not been triggered.

In conclusion, the evaluations carried out within the scope of 4 Criterion and PBF guidelines, "critical habitat" that might be affected by the Project was not determined. One of the reasons why critical habitat was not determined is that many project components are existing roads and facilities. For this reason, measures on biodiversity have been defined. As a result of taking these measures, both habitat and species-based impacts will be minimized.

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4.7.8 Ecosystem Services

“Ecosystem services” refer to the different ways nature supports human well-being. All conditions, processes, functions, benefits and products that ecosystems provide for the survival or survival of people or communities can be defined as Ecosystem Services.

Ecosystem services are categorized into four groups.

- i. Provisioning/Supply services, which include products that people derive from ecosystems: food, clean water, wood and fiber, ornament used in landscaping, mineral raw materials, pharmaceuticals, biochemicals.
- ii. Regulatory services, which include the benefits that people derive from regulating ecosystem processes: pollination and seed dispersal, climate regulation, shading of trees, photosynthesis, natural disaster prevention, water purification, filtration of water in the soil, air quality regulation, reduction of diseases and pests, resistance to invasive species.
- iii. Cultural services, including intangible benefits that people derive from ecosystems: recreation, eco-tourism and cultural heritage.
- iv. Supporting services, including natural processes that sustain other services: habitat creation, soil formation, photosynthesis, nutrient cycle, water cycle.

Within the scope of the project, the project activities will not have an impact on cultural services or supporting services. Cultural services such as recreation and eco-tourism in the region cannot be sustained or have decreased to a very low level due to the earthquake. The project will not have a negative impact on these elements, and will have a positive contribution to these services during the operation phase.

The project is not expected to have a negative impact on lands, soil structure, water and soil, habitat. Therefore, within the scope of the project, only provisioning services and regulatory services have been assessed in terms of the Project’s potential impacts.

Provisioning services

In accordance with the AIB ESS1, within the scope of provisioning services, agricultural and husbandry activities, beekeeping, forestry activities for food products have been assessed.

Food Production (Agricultural and husbandry activities): Agriculture and animal husbandry have been carried out in the rural areas of the Project.

In this context, private lands and common lands (village pastures/treasury lands) are frequently used for agricultural activities and animal grazing.

According to in-depth interviews with the headman and household surveys, the Project does not have a direct impact on the areas where this agricultural activity and livestock farming activities are carried out. However, if access roads to lands are temporarily restricted, these activities may slow down. In order to prevent this impact, relevant mitigation measures have been defined under Section 4.9 Resettlement and Land Acquisition and Livelihood of this document and RP of the Project.

Beekeeping activities decreased significantly in the region after the earthquake. Beekeeping activities have also decreased due to reasons such as ongoing destruction in the region and migration of the population. Beekeeping activities in the region are carried out outside the Project impact area. The project has no impact on beekeeping activities.

When fishing activities were evaluated, it was determined that there were only small-scale fishing activities under the Ađın Bridge within the scope of the Project. This small business is a small-scale surrounded area engaged in fish production and it has been determined that the Project will not have any impact. This issue is explained in the ESMP for P5 sub-project.



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Water sources for drinking and irrigation: For the sustainability of the agriculture and livestock activities, access to water sources is the vital and important issue. The project will not have a significant adverse impact on water resources.

Regulatory services

Within the scope of Regulatory services which include the benefits that people derive from regulating ecosystem processes, the dust impact of the Project on agricultural production and productivity are focused.

Dust impact due to Project activities is expected to occur due to the reconstruction and rehabilitation of the roads and establishment and/or operation of the related/auxiliary facilities (see Table 15).

Dust impact

The project may cause the following effects on agricultural lands in the impact area;

- Vegetables, fruits and vineyards in the garden do not yield during pollination periods due to the effect of dust.
- In February-May, dust prevents pollination and crops do not grow.

Dust can cause loss of income as a factor that reduces product prices.

Additionally, manufacturers may have to use eco-friendly and non-toxic pesticides due to dust. This increases the product quality and also its cost.

The dust effect may also have negative effects on livestock activities as it will cause inefficiency and diseases on animals.

Considering these impacts, possibility of all impacts and mitigation measures are explained in Section 4.3.3 and Section 4.11.3 of this document. In general, the Project will not directly create dust-related livelihood losses or adverse effects on ecosystem services.

4.7.9 Impact Assessment and Mitigation Measures

In line with the provisions of PS6, biodiversity impact assessment has been conducted following the mitigation hierarchy. The main objective of biodiversity studies undertaken within the scope of the Project is to develop and implement mitigation measures and actions in order to achieve no net loss in natural habitats and species of high conservation concern, and net gains in critical habitat.

The implementation of the mitigation hierarchy has been evaluated within the scope of the Project's ESMP after appropriate avoidance, impact minimization and restoration measures have been taken. A conceptual framework for the mitigation hierarchy is presented in Figure 67.



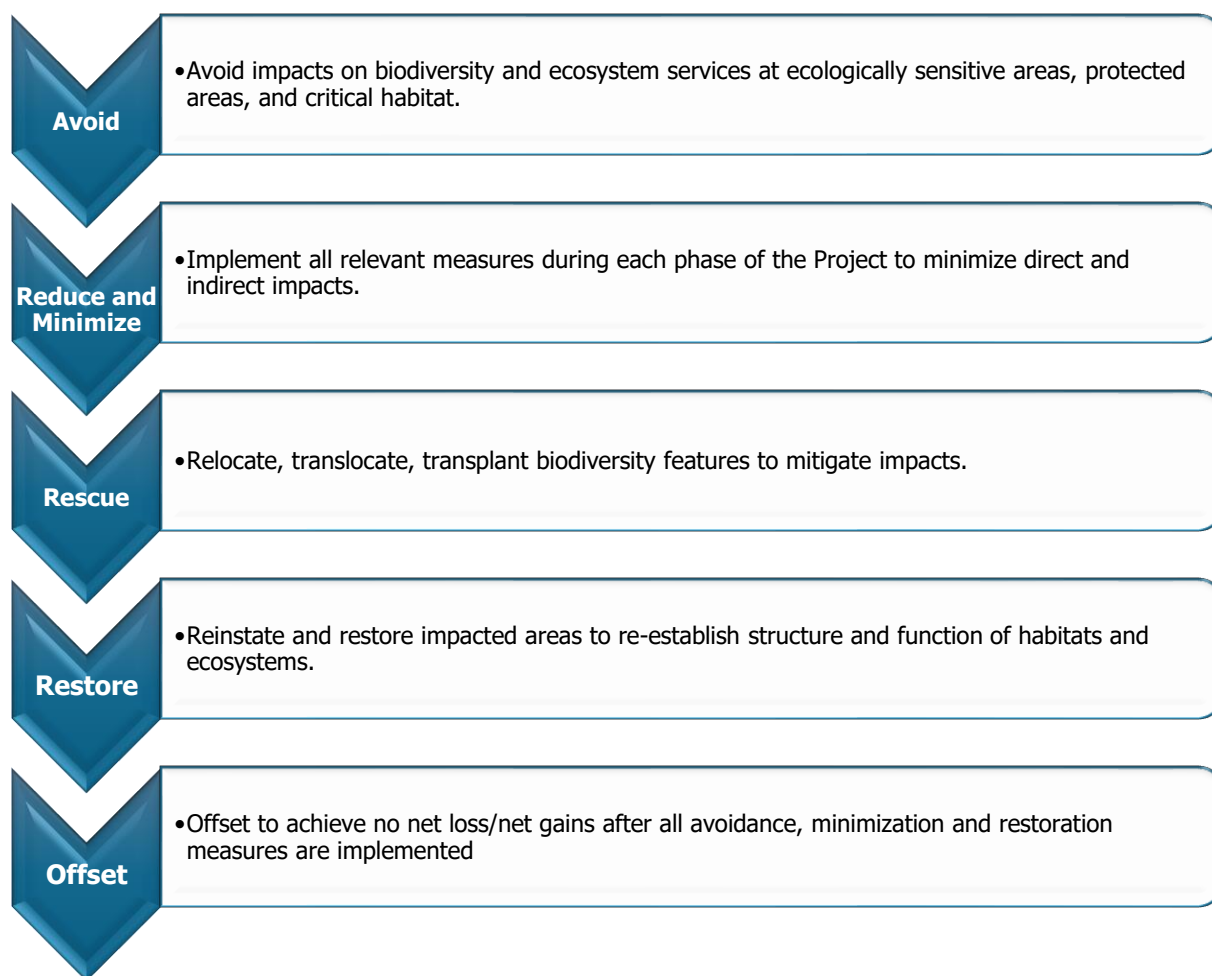


Figure 67. Mitigation Hierarchy

For each group of biodiversity features that has been subject to impact assessment, the mitigation hierarchy presented in Figure 67 has been considered.

Receptor Sensitivity

As a result of the baseline and critical habitat studies conducted within the scope of ESIA, different sensitivity criteria have been developed for habitats and species. The sensitivity of a biodiversity receptor has been determined based on its intrinsic value and susceptibility attributing to its uniqueness, extent, conservation status, endemism, abundance and resilience. Sensitivity criteria used for the Project biodiversity impact assessment are given in Table 130.

Table 130. Sensitivity Criteria for Biodiversity Receptors

Sensitivity	Biodiversity Receptors		
	Habitats	Flora	Fauna
High	Critical and natural habitats that are listed as CR, EN, VU according to the RLE that require longer periods of time to recover (more than 10 years)	Local endemic species and/or those that are listed as CR, EN, VU, NT according to the Red Data Book of Turkish Plants or local endemic species that have not been evaluated according to the Red List criteria yet	Endemic species and/or species of high conservation concern (CR, EN, VU, NT)

Sensitivity	Biodiversity Receptors		
	Habitats	Flora	Fauna
Moderate	Priority habitats listed under Annex I of the Habitats Directive that are of regional significance that can recover in medium-term (5-10 years)	Regional endemic species and/or those that are listed as CR, EN, VU, NT according to the Red Data Book of Turkish Plants	Habitats Directive Annex II/IV species and/or species that are of regional or local significance whose populations may be in decline
Low	Natural habitats that recover in shorter periods of time (1-5 years)	Widespread endemic species and/or those that are listed as LC according to the Red Data Book	Widespread species with relatively higher populations and larger range
Negligible	Modified and artificial habitats	Non-endemic widespread flora species	Vagrant species / accidental records

Receptors that are subject to the impact assessment and their associated sensitivity levels determined applying the above criteria are provided in Table 131. Flora and fauna species that are of high conservation concern have been identified as those that are listed as CR, EN, VU and NT according to the Red List, and those that require specific measures to be conserved.

Table 131. Biodiversity Receptor Sensitivity

Biodiversity Receptor	Sensitivity Level
Natural Habitats	
E1.2E - Irano-Anatolian steppes	Low
G4.6 - Mixed Abies - Picea - Fagus woodland	Low
G5.2 - Small broadleaved deciduous anthropogenic woodlands	Low
F6.2 - Eastern garrigues	Low
H5.6 - Trampled areas	Low
G3.7 - Lowland to montane mediterranean Pinus woodland (excluding Pinus nigra)	Low
C2.3 - Permanent non-tidal, smooth-flowing watercourses	Low
E1.E - Trampled xeric grasslands with annuals	Low
E1.2 : Perennial calcareous grassland and basic steppes	Low
G5.6 - Early-stage natural and semi-natural woodlands and regrowth	Low
G2.9 - Evergreen orchards and groves	Low
E1.D - Unmanaged xeric grassland	Low
G4.E - Mixed mediterranean pine - evergreen oak woodland	Low
F9.1 - Riverine scrub	Low
H5.3 - Sparsely- or un-vegetated habitats on mineral substrates not resulting from recent ice activity	Low
H3.5 - Almost bare rock pavements, including limestone pavements	Low
E2.5 - Meadows of the steppe zone	Low
C1.2 - Permanent mesotrophic lakes, ponds and pools	Low
C3.4 - Species-poor beds of low-growing water-fringing or amphibious vegetation	Low
E1.9 - Open non-Mediterranean dry acid and neutral grassland, including inland dune grassland	Low
Flora and Fauna Species of High Conservation Concern	
Endemic and/or CR, EN, VU, NT fauna species	Moderate

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The following potential impacts were determined as a result of biodiversity impact assessment conducted for the Project:

Construction Phase

- Vegetation and soil losses
- Biodiversity losses
- Disturbance/Destruction of flora and fauna habitat (ecosystem) and displacement/destruction of fauna due to site clearing and storage
- Blocking of rivers flow
- Washing of clothes or vehicles or machinery in the rivers
- Introduction of Alien Invasive Species
- Disturbance on flora and fauna due to (i) waste generation from operation of borrow areas, quarries, asphalt and concrete plants, screening and crushing facilities, site office & maintenance activities such as used containers, food scraps, and office waste, (ii) noise and vibration due to operation of borrow areas, quarries, asphalt and concrete plants, screening and crushing facilities, from the use of machineries and motorized equipment, and (iii) air quality deterioration from dusts generated during excavation, borrowing, filling, backfilling and compaction activities, also air emissions due to operation of borrow areas, quarries, asphalt and concrete plants, screening and crushing facilities.

Operation Phase

- Vegetation and biodiversity losses control
- Introduction of Alien Invasive Species

In addition, no critical habitat that might be affected due to the Project was determined as a result of the studies carried out within the scope of the Project.

Mitigation Measures

The following mitigation measures will be applied throughout the Project's Construction Phase:

- Minimize vegetation clearing.
- Manage topsoil
- Control soil erosion.
- Topsoil management will be carried out in order to protect the seeds and vegetative organs of the natural plants in the area for the topsoil usages in the future.
- Before the cleaning operation, measures such as noise should be employed to drive away the wildlife currently present or expected to be in the area. Additionally, visual inspections should be carried out to identify wildlife within the area, and they should be relocated outside the site using appropriate transportation methods. The *Testudo graeca species*, which has limited mobility, should be carefully transported out of the construction area and placed in a suitable habitat, facing away from the construction site.
- Limit clearing strictly to necessary areas so as to minimize the destruction of flora and fauna.
- Re-vegetate areas likely to be impacted with indigenous plant species immediately after the completion of respective works.
- Any animals discovered during vegetation clearance will be removed and relocated to an appropriate habitat.
- The project site's lighting will be kept to a minimum, and sensory lighting systems, rather than nightlong active lighting, will be considered. The lights will be aimed downwards.
- Workers will be prohibited from killing or trapping wild animals for food or trade. Throughout the project areas, signage will be installed to reinforce the hunting ban.



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- The flow of the river shall not be restricted during construction and under no circumstances shall the stream be blocked.
- No washing of clothes or vehicles/or machinery shall be permitted in the rivers.
- Clearing of vegetation must be undertaken as the work front progresses. Mass clearing is not to be permitted unless the entire cleared area is to be rehabilitated immediately thereafter.
- Should revegetation not be possible immediately, the cleared areas must be protected with packed brush or appropriately battered with fascine work (fixing horizontal branches along the ground using vertical pegs to create resistance to down-slope flow of water/materials). Alternatively, jute (Soil Saver) may be pegged over the soil to stabilize it.
- Organic matter used to encourage regrowth of vegetation on cleared areas should not be brought onto site from foreign areas. Brush from cleared areas should be used as much as possible. Arid areas generally have low organic content in the soil and the use of manure or other soil amendments encourage invasion so should only be used as a last resort.
- All damaged areas shall be re-vegetated upon completion of activities.
- Re-vegetation with indigenous, locally occurring species should take place in disturbed areas. Reseed with locally sourced seed of indigenous grass species that were recorded on site prior to construction.
- Maintain alien invasive plant monitoring and removal programme for 1 year.
- Care must be taken to avoid the introduction of alien invasive plant species to the site. Particular attention must be paid to imported material such as building sand or dirty earth-moving equipment. Stockpiles should be checked regularly and any weeds emerging from material stockpiles should be removed.
- Alien vegetation regrowth must be controlled throughout the entire site during the construction period.
- The alien plant removal and control method guidelines should adhere to best practice for the species concerned. Such information can be obtained from the Working for Water website as well as herbicide guidelines.
- Avoidance of unnecessary revving of engines and switch off equipment when not in use
- Vehicles and equipment will be properly maintained to meet the manufacturers' noise rating levels. Any silencers or bearings which become defective would be replaced as soon as possible
- Using reverse warning systems incorporating broadband noise where practicable
- Using enclosures for noisy plant such as pumps or generators
- Minimizing drop height of materials
- Limiting the use of particularly noisy plant or vehicles where practicable
- Plant and vehicles will be operated with noise control hoods closed
- Artificial lighting used on construction sites and camps at night will be shaded and directed downwards to avoid light spillage and disturbance to birds or other wildlife.
- Implement mitigation measures on "Resource and Waste Mangement", "Noise and Vibration" and "Air Quality and Greenhouse Gas Emission" provided in respective sections to minimize disturbance on flora and fauna.

The following mitigation measures will be applied throughout the Project's Operation Phase:

- Monitor and control vegetation and biodiversity after construction phase
- Control of topsoil and vegetation cover control in laid areas
- Maintain alien invasive plant monitoring and removal program for 1 year.



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Biodiversity impact assessment for the Project was undertaken according to the adapted methodology and accordingly, magnitude of each impact was estimated as a factor of the foreseen geographic extent, duration, and frequency of the impact.

In the assessment of Project-related potential impacts on biodiversity receptors addressed in the ESIA Report, the mitigation hierarchy presented in Figure 67 has been implemented in line with the PS6. The related mitigation measures and significance of residual impacts are presented in Table 132.



Table 132. Impact Significances, Proposed Mitigation Measures and Value of Residual Impacts – Biodiversity

Impact Description	Project Phase	Receptor	Impact Magnitude					Receptor Sensitivity	Impact Significance (prior to mitigation or with existing mitigation)	Proposed Mitigation Measures	Residual Impact Significance
			Extent	Reversibility	Duration	Frequency	Overall Magnitude				
Vegetation and soil losses	Construction Phase	Habitat Soil	Local	Short-term reversible	Short-term	One-off	Low	Low	Minor	<ul style="list-style-type: none"> Minimize vegetation clearing. Manage topsoil Control soil erosion. 	Minor
Biodiversity losses	Construction Phase	Flora and fauna species	Local	Short-term reversible	Short-term	Intermittent	Medium	Low	Minor	<ul style="list-style-type: none"> Topsoil management will be carried out in order to protect the seeds and vegetative organs of the natural plants in the area for the topsoil usages in the future. Before the cleaning operation, measures such as noise should be employed to drive away the wildlife currently present or expected to be in the area. Additionally, visual inspections should be carried out to identify wildlife within the area, and they should be relocated outside the site using appropriate transportation methods. The <i>Testudo graeca</i> species, which has limited mobility, should be carefully transported out of the construction area and placed in a suitable habitat, facing away from the construction site. 	Minor
Disturbance/ Destruction of flora and fauna habitat (ecosystem) and displacement/destruction of fauna due to site clearing and storage	Construction Phase	Habitat Flora and fauna	Local	Short-term reversible	Short-term	Intermittent	Medium	Low	Minor	<ul style="list-style-type: none"> Limit clearing strictly to necessary areas so as to minimize the destruction of flora and fauna. Re-vegetate areas likely to be impacted with indigenous plant species immediately after the completion of respective works. Any animals discovered during vegetation clearance will be removed and relocated to an appropriate habitat. The project site's lighting will be kept to a minimum, and sensory lighting systems, rather than nightlong active lighting, will be considered. The lights will be aimed downwards. Workers will be prohibited from killing or trapping wild animals for food or trade. Throughout the project areas, signage will be installed to reinforce the hunting ban. 	Minor
Blocking of rivers flow	Construction Phase	Aquatic habitat	Local	Medium-term reversible	Short-term	Intermittent	Medium	Medium	Moderate	<ul style="list-style-type: none"> The flow of the river shall not be restricted during construction and under no circumstances shall the stream be blocked. 	Minor
Washing of clothes or vehicles or machinery in the rivers (also see "Water Resources, Water Quality and Wastewater Management" section)	Construction Phase	Aquatic habitat	Local	Medium-term reversible	Short-term	Continuous	Medium	Medium	Moderate	<ul style="list-style-type: none"> No washing of clothes or vehicles/or machinery shall be permitted in the rivers. 	Minor
Introduction of Alien Invasive Species	Construction Phase	Habitat	Local	Medium-term reversible	Long-term	Continuous	High	High	Major	<ul style="list-style-type: none"> Clearing of vegetation must be undertaken as the work front progresses. Mass clearing is not to be permitted unless the entire cleared area is to be rehabilitated immediately thereafter. Should revegetation not be possible immediately, the cleared areas must be protected with packed brush or appropriately battered with fascine work (fixing horizontal branches along the ground using vertical pegs to create resistance to down-slope flow of water/materials). Alternatively, jute (Soil Saver) may be pegged over the soil to stabilize it. Organic matter used to encourage regrowth of vegetation on cleared areas should not be brought onto site from foreign areas. Brush from cleared areas should be used as much as possible. Arid areas generally have low organic content in the soil and the use of manure or other soil amendments encourage invasion so should only be used as a last resort. All damaged areas shall be re-vegetated upon completion of activities. Re-vegetation with indigenous, locally occurring species should take place in disturbed areas. Reseed with locally sourced seed of indigenous grass species that were recorded on site prior to construction. Maintain alien invasive plant monitoring and removal programme for 1 year. Care must be taken to avoid the introduction of alien invasive plant species to the site. Particular attention must be paid to imported material such as building sand or dirty earth-moving equipment. Stockpiles should be checked regularly and any weeds emerging from material stockpiles should be removed. Alien vegetation regrowth must be controlled throughout the entire site during the construction period. The alien plant removal and control method guidelines should adhere to best practice for the species concerned. Such information can be obtained from the Working for Water website as well as herbicide guidelines. 	Moderate
Disturbance on flora and fauna	Construction Phase	Flora and fauna species	Local	Medium-term reversible	Short-term	Intermittent	Medium	Medium	Moderate	<ul style="list-style-type: none"> Avoidance of unnecessary revving of engines and switch off equipment when not in use Vehicles and equipment will be properly maintained to meet the manufacturers' noise rating levels. Any silencers or bearings which become defective would be replaced as soon as possible Using reverse warning systems incorporating broadband noise where practicable Using enclosures for noisy plant such as pumps or generators Minimizing drop height of materials Limiting the use of particularly noisy plant or vehicles where practicable Plant and vehicles will be operated with noise control hoods closed Artificial lighting used on construction sites and camps at night will be shaded and directed downwards to avoid light spillage and disturbance to birds or other wildlife. 	Minor
Waste generation from operation of borrow areas, quarries, asphalt and concrete plants, screening and crushing facilities, site office & maintenance activities such as used containers, food scraps, and office waste	Construction Phase		(see "Resource and Waste Management" part)								
Noise and vibration due to operation of borrow areas, quarries, asphalt and concrete plants, screening and crushing facilities, from the use of	Construction Phase		(see "Noise and Vibration" part)								

Impact Description	Project Phase	Receptor	Impact Magnitude					Receptor Sensitivity	Impact Significance (prior to mitigation or with existing mitigation)	Proposed Mitigation Measures	Residual Impact Significance
			Extent	Reversibility	Duration	Frequency	Overall Magnitude				
machineries and motorized equipment											
Air quality deterioration from dusts generated during excavation, borrowing, filling, backfilling and compaction activities, also air emissions due to operation of borrow areas, quarries, asphalt and concrete plants, screening and crushing facilities	Construction Phase								(see "Air Quality and Greenhouse Gas Emissions" part)		
Vegetation and biodiversity losses control	Operation Phase	Habitat Flora and fauna	Local	Medium-term reversible	Short-term	One-off	Medium	Medium	Moderate	<ul style="list-style-type: none"> Monitor and control vegetation and biodiversity after construction phase Control of topsoil and vegetation cover control in laid areas 	Minor
Introduction of Alien Invasive Species	Operation Phase	Habitat	Local	Medium-term reversible	Long-term	Continuous	High	High	Major	<ul style="list-style-type: none"> Maintain alien invasive plant monitoring and removal program for 1 year. 	Moderate

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4.8 Socio-Economic Environment

Within the scope of the ESIA study, both positive and negative socio-economic risks and impacts of the Project were focused on.

Within the scope of the negative impacts of the project, importance was given to minimizing land acquisition and the need for land acquisition for 1 parcel emerged within the scope of only for sub-project P3.

Land acquisition is necessary for the Antakya-Samandağ Road (Including Samandağ Crossing) Section Supply Construction Works, which is sub-project No. 3 and is located within the borders of the 5th Regional Directorate of Highways.

Apart from this, it has been determined that the negative impacts on livelihoods that may arise from the construction and rehabilitation activities within the scope of the Project may occur in a short-term and narrow impact area.

This impact will result from measures that must be implemented by communities and third parties to prevent unauthorized passage through the construction site and eliminate risks to public health and safety.

Among the environmental and social risks and impacts that may occur due to the construction of the project, the following effects were taken into account;

- There may be difficulties in transitioning to lands used for agriculture and grazing purposes,
- Effects caused by dust that may occur during the construction process,
- Possible impacts from construction activities and AFs activities may occur on lands, houses and other properties (trees, drainage channels, wire fences, water pipes, etc.) outside the construction sites.
- Increased risk of accidents for traffic flow and pedestrians due to traffic congestion.

Within the scope of the ESIA study, Project impacts on population, gender and vulnerable groups were also evaluated, taking into account worker accommodation and population mobility in the Construction and Accommodation Sites of the Project.

Labor and working conditions were evaluated specifically for these areas, and potential risks and mitigating measures were determined.

Project positive impacts have been identified as potential positive effects on employment opportunities, purchases of goods and services, infrastructure and social services.

In order to minimize and/or mitigate these impacts, mitigation measures have been determined for each impact.

Based on this approach, a socioeconomic risk assessment study was carried out for the sub-projects within the scope of the project, specific to the following social components.

- Population Change
- Labor and Working Conditions
- Community Health and Safety
- Resettlement and Land Acquisition and Livelihood
- Infrastructure and Services



4.8.1 Methodology and Project Standards

4.8.1.1 Definition of the Project Aol

The social Aol of the Project has been determined by taking into account the direct and indirect effects of the Project, and in addition to the settlements that may be exposed to negative effects that may arise from the construction and operation activities of the Project, the settlements that may be positively affected by local employment and local purchasing opportunities have also been defined within the scope of the Aol.

This Aol includes the area likely to be affected by:

- The Project activities and facilities that are directly owned, operated, or managed (including by contractors) and that are a component of the project;
- Impacts from unplanned but predictable developments caused by the project that may occur later or at a different location; or
- Indirect project impacts on biodiversity or on ecosystem services upon which Affected Communities' livelihoods are dependent.

Therefore, in the light of the above explanations, the Project Area of Influence is defined in the following order;

- Directly Project activities impacted area which is defined as the footprint of the Project,
- The area where direct environmental, social and economic impacts are spread as a result of the activities of the project,
- The broad area over which Project impacts and benefits are spread that may be affected by the results of the Project.

Based on this approach, the Project Area of Influence diagram is shown in Figure 68.

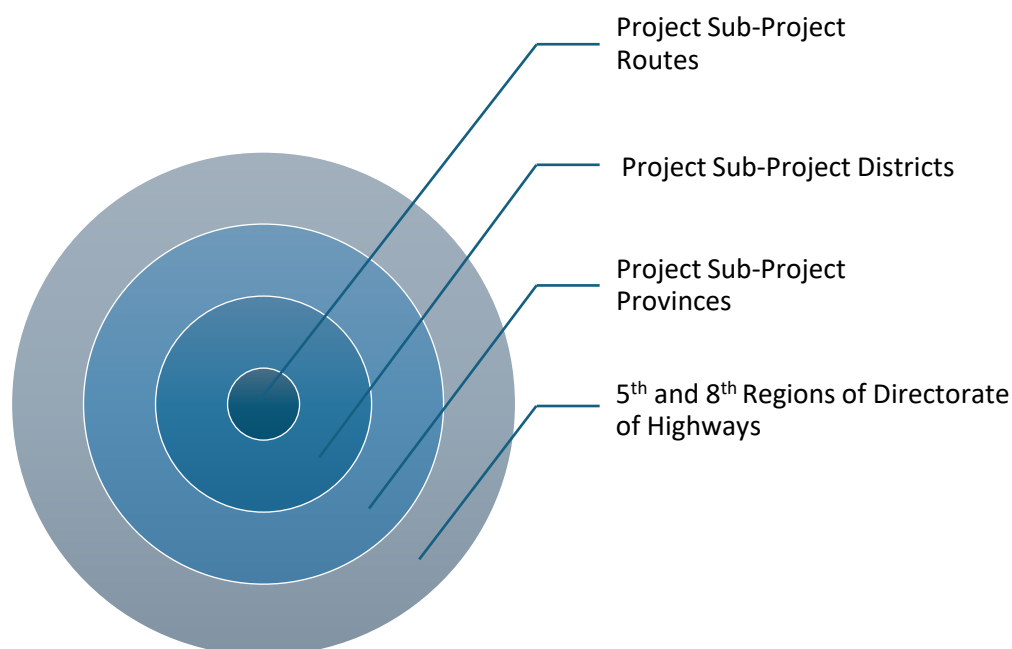


Figure 68. Influence Diagram

4.8.1.2 Field Studies and Methodology

In the field research carried out to develop the ESDD and ESIA reports of the project, social assessments, observations, preliminary investigations and construction site visits were made on the routes of all Sub-Projects and current situation determinations were reported. Based on these preliminary studies and scans, areas, settlements and locations where the effects of the Project may occur have been determined. These identified areas were included in the second field study, which included headman interviews and catch interview survey interviews with people affected by the Project. Survey forms given in Appendix-5.1, Appendix-5.2, Appendix-5.3, and Appendix-5.4 were used to assess the project impacts.

Within the scope of the second field studies carried out for ESIA&ESMP, interviews were held with fish farms and recreational facilities in the Project impact area, household surveys and Mukhtar interviews were conducted, and construction sites were visited. Photos from the ESIA field studies are given in Appendix-5.5.

Details of the field studies are presented in Table 133.

Table 133. ESIA field studies

Sub-project No	Sub-project	Province/District	Mukhtar interviews held	Household surveys held	Stakeholder interviews with workplaces	Visited construction sites
1	TAG Highway Aslanlı Tunnel (Km:214+490)-Nurdağı Junction (Km: 223+115) Section, Repair of All Kinds of Damages and Strengthening of Viaducts Against Earthquakes in This Section Construction Work	Gaziantep/Nurdağı	Başpınar	3	-	SNH Construction Ceyhan Construction Site and Accommodation Area 5th Regional Directorate of Highways guest house (Bahçe Accommodation Area)
			Arıcaklı	-		
			Bademli	-		
2	İslahiye-Hassa-Kırıkhan Road (Km:24+500-84+500), Antakya-Reyhanlı Road (Km:0+000-42+500) Hot Bituminous Mixture Repair Work, Hatay Airport Road Soil Works, Art Structures and Superstructure Construction Work	Hatay	Muratpaşa	-	-	FEZA Construction Kızılkaya Construction Site and Accommodation Area DEHA Construction Kuruyer Construction Site and Accommodation Area
			Narlıca Kuruyer	2		
			Değirmencik (İslahiye)	-		
			Demirköprü	3		
			Alaattin	2		
			Üzümdalı	-		
			Ardıçlı	7		
			Demrek/Deliçay	7		
			Aşağıoba	5		
			Paşaköy	4		
			Madenboyu	4		
Konuk	4					
3	Antakya-Samandağ Road (Including Samandağ Crossing) Km:	Hatay/Samandağ	Mağaracık	-	-	-
			Kurtderesi veya Yeni Mahalle	-		
			Sutaşı/ Defne	2		

Sub-project No	Sub-project	Province/ District	Mukhtar interviews held	Household surveys held	Stakeholder interviews with workplaces	Visited construction sites
	0+000-26+850 Section Supply Construction Works		Ataköy	2		
			Uzunbağ	3		
4	(Malatya-Akçadağ) Junction - Gölbaşı Road (Construction Works of Erkenek Tunnel Damaged in Earthquake and Erkenek Tunnel-Karanlıkdere Section Damaged in Earthquake)	Malatya/ Doğanşehir Adıyaman/ Gölbaşı	Karanlıkdere	-	Workplace interviews were held with the following 3 recreational facilities: Hakan's Place Uncle Halil's Place blue Moon	-
5	Repair of Technological Bridges Damaged in Earthquake (Tohma, Ağın, Beylerderesi Bridges Earthquake Damage Repair)	Malatya Elazığ	Tohma Durucasu	-	Network fishing business meeting	Enkon Construction A.Ş. (ENKON) Tohma Construction and Accommodation Site Construction area right next to the Ağın Bridge
			Yakınca (Yeşilyurt)	-	-	

All studies carried out within the scope of ESIA were carried out according to AIIB's ESSs.

The ESSs cover the following:

- ESS 1: Environmental and Social Assessment and Management,
- ESS 2: Involuntary Resettlement, and
- ESS 3: Indigenous Peoples (is not applicable for the Projects in Türkiye, since there is no communities or groups of people which can be identified/defined as indigenous peoples in the country.)

ESS 1 (Environmental and Social Assessment and Management): The objective of ESS 1 is to achieve the environmental and social soundness and sustainability of Projects and to support the integration of environmental and social considerations into the Project decision-making process and implementation.

ESS 1 applies if the Project is likely to have adverse environmental risks and impacts or social risks and impacts (or both). The scope of the environmental and social assessment and management measures are proportional to the risks and impacts of the Project. ESS 1 provides both for quality environmental and social assessment and for management of risks and impacts through effective mitigation and monitoring measures during the course of Project implementation.

ESS 2 (Involuntary Resettlement): The objectives of ESS 2 are: (a) to avoid Involuntary Resettlement wherever feasible; (b) to minimize Involuntary Resettlement by exploring Project alternatives; (c) where avoidance of Involuntary Resettlement is not feasible, to enhance, or at least restore, the livelihoods of all displaced persons in real terms relative to pre-Project levels



and to provide resettlement assistance; (d) to understand and address gender-related risks and differential impacts of Involuntary Resettlement; (e) to improve the overall socioeconomic status of the displaced poor and other vulnerable groups; and (f) to conceive and implement resettlement activities as sustainable development programs, providing sufficient resources to enable the persons displaced by the Project to share in Project benefits.

ESS 2 applies if the Project would or may involve Involuntary Resettlement (including Involuntary Resettlement of the past or foreseeable future that the Bank determines is directly linked to the Project).

4.8.2 Baseline Conditions

4.8.2.1 Population and Demography

Türkiye has constituted seven geographical regions, 81 provinces, 922 districts, 32,240 quarters, 18,275 villages, 23,822 affiliated settlements and 1,391 municipalities in accordance with administrative structure under local authority units²⁶.

In this structure, Gaziantep, Hatay, Malatya, Elazığ and Adıyaman are provinces, Nurdağı, İslahiye, Hassa, Kırıkhan, Reyhanlı, Samandağ, Antakya, Doğanşehir, Gölbaşı, Akçadağ, Darende and Ağın are the districts in the Project Aol.

District and Provinces located in the Project Aol are shown in the Table 134.

Table 134. Project Aol Settlements and Region

Responsible Regional Directorate	Sub-project No.	District Level	Province Level
5 th Regional Directorate (Mersin)	1	Nurdağı	Gaziantep
	2	İslahiye Hassa Kırıkhan Reyhanlı	Hatay
	3	Samandağ Antakya	Hatay
8 th Regional Directorate (Elazığ)	4	Doğanşehir Gölbaşı Akçadağ	Malatya Adıyaman
	5	Darende Ağın	Malatya Elazığ

Population and population change of the provinces and districts are given in Table 135.

It is seen that the population structure and population change of the provinces included in the Project Aol have undergone a major change after the February 2023 earthquake. Among the provinces that experienced population growth in 2022, especially Hatay, Malatya and Adıyaman showed a dramatic decrease after the earthquake. In addition, Gaziantep and Elazığ, which were relatively less affected by the earthquake, became provinces that received immigration and their population increased.

²⁶ Republic of Türkiye Ministry of Interior Inventory of Local Authority Units <https://www.e-icisleri.gov.tr/Anasayfa/MulkidariBolumleri.aspx>. Access date: August, 2023.



Table 135. Population changes of the provinces

Provinces	Total		Province and district centers		Towns and villages		Annual population growth rate (‰)		Population density
	2022	2023	2022	2023	2022	2023	2021-2022	2022-2023	
Türkiye	85 279 553	85 372 377	79 613 279	79 399 292	5 666 274	5 973 085	7,1	1,1	111
Adıyaman	635 169	604 978	458 278	415 273	176 891	189 705	4,8	-48,7	86
Elazığ	591 497	604 411	459 901	457 231	131 596	147 180	5,8	21,6	71
Gaziantep	2 154 051	2 164 134	2 154 051	2 164 134	-	-	11,0	4,7	317
Hatay	1 686 043	1 544 640	1 686 043	1 544 640	-	-	9,1	-87,6	265
Malatya	812 580	742 725	812 580	742 725	-	-	4,8	-89,9	63

The average household size of Aol provinces is higher than the Turkish average. The proportion of households with a large number of children is higher than the Turkish average. As can be seen in the data below, the average household size, which is 3.2 in Türkiye, is 4 for Gaziantep and Adıyaman among the Aol provinces.

Table 136. Number of households and average size of households by provinces, 2021

Provinces	Number of households	Average size of households
Türkiye	25 329 833	3,2
Adıyaman	155 300	4,0
Elazığ	173 836	3,2
Gaziantep	522 947	4,0
Hatay	449 151	3,6
Malatya	230 499	3,4

Total age dependency ratios in the provinces are higher than the Türkiye average. The noteworthy point is that while the elderly population dependency ratio is high in Elazığ and Malatya, the child dependency ratio in Gaziantep, Adıyaman and Hatay is higher than the country average.



Table 137. Age dependency ratio by provinces, 2023

Provinces	Total population	Age group			Total age dependency ratio (%)	Child dependency ratio (%)	Elderly dependency ratio (%)
		0-14	15-64	65 +			
Türkiye	85 372 377	18 311 633	58 337 938	8 722 806	46,3	31,4	15,0
Adıyaman	604 978	164 765	387 980	52 233	55,9	42,5	13,5
Elazığ	604 411	125 606	411 994	66 811	46,7	30,5	16,2
Gaziantep	2 164 134	650 138	1 386 990	127 006	56,0	46,9	9,2
Hatay	1 544 640	395 878	1 017 917	130 845	51,7	38,9	12,9
Malatya	742 725	153 575	502 399	86 751	47,8	30,6	17,3

Education level by provinces for population 15 years of age and over as 2022 is given below. When their educational status is evaluated, it is seen that the education level of women is lower than that of men, and the rate of illiterate women is higher than that of men.

Table 138. Education level by provinces for population 15 years of age

Province name	General Total			Lower secondary school		
	Total	Male	Female	Total	Male	Female
Türkiye	65 026 277	32 347 391	32 678 886	12 022 449	6 607 428	5 415 021
Adıyaman	456 194	228 587	227 607	100 832	55 412	45 420
Elazığ	462 970	226 250	236 720	89 954	47 688	42 266
Gaziantep	1 477 527	741 631	735 896	360 550	200 357	160 193
Hatay	1 235 619	616 138	619 481	255 509	138 534	116 975
Malatya	632 081	312 877	319 204	114 944	64 332	50 612
	Illiterate			Upper secondary school		
	Total	Male	Female	Total	Male	Female
Türkiye	1 726 445	224 542	1 501 903	17 442 997	9 855 144	7 587 853
Adıyaman	26 688	3 613	23 075	118 735	68 687	50 048
Elazığ	16 651	2 673	13 978	126 596	74 593	52 003

Gaziantep	47 811	4 334	43 477	340 451	195 978	144 473
Hatay	23 619	4 240	19 379	290 027	161 836	128 191
Malatya	31 848	4 166	27 682	176 026	100 795	75 231
	Literate without a diploma			Universities and other higher educational institutions		
	Total	Male	Female	Total	Male	Female
Türkiye	2 261 470	517 515	1 743 955	12 166 766	6 314 394	5 852 372
Adıyaman	16 457	5 058	11 399	69 979	38 683	31 296
Elazığ	29 001	4 473	24 528	81 393	45 118	36 275
Gaziantep	56 137	13 555	42 582	207 403	109 734	97 669
Hatay	65 336	12 865	52 471	192 306	101 373	90 933
Malatya	20 989	5 066	15 923	117 676	63 312	54 364
	Primary school			Master +		
	Total	Male	Female	Total	Male	Female
Türkiye	11 898 596	4 694 605	7 203 991	1 475 690	793 593	682 097
Adıyaman	72 303	29 414	42 889	7 359	4 780	2 579
Elazığ	70 030	24 093	45 937	10 381	6 050	4 331
Gaziantep	258 360	94 175	164 185	24 160	13 991	10 169
Hatay	251 596	110 624	140 972	19 083	10 913	8 170
Malatya	104 226	38 585	65 641	13 169	7 615	5 554
	Primary education			Doctorate		
	Total	Male	Female	Total	Male	Female
Türkiye	5 048 202	2 851 250	2 196 952	242 549	141 194	101 355
Adıyaman	40 706	21 273	19 433	909	613	296
Elazığ	33 258	18 277	14 981	2 097	1 401	696
Gaziantep	161 220	99 068	62 152	2 897	1 789	1 108
Hatay	106 015	59 273	46 742	2 227	1 397	830
Malatya	45 901	25 322	20 579	2 185	1 412	773



When mean years of schooling by provinces are evaluated, it is seen that the average education period of women is shorter than that of men. It can be said that this inequality is higher in Elazığ, Adıyaman and Malatya.

Table 139. Mean years of schooling by provinces, 2020-2022

Province name	2020				2021				2022			
	Total	Males	Females	Gender Parity index	Total	Males	Females	Gender Parity index	Total	Males	Females	Gender Parity index
TÜRKİYE	8,9	9,7	8,1	0,83	9,1	9,8	8,3	0,84	9,2	10,0	8,5	0,85
Adıyaman	8,2	9,3	7,1	0,76	8,4	9,5	7,3	0,77	8,6	9,6	7,5	0,78
Elazığ	8,5	9,9	7,3	0,74	8,7	10,1	7,5	0,74	8,9	10,2	7,6	0,75
Gaziantep	8,2	9,2	7,2	0,78	8,4	9,4	7,4	0,79	8,6	9,5	7,6	0,80
Hatay	8,2	9,0	7,4	0,83	8,4	9,2	7,7	0,83	8,6	9,3	7,8	0,84
Malatya	8,6	9,7	7,6	0,78	8,8	9,9	7,8	0,79	9,0	10,1	8,0	0,79

Population and population changes of the Project Aol Districts are given below table and figures. The sharp population change after the earthquake is striking in the Project districts whose populations are given in the table below and whose population distributions are shown in the figures.

Table 140. Population of the Project Aol Districts

Province	District	Total	Male	Female
Gaziantep	Nurdağı	39.465	20.275	19.190
Hatay	Antakya	298.620	152.567	146.053
	Defne	142.146	71.494	70.652
	Samandağ	120.600	59.840	60.760
	Reyhanlı	113.615	57.425	56.190
	Kırıkhan	106.975	54.147	52.828
	Hassa	55.604	28.482	27.122
Malatya	Doğanşehir	35.936	18.498	17.438
Adıyaman	Gölbaşı	47.876	24.188	23.688
Malatya	Akçadağ	34.322	19.173	15.149
	Darende	26.318	13.382	12.936
Elazığ	Ağın	2.834	1.413	1.421

Population change of the districts are shown in the figures below.

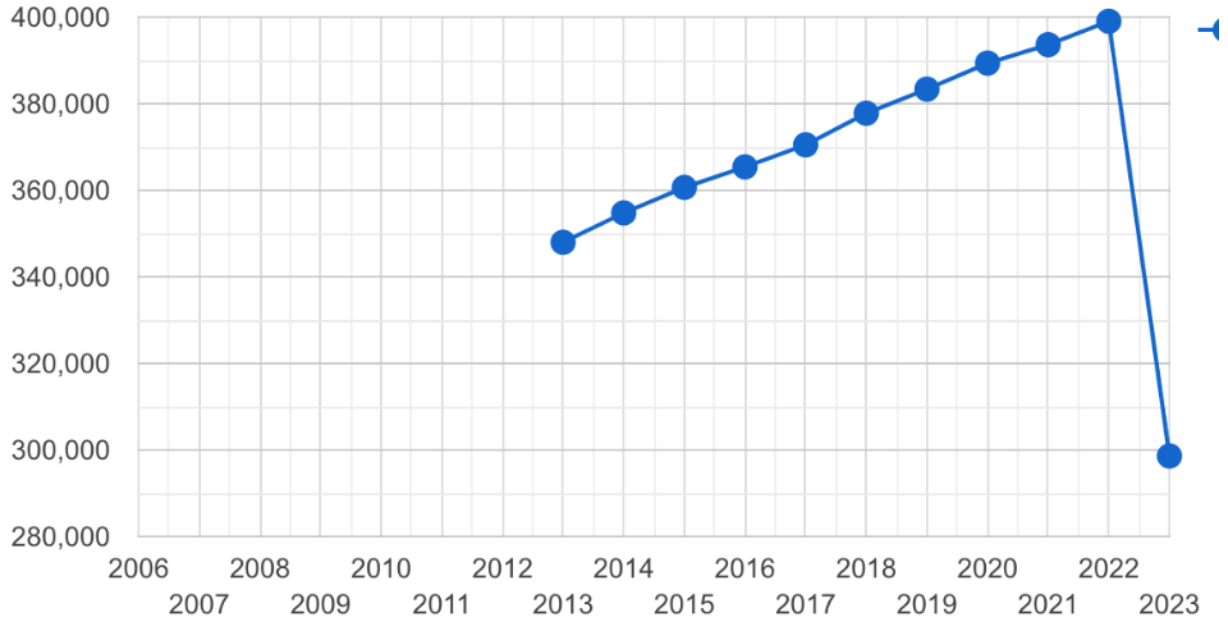


Figure 69. Antakya Population Change

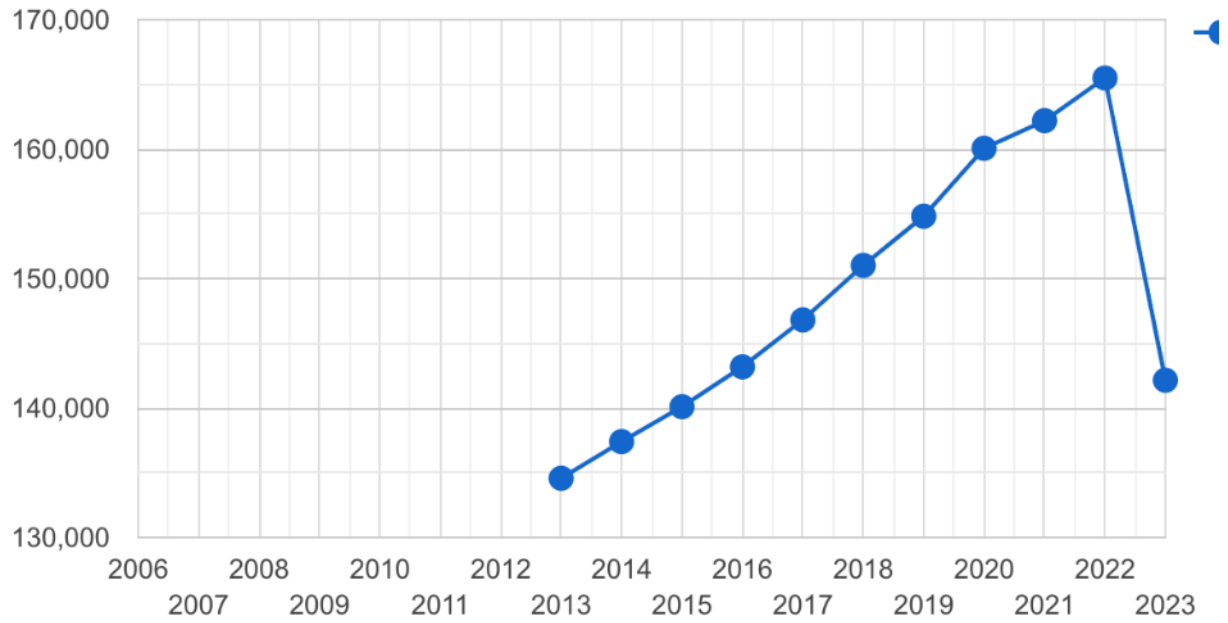


Figure 70. Defne Population Change

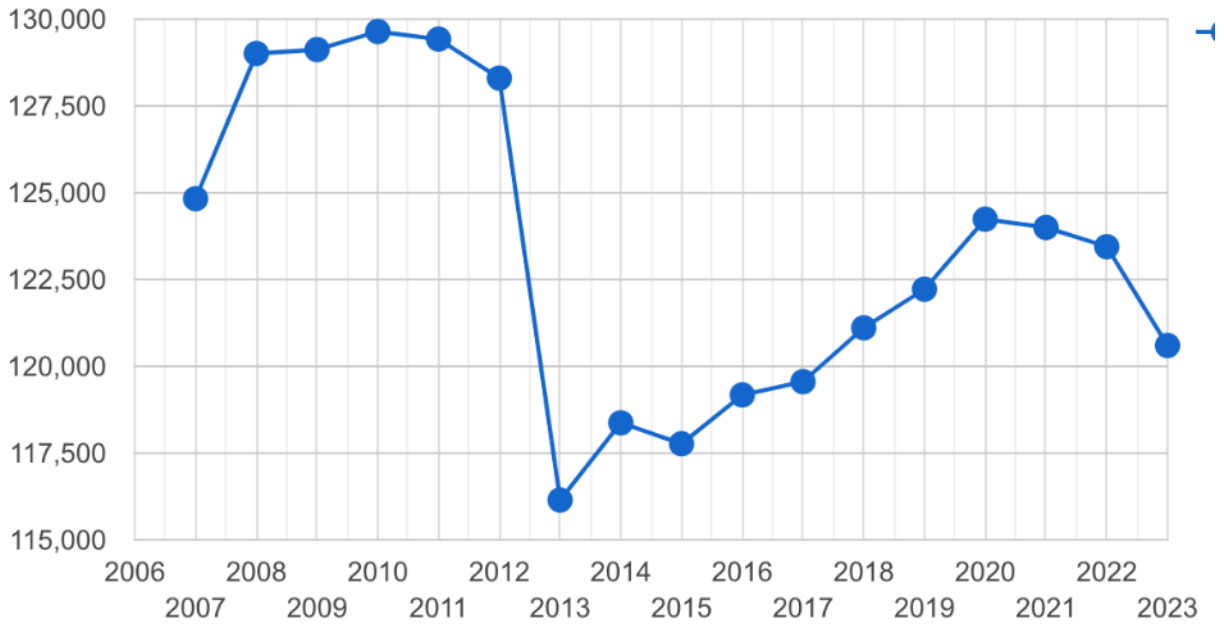


Figure 71. Samandağ Population Change

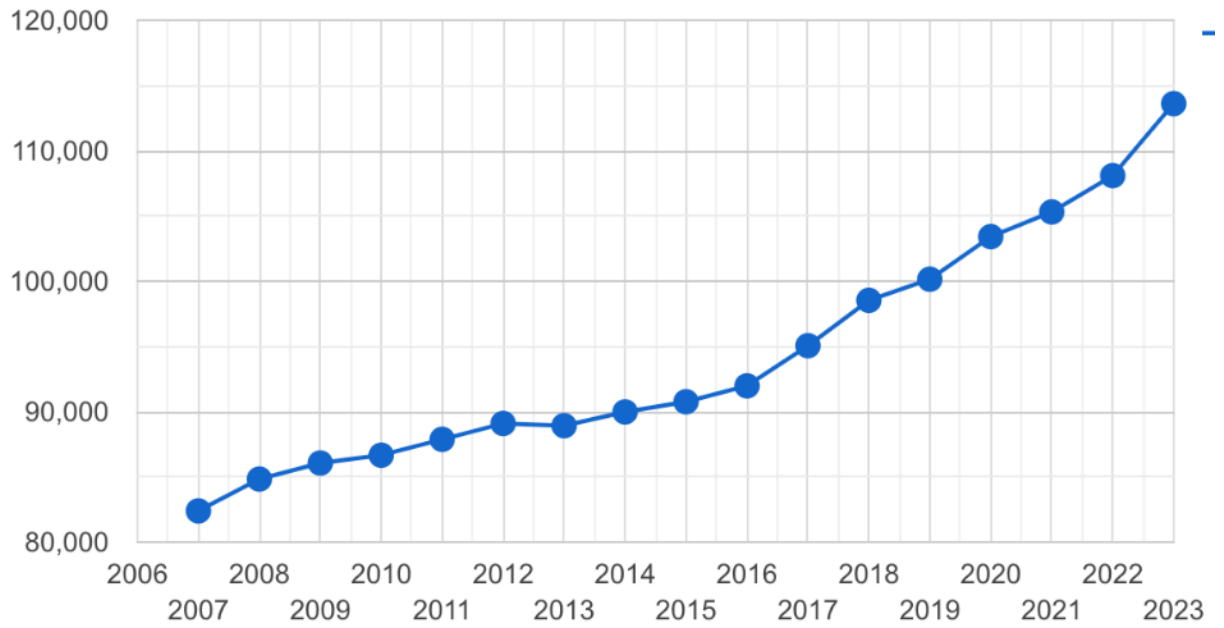


Figure 72. Reyhanlı Population Change

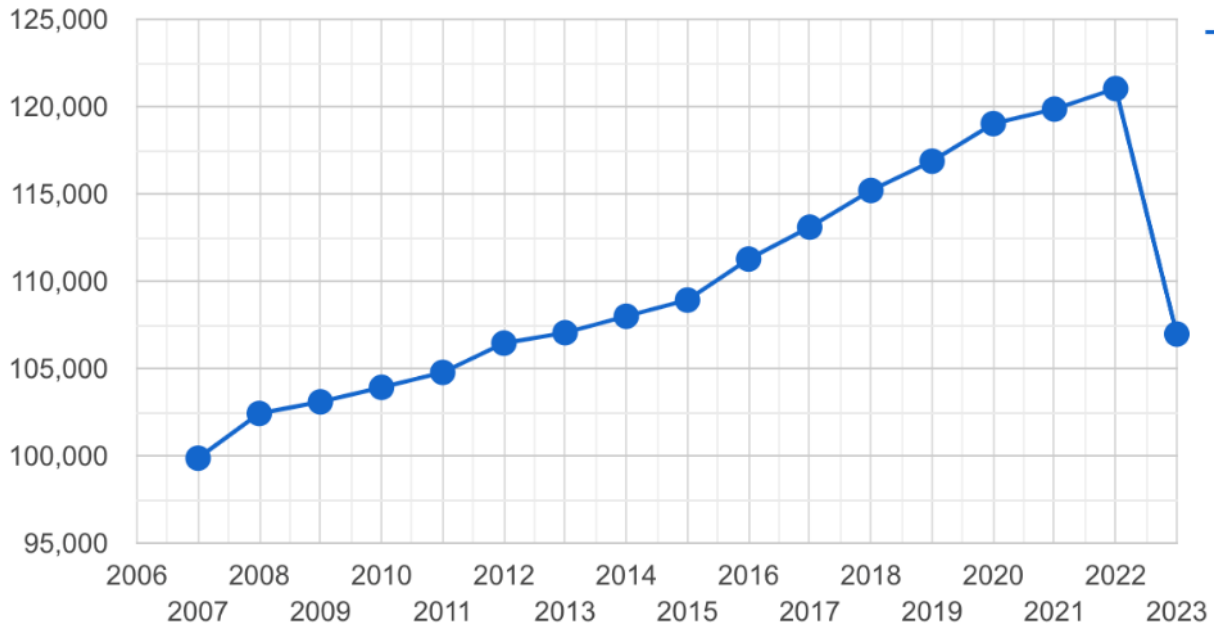


Figure 73. Kirikhan Population Change

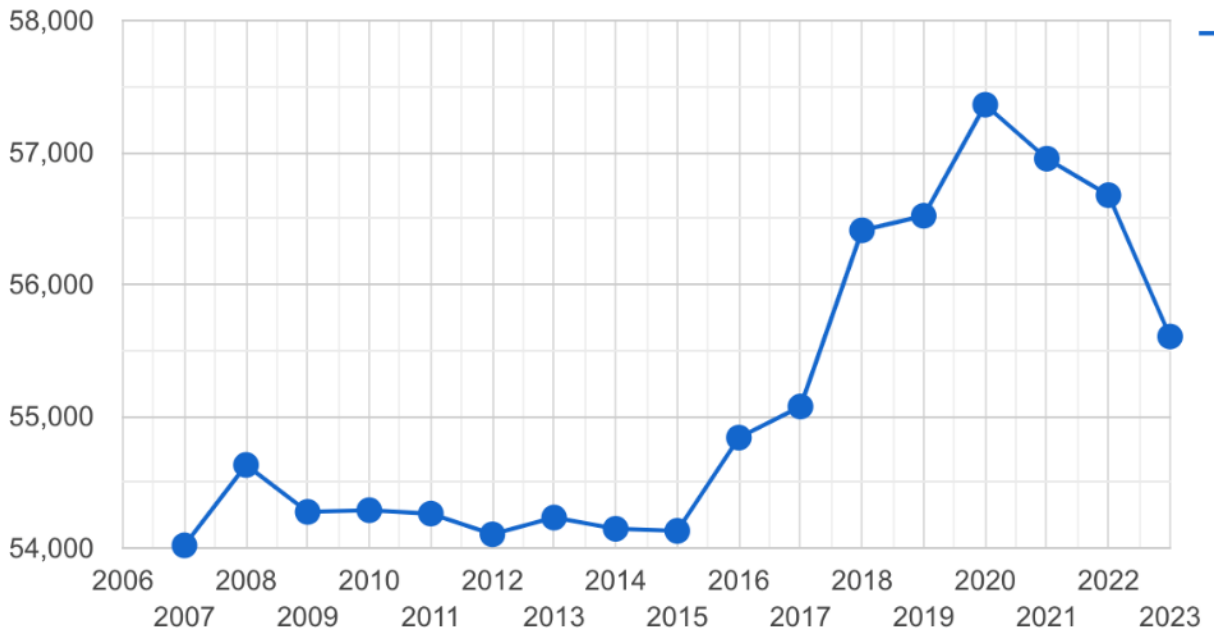


Figure 74. Hassa Population Change



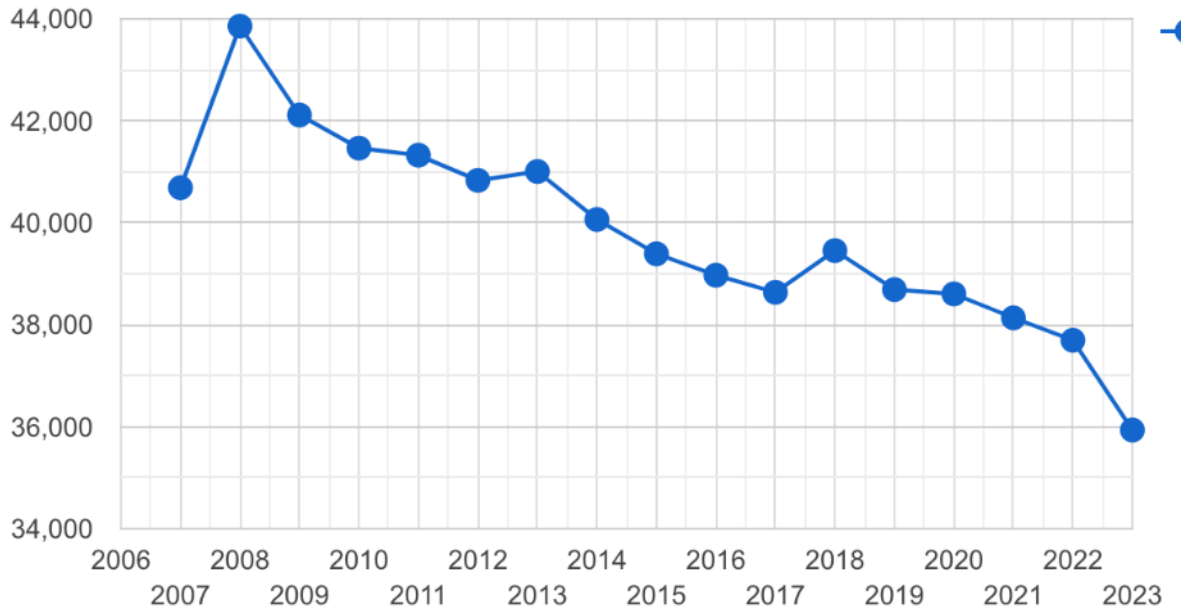


Figure 75. Doğanşehir Population Change

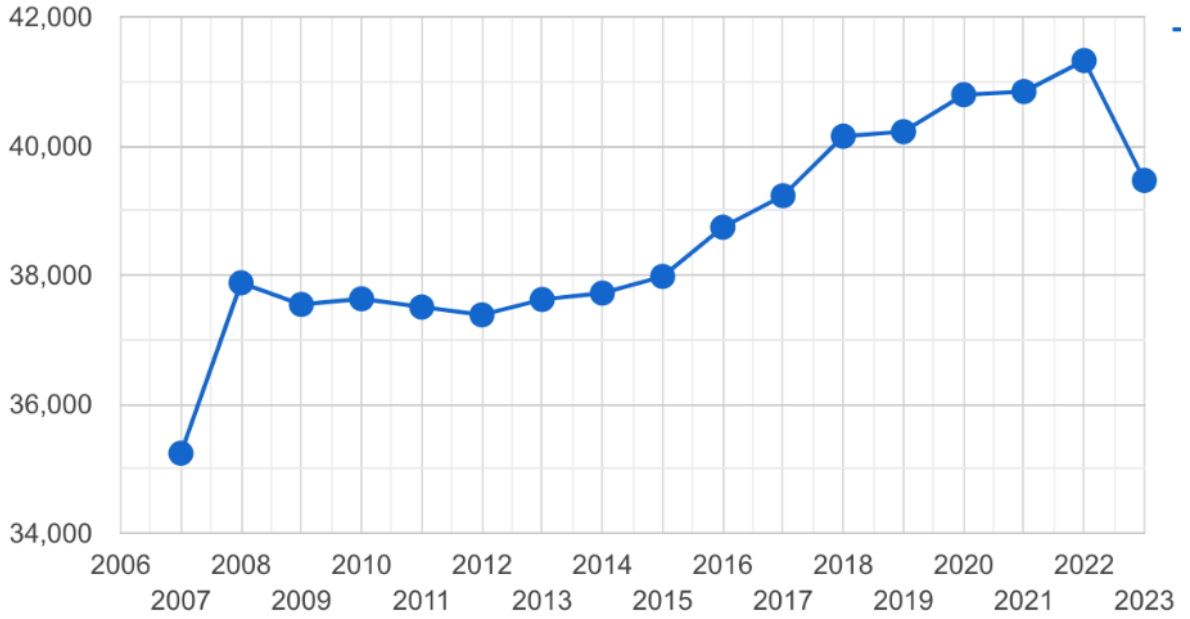


Figure 76. Nurdağı Population Change

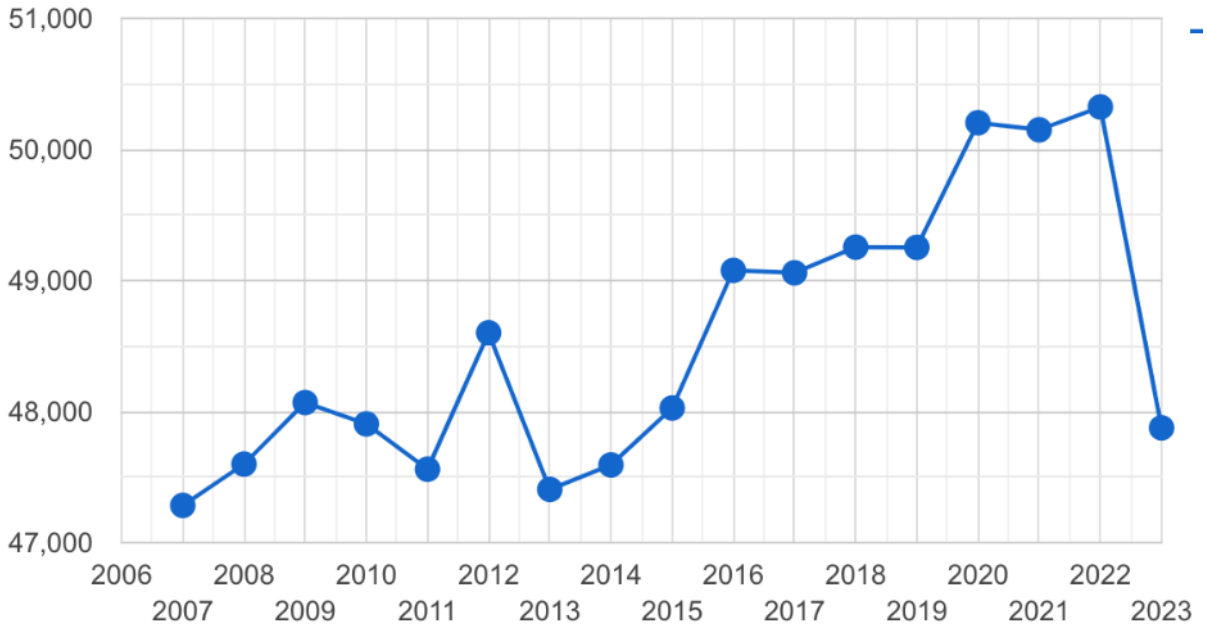


Figure 77. Gölbaşı Population Change

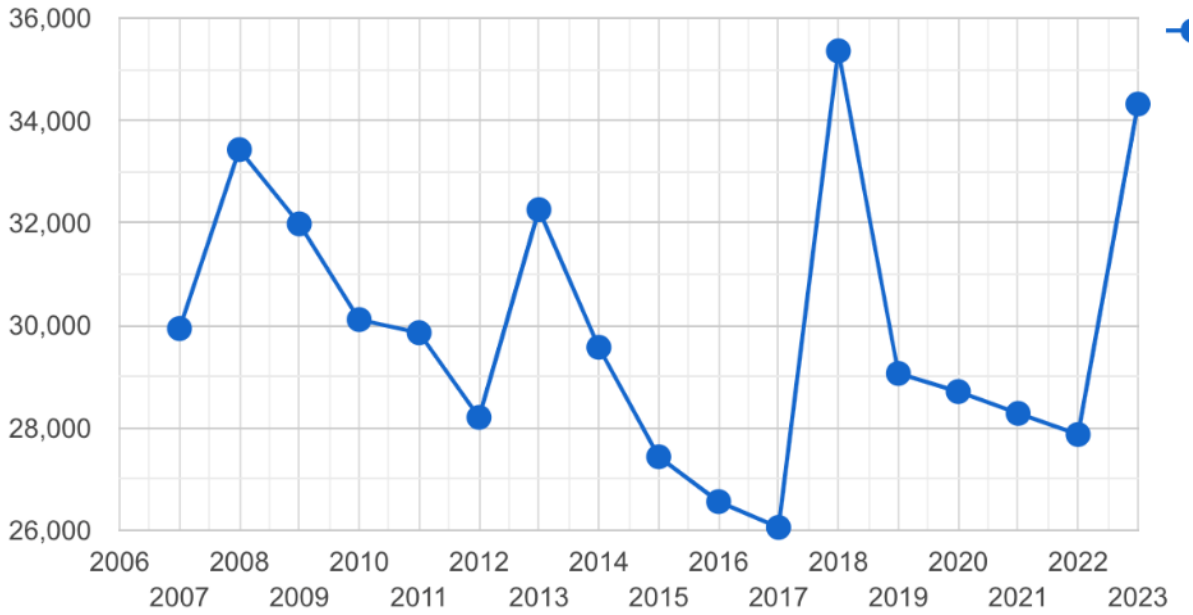


Figure 78. Akçadağ Population Change

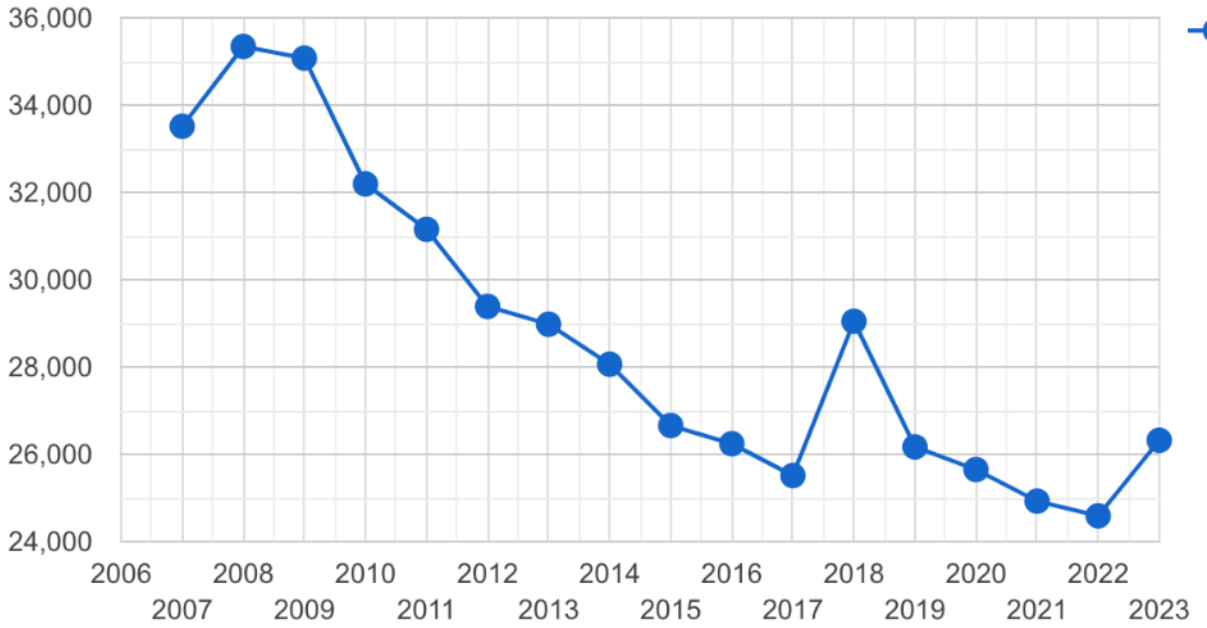


Figure 79. Darende Population Change

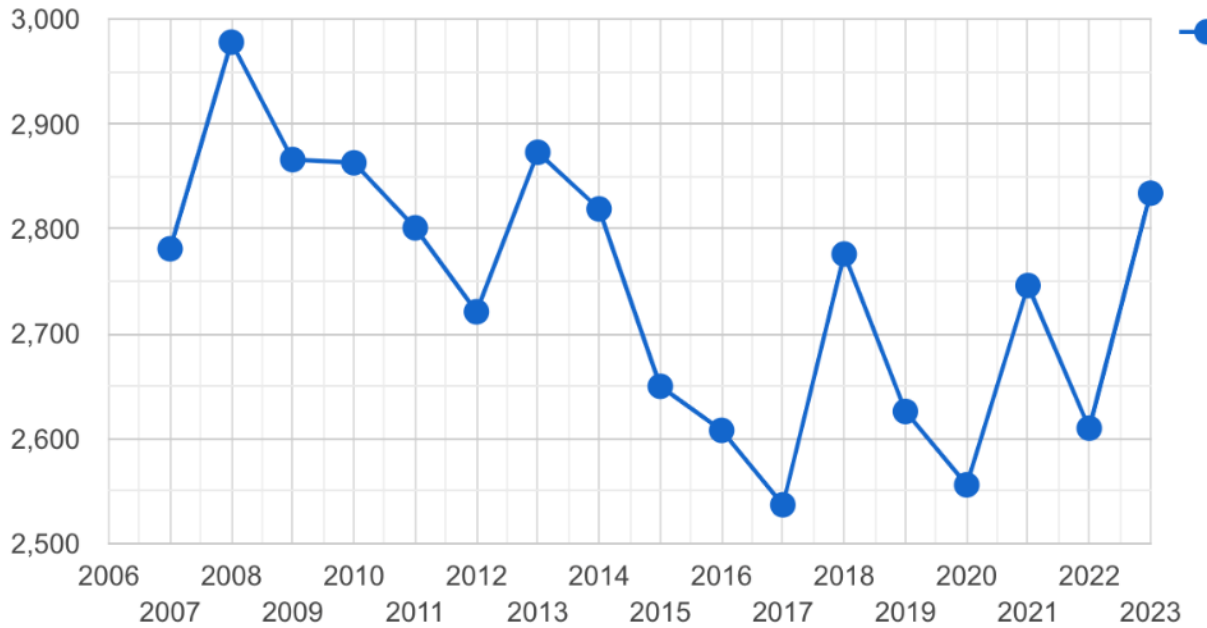


Figure 80. Ağın Population Change

4.8.2.1.1 Vulnerable Groups

Vulnerable groups refer to people who may be more affected by the potential negative impacts of the Project or are less able to access information or get their voice heard and concerns raised. When the Project Aol population data is evaluated, it is seen that the population of the region is in a fragile period and the population structure has changed in the last year due to internal migration.

It can be noted that the proportion of vulnerable groups within the population in the project impact area is high.

The following vulnerable groups have been identified in the project impact area.



- People with physical or mental disabilities
- PAPs with chronic diseases or bedridden people
- Female heads of households
- Poor people living on government or association aid within Project Aol
- Elderly people in need of care and social assistance
- Unemployed (even though they are looking for a job)
- People who are homebound due to chronic illness
- Illiterate adults
- Earthquake victims
- Refugees, migrants, citizens with limited Turkish language abilities
- Villagers who do not own land and work on other people's lands as daily wage earners.

Since its geographical location, Hatay is among the areas with the highest number of Syrian refugees. In terms of the number of Syrian refugees, Gaziantep and Osmaniye follow respectively.

Figure 81 shows the number of Syrian refugees in the cities in Türkiye, including the Project Aol.

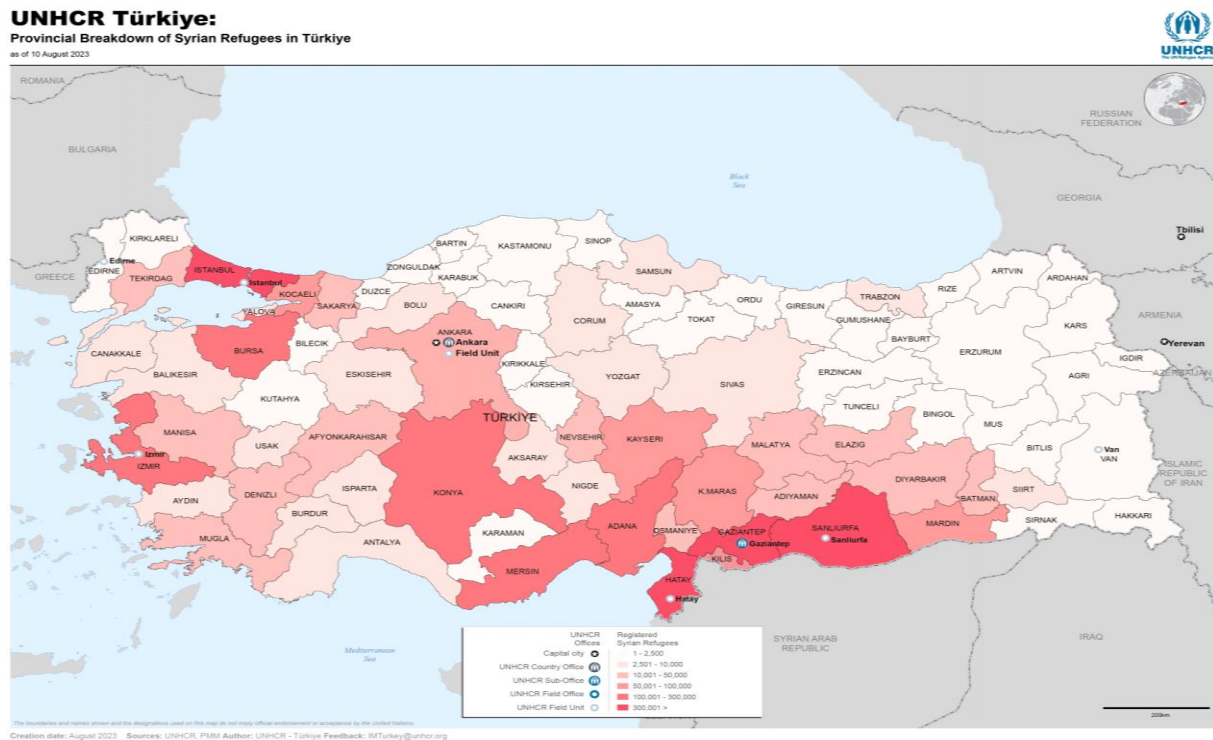


Figure 81. Syrian Refugees in Türkiye

Poverty is an important indicator within Project Aol. The regions with the highest poverty rate in the region were Hatay, Kahramanmaraş and Osmaniye, which were most affected by the earthquake. According to 2023 TUIK data in these provinces, the poverty rate was determined to be 10.4 percent.

4.8.2.1.2 Gender Assessment

Project Aol provinces Adıyaman, Elazığ, Gaziantep, Hatay and Malatya are among the provinces with high gender inequalities in Türkiye.

The Economic Policy Research Foundation of Türkiye (TEPAV) "Gender Equality Scorecard 2018 for 81 Cities with Comparisons" report evaluated the situation of the provinces according to the gender inequality indicators and index scores at the local level²⁷.

According to the evaluation in the report, the status of the provinces in terms of gender indicators is shown on the map below.

As seen in the map, Adıyaman and Gaziantep have high level of inequality in terms of gender indicators.

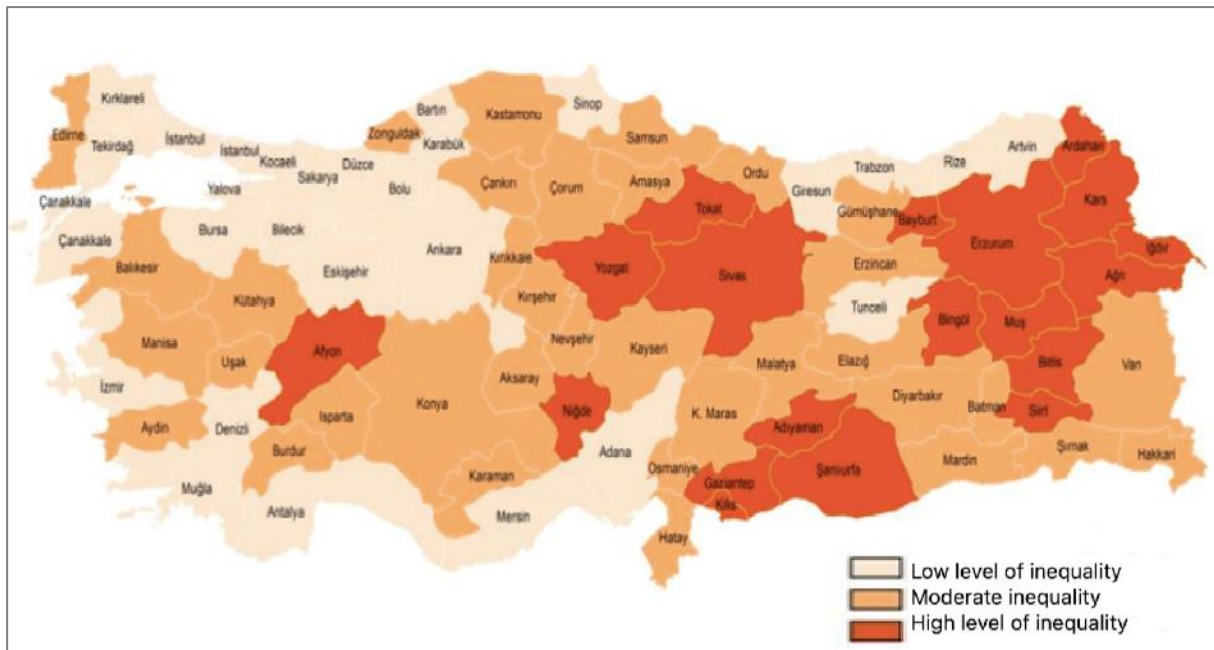


Figure 82. Gender Inequality Levels

Source: https://www.oran.org.tr/images/dosyalar/20190918155744_2.pdf

After the earthquake, it was revealed as a result of research and reports that existing gender inequalities deepened even more.

In this regard, the report "Gender Analysis in Earthquake Regions: Women's Access to Justice and Legal Aid"²⁸, published with the support of the European Union and the Council of Europe, highlighted the following findings.

- Half of the population of the 11 affected provinces is women and girls. 54% of the population over the age of 60 are women, 8% of 3.5 million households have at least one child, and the head of the family in these households is a woman.
- Women are not adequately represented in political decision-making processes in the affected provinces.
- Women's labor force participation rate in the affected region is lower than in Türkiye overall and labor force participation is also low. Therefore, there is a serious gender gap between men and women in employment.
- Agriculture is one of the main sectors in the region. Almost all women working in the agricultural sector work as unpaid family workers (78.7%; this rate for men is 20.2%), thus they are deprived of social security benefits, health insurance, union rights and are exposed to poor working conditions and low wages.

²⁷<https://www.tepav.org.tr/upload/files/1520402632->

7.Karsilastirmalarla_81_Il_Icin_Toplumsal_Cinsiyet_Esitligi_Karnesi_2018.pdf

²⁸ <https://rm.coe.int/tur-2023-wa2j-deprem-bolgelerinde-toplumsal-cinsiyet-analizi/1680ae1fad>

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- According to official data on domestic violence against women before the earthquake, the rate of reporting to the authorities is relatively lower in the affected areas and the level of acceptance in case of violence is higher.
- The rate of early marriage among the three regions where the provinces affected by the earthquake are distributed is well above the country average.

One of the most important findings in the reports and data within the Project Aol is that the rate of unregistered work of women, especially in agriculture, service and industry, is high, and that the proportion of women who continue to earn their living as female heads of households and are responsible for the care of their families has increased after the earthquake²⁹.

As underlined by the CEDAW Committee in its General Recommendation No. 37, women and girls are more negatively affected by the consequences of natural disasters due to gender inequalities. The relevant Decision states that the lack of physical security, especially in temporary settlements, and the lack of safe and accessible infrastructure and services, affect women and girls. It also draws attention to the fact that it causes an increase in gender-based violence against women.

Based on the field studies conducted in Hatay, Malatya, Adiyaman and Gaziantep, which are the project Aol provinces, the *Women and Girls After the Earthquake* report³⁰ published by UN Women revealed that GBVH risks increase both in temporary shelter areas and in daily life. Children, in particular, are among the groups most affected by gender inequality. As a reflection of gender inequality, the problem of girls being married at an early age and boys being directed to child labor due to increasing economic difficulties was included in the report.

4.8.2.2 Infrastructure and Services

4.8.2.2.1 Healthcare

Health services in Türkiye are primarily managed by the Ministry of Health. Health services are provided through the public health system, which includes several layers of care, from primary care to specialized medical services.

The health system in Türkiye, under the responsibility of the Ministry of Health, is designed to provide comprehensive and accessible health services to the public.

Basic Health Services: The primary health care system forms the basis of health services in Türkiye. It includes local health centers and family health centres. These centers provide basic medical services, preventive care, health education, vaccination, maternal and child health services and treatment of common diseases. They also serve as the first point of contact for patients seeking medical care.

Hospitals: Türkiye has a network of public and private hospitals offering a wide range of medical services. Public hospitals are under the jurisdiction of the Ministry of Health and provide services according to the patient's needs, including emergency care, surgeries, special treatments and inpatient treatment. Public hospitals provide services to citizens and residents, often at little or no cost.

Specialized Medical Services: Public hospitals in Türkiye provide specialized medical services in many different disciplines such as cardiology, oncology, neurology, orthopedics and more. These services are available in larger hospitals and university hospitals.

²⁹ <https://www.kadinisci.org/guncel/deprem-bolgesinde-istihdam-edilen-kadinlarin-yarisi-kayit-disi/>

³⁰ [https://eca.unwomen.org/sites/default/files/2024-](https://eca.unwomen.org/sites/default/files/2024-03/her_aftermath_deprem_sonrasi_adalet_erisimin_onundeki_engeller_aralik_23_tr_0.pdf)

[03/her_aftermath_deprem_sonrasi_adalet_erisimin_onundeki_engeller_aralik_23_tr_0.pdf](https://eca.unwomen.org/sites/default/files/2024-03/her_aftermath_deprem_sonrasi_adalet_erisimin_onundeki_engeller_aralik_23_tr_0.pdf)



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Emergency Health Services: Emergency care is provided in public hospitals and emergency rooms. Ambulance services are available to transport patients requiring urgent medical attention.

Pharmacies: There are pharmacies all over Türkiye. Pharmacists provide prescription and over-the-counter medications, as well as guidance on medication use. Pharmacies are an important part of the healthcare system, providing access to medicines and medical advice.

Following the earthquakes in the project impact area, centered in Kahramanmaraş, all infrastructure services and health services were damaged. Following the earthquakes, rehabilitation, improvement, repair and reconstruction works were quickly initiated in the health services in the region, as in all superstructure and infrastructure. The Ministry of Health established the *Earthquake Information Platform* to provide information about all health services in this process.

4.8.2.2.2 Education

In the project impact area provinces, one of the most important areas affected after the February 2023 earthquake was education. After the earthquake, education and training were disrupted due to factors such as the physical security of schools and internal migration.

Ministry of National Education (MoNE) has been carrying out many projects, activities and studies in the region after the February 6 earthquakes.

MoNE has prepared the 'Ministry of National Education Earthquake Zone Provinces Report'³¹. According to the report, approximately 3.7 million students and around 220 thousand teachers were affected by the earthquake disaster in 11 provinces.

Many projects and activities are carried out in Project Aol provinces and all earthquake provinces to renew the educational infrastructure, meet the need for teachers, and rebuild safe educational institutions.

4.8.2.2.3 Infrastructure

The infrastructure services of the provinces of Adıyaman, Elazığ, Gaziantep, Hatay and Malatya, which are within the scope of the project impact area, were damaged after the February 2023 earthquakes and improvement and reconstruction activities are ongoing.

For this reason, the electricity, communication, water and sewage infrastructures in the provinces, which were sufficient before the earthquake, were damaged at many points due to the earthquake after February 2023. In the Mukhtar interviews held during the Project ESIA field work, it was stated that the electrical infrastructure of the provinces and districts in the region was sufficient before the earthquake, but there were outages and infrastructure problems after the earthquake and they still continue. Although these problems are seen throughout the earthquake region, intensive improvement and reconstruction efforts in infrastructure and superstructure continue in the region.

4.8.3 Impact Assessment and Mitigation Measures

While evaluating the potential risks of the project on population change, gender and vulnerable groups, the focus was on construction and accommodation sites where worker accommodation will be provided.

In this context, Project risks have been evaluated and mitigation measures have been planned for both the construction and accommodation sites given in Table 15 and nearby settlements.

³¹ <https://sgb.meb.gov.tr/yayinlarimiz/yayin/113>



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In addition to the Proposed Mitigation Measures which are presented in Table 135, the project has established a Grievance Redress Mechanism (GRM) through which all external complaints and stakeholders can easily and safely report their concerns. The Project will inform all Project-affected settlements, PAPs, headmen and stakeholders about this GRM. The project will operate the GRM according to the GRM Procedure prepared in accordance with AIB ESSs. Responsible for the proper operation of the GRM, KGM is responsible for ensuring that all Project contractors manage the GRM appropriately.

4.8.3.1 Construction Phase

4.8.3.1.1 Impacts on Population and Demography

Considering that the population of the settlements affected by the camp area is low, mitigation measures have been defined by foreseeing that the camp area, where the worker population, which is predominantly male, will have effects on the demographic structure and social structure in the nearby settlements.

Within the scope of Population Change, gender inequalities and risks that may arise on vulnerable groups are important.

In the camp sites both installed or during the installation process for the Project are assessed in 4.8.2.1 Population and Demography Section. Closed settlements, accommodation conditions, workers distribution according to gender are given under this section. It is foreseen that the majority of workers working in the project and will be accommodate in the camp sites will be men. Considering this situation, in order to avoid negative communication with the surrounding settlements and to prevent conflicts arising from social and cultural disagreements, the interaction between workers and local people will be minimized and all needs will be met within the camp area.

Training on CHS, SEA/SA, traffic security, communication with local people should be provided for workers, security personnel and drivers staying at the camp site, and the code of conduct should also include compliance with the measures taken on these issues as part of the contracts.

The fact that the ratio of male workers is very high compared to women may reveal inequalities in women's participation in social life and use of public spaces and/or may reveal gender-based security problems, causing women to feel less safe in social and daily life.

The necessity to address gender-based violence and cases of sexual harassment and abuse in social matters underlines the need for additional measures. In this context, the Project should be managed with a gender-inclusive approach.

Integrating GBV issues into the training of Project staff, including the dimensions of socio-cultural awareness, non-violence and the multi-faceted dynamics of GBV, is important in reducing project resources risks that may arise both from CHS, labor and social aspects.

During the Project stakeholder engagement processes, communication strategies, communication tools and activities which have been defined in the SEP including GRM of the Project will be used to ensure the meaningful participation of vulnerable groups and women in the Project process. In addition, a project level GAP has been prepared to ensure the meaningful participation of vulnerable groups and women in the Project, to ensure gender equality and to eliminate gender risks. These improvements and measures will be implemented to ensure that the opinions, suggestions, and complaints of vulnerable groups are conveyed to the Project smoothly and in a timely manner.



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4.8.3.1.2 Social conflict

Within the scope of Population Change, the risk of social disharmony and conflict that may occur between workers coming from outside the province and unfamiliar with the local culture and the local population.

Temporary and short-term Project construction activities will continue within the scope of the Project. However, since the majority of the workers who will work within the scope of the Project are not recruited from local communities and migrant workers predominate, there may be a risk that migrant workers may not be able to adapt to the local social and cultural structure. This can lead to conflicts between workers and local community members. These conflicts can arise in the following ways:

- The risk of illegal behavior and crime may be increased due to illicit relationships or informal economic and social relationships between local residents and workers.
- Inadequate interaction and communication with local communities can lead to local communities' concerns and complaints being ignored.
- Due to the hiring of external employees instead of local employment, local people may not accept cooperation with the Project and may see Project employees as a threat to the local people.
- Conflicts may arise due to the workers, subcontractors and security personnel who will be in face-to-face communication with the local people during the project process do not have knowledge and awareness about the local cultural structure and gender sensitivity.

Potential risks may be occurred from the security measures of the Project facilities and security personnel will be managed with the mitigation measures defined in Table 141.

Establishing a Grievance Redress Mechanism accessible to both workers and local households is important in this process. This mechanism increases trust and minimizes conflict by handling disagreements skillfully.

It is recommended to integrate social dynamics insights into worker orientation. Providing information about local culture and encouraging nonviolent communication aids interactions. Informing workers about the project's environmental and social policies improves communication with local communities.

Prioritizing local businesses in purchasing increases local benefits and strengthens the perception of the project. Involving local communities in employment to minimize the negative effects of the Project on population and demography will not only increase project acceptance but also reduce potential socio-cultural conflicts arising from population growth. Aligning the cultural characteristics of external workers with the culture of the region promotes the creation of a harmonious environment for construction.

4.8.3.1.3 Infectious diseases

Population influx due to worker accommodation may introduce new infectious diseases, including sexually transmitted diseases, to the project area.

The presence of large numbers of construction workers, potentially young men, may contribute to an increased risk of infectious diseases such as HIV/AIDS.

Considering all these circumstances, detailed health checks and reports of all subcontractors, including their employees and workers, will be a prerequisite for the recruitment and mobilization of Project employees.



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4.8.3.2 Infrastructure and Services

The project will also provide adequate facilities to employees at camp and construction sites, taking into account the fragile situation of the settlements in the impact area in terms of infrastructure and services after the earthquake, and will continue construction activities in a way that will not put pressure on the existing infrastructure.

Construction and Accommodation Site accommodation capacities are assessed under Section 4.10.1.2.

According to the site visit and Project data findings, it's seen that camp sites will not create pressure on the local infrastructure and services. However, both installed and installing camp sites will be monitored by Supervision Consultant and/or KGM to ensure that the contractors provide opportunities to meet the food, beverage, health and daily life needs of the workers in accordance with the AIIB ESSs.

While providing these opportunities, camp sites will sustain infrastructure services within the scope of continuous consultation and agreements with the relevant responsible official institutions of the provinces and districts, municipalities and local stakeholders. Appropriate resources that will not put any pressure on local capacity will be used and support will be provided to local infrastructure and services when necessary.

The mitigation measures to be implemented in this process are set out in Table 141.

4.8.3.3 Implementation Phase

No significant population influx impact is expected during the operation phase. Based on the approach defined above, Proposed Mitigation Measures are presented in Table 141.



Table 141. Impact Significances, Proposed Mitigation Measures and Value of Residual Impacts – Socio-Economic Environment

Impact Description	Project Phase	Receptor	Impact Magnitude					Sensitivity/ Value of Resource/ Receptor	Impact Significance (prior to mitigation or with existing mitigation)	Proposed Mitigation Measures	Residual Impact Significance
			Extent	Reversibility	Duration	Frequency	Overall Magnitude				
Impacts on Population and Demography	Construction	Local Settlements	Local Project construction and accommodation sites affected settlements	Short- term reversible	Short-term	One-off/rare	Low	Low	Minor	<p>In order to limit the negative impacts on the population, the necessary personnel and subcontractors for the works within the scope of construction and related facilities will be employed primarily from the settlements within and near the Project AoI.</p> <p>In case of employing foreign workforce, cultural awareness training will be given to workers in order to prevent cultural conflicts.</p> <p>A Worker Code of Conduct will be prepared and applied to all workers and subcontractors, including;</p> <ul style="list-style-type: none"> ▪ GBVH problems, ▪ Violent behavior and physical aggression, ▪ Intentionally damaging the property, interests or environment of others, ▪ Violation of provisions aimed at preventing the spread of sexually transmitted diseases and AIDS, ▪ Harm or damage to the environment, population or property, ▪ Drug use, including the use of cannabis, trespassing on local people's property without the permission of land owners or users. <p>The Code of Conduct will identify non-compliance that requires disciplinary action and includes that repeated non-compliance may result in immediate dismissal or, depending on the risks these situations may pose.</p> <p>The Project GRM will operate in accordance with AIB standards, all complaints will be evaluated, resolved and managed in accordance with the Procedure.</p>	Negligible
Social conflict	Construction	Local Settlements	Local Project construction and accommodation sites affected settlements Project construction activities affected settlements	Short- term reversible	Short-term	One-off/rare	Low	Low	Minor	<p>Workers' accommodation will be provided in accordance with AIB standards and good practice in order to limit the interaction of non-local workers who come to work on the project, the basic needs of workers will be met in camping areas-accommodation areas.</p> <p>In the Environmental and Social Management Plan of the Sub-Projects, the basic needs of the workers, how the necessary services will be planned, and which resources will be used will be explained, and the implementation and monitoring stages will be explained.</p> <p>The Project GRM will operate in accordance with AIB standards, all complaints will be evaluated, resolved and managed in accordance with the Procedure.</p> <p>Employment of the local population and migrant workers will be ensured by providing training to employees on social harmony, gender issues, complaint mechanism, labor rights, and rules of conduct.</p> <p>Employees will be trained to prevent discrimination in the workplace.</p> <p>Necessary measures will be taken by contractor to make sure that workers coming from outside the city will be given a training program on dialogue and communication with local communities, and that there are no social or cultural issues between host communities and external workers.</p>	Negligible
Infectious diseases	Construction	Local Settlements	Local Project construction and accommodation sites affected settlements	Short- term reversible	Short-term	One-off/rare	Low	Low	Minor	<p>Necessary health checks will be carried out during the recruitment of workers, health reports will be recorded in the employees' files and health reports will be renewed at necessary intervals.</p> <p>The Project GRM will operate in accordance with AIB standards, all complaints will be evaluated, resolved and managed in accordance with the Procedure.</p>	Negligible
Infrastructure and Services	Construction	Local Settlements	Local Project construction and accommodation sites affected settlements	Short- term reversible	Short-term	One-off/rare	Low	Low	Minor	<p>All necessary services, social facilities and accommodation requirements for camps and construction sites will be provided by using the most appropriate resources, through consultation and official agreements with local official institutions and municipalities.</p> <p>In order to avoid pressure on local facilities and services, workers' interaction with local communities will be limited and regular consultations will be held with local people and headmen on this issue, especially in settlements affected by the camp area.</p> <p>Necessary services, social facilities and accommodation will be provided within the camping area for all employees coming from outside the region.</p> <p>The accommodation capacity of the camping areas will be planned in accordance with the number of workers and the facilities needed.</p> <p>The Supervision Consultant and/or KGM will monitor the camp sites to ensure that all infrastructure and services are provided with agreements and permissions.</p> <p>The Project GRM will operate in accordance with AIB standards, all complaints will be evaluated, resolved and managed in accordance with the Procedure.</p>	Negligible

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4.9 Resettlement and Land Acquisition and Livelihood

4.9.1 Methodology and Project Standards

4.9.1.1 Methodology

The project has implemented measures to avoid impacts resulting from land acquisition and to eliminate impacts resulting from land acquisition on residential areas, buildings, other structures and agricultural lands.

As a result of all the implemented avoidance measures, only 1 parcel within the scope of the Project is affected by land acquisition. Land acquisition was necessary for the Antakya-Samandağ Road (Including Samandağ Crossing) Section Supply Construction Works, which is sub-project No. 3 and is located within the borders of the 5th Regional Directorate of Highways.

Land acquisition process is assessed in accordance with the AIIB ESS 2.

ESS 2 (Land Acquisition and Involuntary Resettlement): If the Project is likely to involve Involuntary Resettlement the Bank requires the Client to address this in the social section of the assessment report, complemented by more in-depth coverage, as required under ESS 2. The Client covers this in a plan or framework, as applicable, which may be called a land acquisition and resettlement plan, land acquisition plan or resettlement plan (LARP/LAP/RP) or, in the case of a framework, a land acquisition and resettlement planning framework, land acquisition planning framework or resettlement planning framework (LARPF/LAPF/RPF). This plan or framework is provided to the Bank as a freestanding document, an annex to the assessment report, or incorporated as a recognizable element of the report.

The objectives of ESS 2 are: (a) to avoid Involuntary Resettlement wherever feasible; (b) to minimize Involuntary Resettlement by exploring Project alternatives; (c) where avoidance of Involuntary Resettlement is not feasible, to enhance, or at least restore, the livelihoods of all displaced persons in real terms relative to pre-Project levels and to provide resettlement assistance; (d) to understand and address gender-related risks and differential impacts of Involuntary Resettlement; (e) to improve the overall socioeconomic status of the displaced poor and other vulnerable groups; and (f) to conceive and implement resettlement activities as sustainable development programs, providing sufficient resources to enable the persons displaced by the Project to share in Project benefits.

ESS 2 applies if the Project would or may involve Involuntary Resettlement (including Involuntary Resettlement of the past or foreseeable future that the Bank determines is directly linked to the Project).

4.9.2 Baseline Conditions

Since the project-related reconstruction and rehabilitation works will mainly be conducted within the existing right-of-way, no large-scale land acquisition is expected within the scope of the Project. The only area where the land acquisition will be required is located in Hatay province, within the scope of the sub-project P3 Antakya-Samandağ Road. This land is the only land to be expropriated within the scope of the Project and located within the borders of 5th Regional Directorate of Highways.

Land need of the Project is summarized in Table 142.



Table 142. Land Need of the Project

Responsible Regional Directorate	Sub-project No.	Sub-project Name	Private Parcels		Province	District	Settlement	Parcel no	Remarks
			To be expropriated lands	Temporary rented lands					
5 th Regional Directorate (Mersin)	1	TAG Highway Aslanlı Tünel Repair of All Kinds of Damages and Strengthening of Viaducts Against Earthquakes in This Section Construction Work	0	0					
	2	İslahiye-Hassa-Kırıkhan Road Hot Bituminous Mixture Repair Work, Hatay Airport Road Soil Works, Art Structures and Superstructure Construction Work	0	0					
	3	Antakya-Samandağ Road	1	0	Hatay	Samandağ	Sutaşı	200/105	Permanent involuntary displacement
8 th Regional Directorate (Elazığ)	4	(Malatya-Akçadağ) Junction - Gölbaşı Road (Construction Works of Erkenek Tunnel Damaged in Earthquake and Erkenek Tunnel-Karanlıkdere Section Damaged in Earthquake)	0	0					
	5	Repair of Technological Bridges Damaged in Earthquake (Tohma, Ağın, Beylerderesi Bridges Earthquake Damage Repair)	0	1	Malatya	Yeşilyurt	Sütlüce	N/A	Temporary voluntary land rental from the land owner

Permanent Land Acquisition: The only area where the land acquisition will take place is at Sutaşı District, 200/105 Parcel. 915 m² of the 5060 m² area from the parcel will be expropriated. There is no residential building on the parcel. However, it has been determined that there are fixed assets such as concrete poured field, wire mesh, concrete wall, iron pipe fence, concrete pole, iron profile electric pole on the 915 m² area of the parcel to be expropriated. The expropriation process has been started at the first quarter of the 2024.

The satellite image of the mentioned parcel is shown in Figure 83, and the area subject to land acquisition is presented in Figure 84.



Figure 83. 200/105 Parcel in Sutaşı District

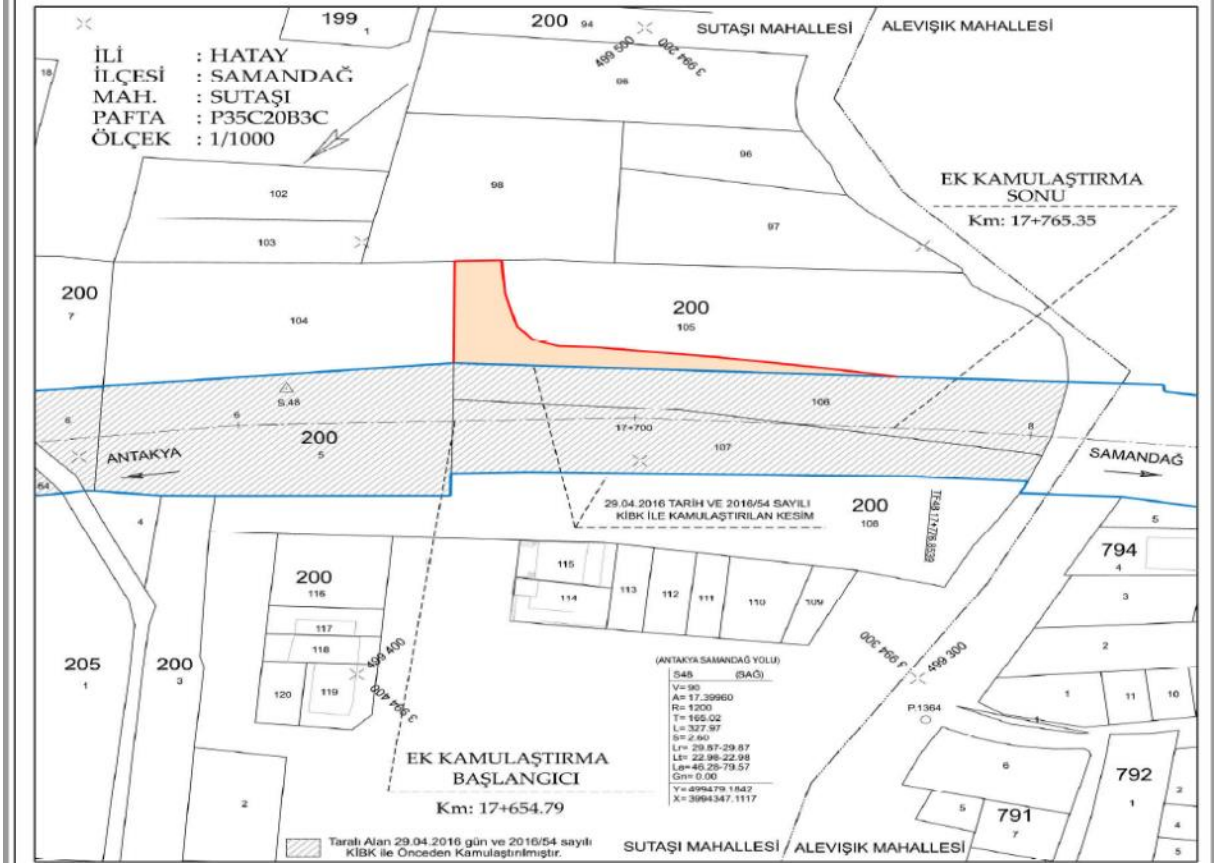


Figure 84. The Area to be Expropriated

According to expropriation valuation reports, the parcel has 12 shareholders. Among the 12 shareholders of the land, 1 shareholder and his family live in a portable container on the land. For this household, the container on the land currently serves as container residence, until they will have a right for a permanent house within the scope of the governmental earthquake house projects.



Figure 85. View of the Container in Parcel 200/105

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Within the scope of the official agreement made between KGM and AFAD for the household living in the portable container on the land, the family living in the container on the land will continue to stay on the land until the construction of the earthquake houses is completed (estimated year 2025).

Based on the land acquisition need of the project, Project RP has been prepared and will be implemented in order to realize and manage land acquisition in accordance with AIIB ESS2. Detailed explanations on this subject are included in the RP document.

The summary of the process carried out regarding this Parcel is as follows:

- Expropriation Plan Approved and Public Interest Decision was taken.
- Measurement was made on the basis of the Valuation Appraisal on the parcel and the outbuildings (tree, type of tree, age, wall, pole, etc.) entering the expropriation corridor were determined.
- In order to obtain the zoning and construction characteristics that are the basis for the valuation of the parcel, the zoning status was asked from Samandağ Municipality in an official letter.
- Research is ongoing for similar sales that have been made recently around the parcel.
- Once the valuation procedures are completed, purchasing negotiations will begin with the parcel owners.
- Identifications made during the expropriation process; more than one asset have been identified in the 200/105 parcel. Detailed assessments are given below. Within the scope of the determinations, the land and the list of outbuildings on it were determined as follows.
 - 8.70 x 3.00 + 3.00 3.00 m2 concrete poured field
 - 20 iron pipe fence posts measuring 1.50 square meters, 40 meters long, 2 meters apart
 - 0.40 x 0.25 x 1.50 square meter concrete pole
 - 0.10 x 0.10 x 6.00 square meter iron profile electric pole
 - 25 Olive Trees, 7 years old
 - 41 Tangerine trees, 40 years old

Detailed information is presented in Table 143.



Table 143. Detailed Assessment of Parcel 200/105

Total Parcel Area (m ²)	The Area to be Expropriated (m ²)	Assets on the Parcel	Ownership Status of the Parcel	Who Use the Affected Containers	Explanation
5060	915	<ul style="list-style-type: none"> ▪ Concrete poured field ▪ Iron pipe fence ▪ Concrete pole ▪ Iron profile electric pole ▪ 25 Olive Trees ▪ 41 Tangerine trees 	Multi-shareholder parcel (12 shareholders)	Shareholder users (2 households)	Within the scope of the official agreement made between KGM and AFAD for the household living in the portable container on the land, the family living in the container on the land will continue to stay on the land until the construction of the earthquake houses is completed (estimated year 2025). Detailed explanations on this subject are included in the RP document.

Detailed information about the household is provided in Table 144.

Table 144. Household Living on the Project Affected Parcel

Household	Household member status	Age	Birth place	Sex	Marital Status	Education	Work/ occupation	Social insurance	Vulnerability
1. Household living in the container on the Project affected Parcel	Head of household	46-55	Antakya	MALE	Married	Primary or secondary school graduate	Paid employee	Green card/no premium payment	Earthquake victim
	Wife of the head of the household	26-35	Antakya	FEMALE	Married	Primary or secondary school graduate	Paid employee	Green card/no premium payment	Earthquake victim
	Children of the head of the household	Below 25	Antakya	MALE	Single	Primary or secondary school graduate	Student, child	Dependent on spouse and parents	Earthquake victim



Household	Household member status	Age	Birth place	Sex	Marital Status	Education	Work/ occupation	Social insurance	Vulnerability
	Children of the head of the household	Below 25	Antakya	MALE	Single	Primary or secondary school graduate	Student, child	Dependent on spouse and parents	Earthquake victim
	Children of the head of the household	Below 25	Antakya	MALE	Single	A child who has not yet completed a level of education	Student, child	Dependent on spouse and parents	Earthquake victim
2. Household living in the container on the Project affected Parcel	Head of household	56-65	Samandağ	MALE	Married	Primary or secondary school graduate	Farmer	No social security	Earthquake victim
	Wife of the head of the household	36-45	Samandağ	FEMALE	Married	Primary or secondary school graduate	Housewife	No social security	Earthquake victim
	Children of the head of the household	26-35	Samandağ	MALE	Single	Primary or secondary school graduate	Unemployed	No social security	Earthquake victim
	Children of the head of the household	Below 25	Samandağ	MALE	Single	Primary or secondary school graduate	paid employee	SGK	Earthquake victim

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Temporary Land Need: Within the scope of the sub-project P5, The Renovation of Technological Bridges Damaged in the Earthquake, a small area of a private parcel is rented by the Contractor from the land owner to be used temporarily. The rented area is utilized as the Tohma Construction and Accommodation Site. This parcel is not subject to involuntary physical or economical resettlement. The land will be handed back to the land owner in a rehabilitated form and in accordance with the conditions specified in the rental contract after the completion of the sub-project. There will be no involuntary economic or physical resettlement within the scope of this parcel.

During construction phases, main Project activities and Project related facilities may have impacts on livelihoods due to dust, restriction of passage, damage to products or assets. In this context, the following factors that may negatively affect livelihoods are defined as follow.;

- Effects caused by dust formation,
- Effects caused by damage to irrigation channels,
- Impacts resulting from damage to drainage channels/pipes identified as potential impacts,
- Temporary restriction of access areas to livestock and pasture areas

In this context, Project mitigation measures have been determined for livelihood loss in addition to the land acquisition impacts of the Project.

4.9.3 Impact Assessment and Mitigation Measures

Within the scope of Project land acquisition, RP (CNR-KGM-TERRRP-RP-001) document has been developed.

RP was prepared to assess and minimize the land acquisition potential impacts and potential economic displacement impacts of the Project. Additionally, Proposed Mitigation Measures are presented in Table 145.



Table 145. Impact Significances, Proposed Mitigation Measures and Value of Residual Impacts - Resettlement and Land Acquisition and Livelihood

Impact Description	Project Phase	Receptor	Impact Magnitude					Receptor Sensitivity	Impact Significance (prior to mitigation or with existing mitigation)	Proposed Mitigation Measures	Residual Impact Significance
			Extent	Reversibility	Duration	Frequency	Overall Magnitude				
Land acquisition impacts	Construction	Project construction and accommodation sites Project affected settlements	Local	Short-term reversible	Short-term	Intermittent	Low	Low	Minor	<p>Alternative project designs will be investigated to prevent physical displacement and minimize it where avoidance is not possible.</p> <p>Forced evacuation will be prevented.</p> <p>RP document will be applied to predict and minimize negative social and economic impacts resulting from land acquisition or land use restrictions where it is not possible to avoid.</p> <p>All of the following PAPs within the scope of land acquisition, owners, shareholders and official tenants of the properties, individuals/households and vulnerable groups affected by land acquisition/expropriation will be considered as potential beneficiaries of RPU registered residential users,</p> <ul style="list-style-type: none"> ▪ One or more households living in a household, ▪ Disadvantaged groups who do not have formal contracts, ▪ Shareholder residential users. ▪ Temporary land acquisition impacted PAPs 	Negligible
Livelihood loss	Construction	Project construction and accommodation sites Project affected settlements	Local	Short-term reversible	Short-term	Intermittent	Low	Low	Minor	<p>Level crossings used for passage to livestock and pasture areas will be determined and shared with PAPs. It will be determined in consultation with the villagers to ensure that animal crossings do not cause livelihood difficulties and do not lengthen the roads, and a passageway will be left at regular intervals for animal crossings.</p> <p>Passage roads and underpasses to be used in transition to agricultural lands will be left and these passages will be planned taking into account width, height and ground slope,</p> <p>The structure of the passages should be suitable not only for tractor passage, but also for combine harvester, loaded trailer and product passage. delivery vehicles, agricultural machinery.</p> <p>To prevent dust formation, regular irrigation will be carried out on construction and transportation roads, Regular training will be provided to Project employees on Project impacts and Project-related impacts.</p> <ul style="list-style-type: none"> ▪ Taking into account other factors that may adversely affect livelihoods, ▪ Effects resulting from dust formation will be compensated when detected, ▪ Impacts resulting from damage to irrigation channels will be compensated when detected, ▪ Impacts resulting from damage to drainage channels/pipes, which are determined as potential impacts, will be compensated when detected. 	Negligible

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4.10 Labor and Working Conditions

4.10.1 Baseline Conditions

4.10.1.1 Labour Force and Employment

The GDP of the provinces in the project impact area is an important indicator of the socioeconomic levels of the provinces. When the provinces located in the earthquake zone and including the Project Aol provinces are evaluated, it is seen that these provinces are lower than Türkiye's average GDP per capita.

GDP per capita in Adana, Hatay, Elazığ and Osmaniye varies between 6,000 and 7,000 dollars. Adıyaman is even lower than this figure with 4,092 dollars.

Gaziantep is the province with the highest GDP among the provinces within the Project Aol.

When GDP is evaluated according to economic activity branches, the share of industry and manufacturing industry in the sectoral distribution of gross domestic product on a provincial basis is quite high in Gaziantep (45.52%, 43.32%). While Hatay (33.52%, 29.63%) came after Gaziantep in 2022, the effects of the earthquake negatively affected this share and caused the decline of the provinces in the region³².

Average equivalent household incomes in TR63 (Hatay, Kahramanmaraş, Osmaniye), TRB1 (Malatya, Elazığ, Bingöl, Tunceli) and TRC1 (Gaziantep, Adıyaman, Kilis) regions are close to each other, between 25,000-27,500 TL. The poverty line in TRB1 (Malatya, Elazığ, Bingöl, Tunceli) regions is 13,658 TL and 13,202 TL. The poverty rate of 22.4% in the TR62 region shows that 913 thousand people in the region live at the poverty line. The other region with the highest poverty rate in the region is the TR63 region, which includes Hatay, Kahramanmaraş and Osmaniye, which were heavily affected by the earthquake. In the region, where the poverty rate is 10.4%, 636 thousand people live below the poverty line of 11,953.

Employment and unemployment data are presented below within the scope of labor force indicators. According to the data, both labor force participation rate and employment rate in Project Aol provinces are below the Türkiye average.

When this rate is evaluated according to female and male labor force participation, it shows that although the labor force participation rate of women is approximately half of that of men, the employment rate of women is lower than that of men and the unemployment rate is higher than that of men.

³² Source: TURKSTAT, 2022



Table 146. 15+ Age Main Labor Force Indicators

	Total			Male			Female		
	Labor force participation rate (%)	Employment rate (%)	Unemployment rate (%)	Labor force participation rate (%)	Employment rate (%)	Unemployment rate (%)	Labor force participation rate (%)	Employment rate (%)	Unemployment rate (%)
Türkiye	53,3	48,3	9,4	71,2	65,7	7,7	35,8	31,3	12,6
TR63 <i>(Hatay, Kahramanmaraş, Osmaniye)</i>	45,6	38,6	15,5	65,2	57,0	12,5	26,5	20,6	22,5
TRB1 <i>(Malatya, Elazığ, Bingöl, Tunceli)</i>	47,2	43,9	7,2	66,7	62,9	5,8	28,3	25,4	10,4
TRC1 <i>(Gaziantep, Adıyaman, Kilis)</i>	48,2	43,3	10,2	71,6	65,3	8,8	25,1	21,5	14,2

Source: TURKSTAT, Labour Force Statistics

When population employment is evaluated by sector, it is seen that women mainly work in agriculture and service sectors.

Within Project Aol, the service sector has the highest employment rate.

Table 147. 15+ Population Employment by Sector (2023)

Sub-region	Percentage (%)				Percentage (%)				Percentage (%)			
	Total	Agriculture	Industry	Service	Total	Agriculture	Industry	Service	Total	Agriculture	Industry	Service
	Total				Male				Female			
Türkiye	100	14,8	27,5	57,6	100	13,0	32,2	54,9	100	18,7	18,0	63,3
TR63 <i>(Hatay, Kahramanmaraş, Osmaniye)</i>	100	15,2	26,3	58,4	100	13,0	32,3	54,7	100	21,4	10,2	68,4
TRB1 <i>(Malatya, Elazığ, Bingöl, Tunceli)</i>	100	29,0	22,1	48,9	100	23,1	26,9	49,9	100	43,1	10,6	46,3
TRC1 <i>(Gaziantep, Adıyaman, Kilis)</i>	100	10,9	35,7	53,4	100	9,2	41,1	49,7	100	16,1	19,2	64,6

Source: TURKSTAT, Labour Force Statistics



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4.10.1.2 Conditions of the Camp Sites of the Project

Labor and Working Conditions potential risks of the Project are assessed for the construction and accommodation sites and nearby settlements affected from the camp sites. In this context, Project risks have been evaluated and mitigation measures have been planned for both the construction and accommodation sites given in Table 15 and nearby settlements.

4.10.1.2.15th Regional Directorate of Highways Sub-Project Construction and Accommodation Sites

Feza Taahhüt A.Ş. (FEZA) was assigned as the Contractor through a contract signed with the 5th Regional Directorate of Highways on 05.05.2023 for three sub-projects; İslahiye-Hassa-Kırıkhan Road, Antakya-Reyhanlı Road Hot Bituminous Mixture Repair Work, Hatay Airport Road Soil Works, Art Structures and Superstructure Construction Work.

Kırıkhan-Kızılkaya Construction Site

80 workers and 25 technical personnel are accommodating at the Kırıkhan-Kızılkaya Construction Site, which is located next to the Kızılkaya Quarry in the Kızılkaya Village.

As evaluated in terms of the conditions of the construction site, there are showers, toilets, rest areas and a dining hall within the Camp Site to meet all accommodation needs of the workers. No sewerage infrastructure exists on the construction site. Septic tanks are being utilized, with sewage truck services provided by Kırıkhan Municipality.

Conditions of the Camp site is shown in the photos below.





Figure 86. Kirikhan-Kızilkaya Campsite

Accommodation conditions were evaluated to include drinking water, health facilities, washing-bathroom conditions, changing rooms, food and beverage facilities, accommodation areas, rest areas, worker health and safety conditions.

Workers work in road construction areas, their food and beverage needs are met from the camp site, and they are transported to the work areas by shuttle service. It has been observed that service facilities and cafeteria conditions are suitable.

Accommodation is in dormitories for 4 people, and the necessary 12 cubic meters of space per person is provided for workers.

There are 3 shuttle vehicles for transporting workers in the campus. Approximately 40 local workers are employed, 5 of whom are female. The female cafeteria worker is an earthquake victim and is staying at the camp site with her family.

Although the accommodation conditions at the camp site comply with AIB ESSs, it is recommended to improve the isolation of the camp site from the outside for both workers safety and preventing the community health and safety potential risks.

Antakya Kuruyer Construction Site

Antakya Kuruyer Construction Site will be used for the Antakya-Reyhanlı Road construction activities. There will be accommodation for a maximum of 150 people. Nearest resident is approximately 1250 m from the Kuruyer Construction Site.

The camp site is in the installation process and located in the Narlıca Kuruyer Village boundaries. There are currently 10 employees in the Kuruyer Camp Site. Infrastructure works continue and transportation is provided by shuttle vehicles. The rooms have air conditioning and there will be separate showers, toilets, dining halls and social areas for men and women. It is also planned to build a masjid and ablution facility.

Before completing the installation of the Kuruyer Construction Site, the camping area will be isolated to protect its boundaries from the outside and the accommodation conditions, drinking

water, health facilities, washing-bathroom conditions, changing rooms, food and beverage facilities, accommodation areas, rest areas, worker health and safety conditions were ensured to meet the requirements of ILO standards by the Contractor. KGM will also monitor the process to ensure that it is provided in accordance with the ILO standards and AIIB ESSs.

Location of the camp site is given in the figure below.



Figure 87. Kuruyer Campsite

Source: Google Maps

During the process of meeting the electricity, water and sewage needs for the camp site to be used within the scope of the project, pressure should not be put on the services used by the local people. It has been learned that Kuruyer Construction Site will use groundwater, and there will be a septic tank at the camp site. In addition, all other usage permits must be obtained, documented and monitored.

Ceyhan Construction and Accommodation Site

Ceyhan Construction and Accommodation Site is the Contractor's (SNH) main accommodation site which has actively been used since 2019 for different projects. Construction Site is used for the construction works of the TAG Highway sub-project. The construction site is located in Ceyhan district.

143 workers are accommodated at the construction site, which is approximately 20 km away from the nearest settlement. Accommodation is in dormitories for 4/6 people, and the required 12 cubic meters of space per person is provided for workers.

Project work has limited communication and interaction with the local population, and the camp site does not have any negative impact on the surrounding settlements or the local population.

Drinking water for Ceyhan Construction Camp Site is provided from ready-bottled water, utility water is provided from Hacı Sabancı OIZ, and irrigation water is obtained from groundwater well. For the use of groundwater well, the usage license must be shared. Hot water is supplied via solar panels. Electrical infrastructure is available and there is also an emergency generator.

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On the other hand, only domestic wastewater has been generated from the activities, and domestic wastewater has been discharged into the water channel after being treated in the package WWTP, which has an environmental permit and an approved WWTP identification certificate.

The campsite does not create any pressure on local settlements and local services.

For the field workers of the Project, meals are being prepared at the Ceyhan Construction and Accommodation Site and distributed to the personnel working on different sites within the scope of the sub-project.

Additionally, several apartments from the lodging of 5th Regional Directorate of Highways were reorganized and allocated to the project personnel. Approximately 30 personnel are staying at this accommodation area (also known as Bahçe Accommodation Area). Showers, toilets, cafeteria, and social areas are available.

Engineer and worker dormitories are separate and have showers, toilets and a common activity area. Men's and women's toilets are separated. Hot water is provided by solar energy and the municipality's mains water is also used. Drinking water is packaged and supplied from private companies. There is an active workers' dining hall serving all workers.

Field findings and evaluations show that accommodation and working conditions are carried out in accordance with the Working Conditions and Community Health and Safety requirements defined within the scope of AIB ESS 1 Environmental and Social Management System for Ceyhan Construction Camp Site and Bahçe Accommodation Site.

4.10.1.2.28th Regional Directorate of Highways Sub-Project Construction and Accommodation Sites:

Enkon İnşaat A.Ş. (ENKON) was assigned as the Contractor through a contract signed with the 8th Regional Directorate of Highways for the Sub-Project P5 Repair of Technological Bridges Damaged in Earthquake.

Tohma Construction and Accommodation Site

Tohma Construction and Accommodation Site will be used within the scope of the sub-project.

Tohma Camp Site is installing on a land which includes a private 2-storey house structure belonging to the owner of the construction site parcel. There is no sewage infrastructure in the region therefore, ENKON utilizes the septic system of the private 2-storey house made with the land owner in exchange for a fee.

As of the beginning of March, there are 5 employees at the construction site, which is under installation, and 3 workers accommodation are provided in this camping area. A cook was employed in the camp area to meet the food needs of the workers. The camp site located in front of Tohma Stream, is approximately 4 km away from the nearest settlements, Sürün Village and Durucasu. As of the first week of March, the administrative building has been completed and a cafeteria exists in the construction site.

Electrical infrastructure is available, but there is no generator for emergencies. Drinking water is provided from ready-bottled water, whereas mains water is utilized as utility water. Permissions and capacity determinations regarding the infrastructure used must be made

Considering the health infrastructure around Tohma Camp Site, Malatya Training and Research Hospital is 22 km away, Battalgazi State Hospital is 18 km away and Yazihan District State Hospital is located 18 km away. The hospitals in this location are the nearby hospitals that will be used in case of potential need within the scope of the Project.



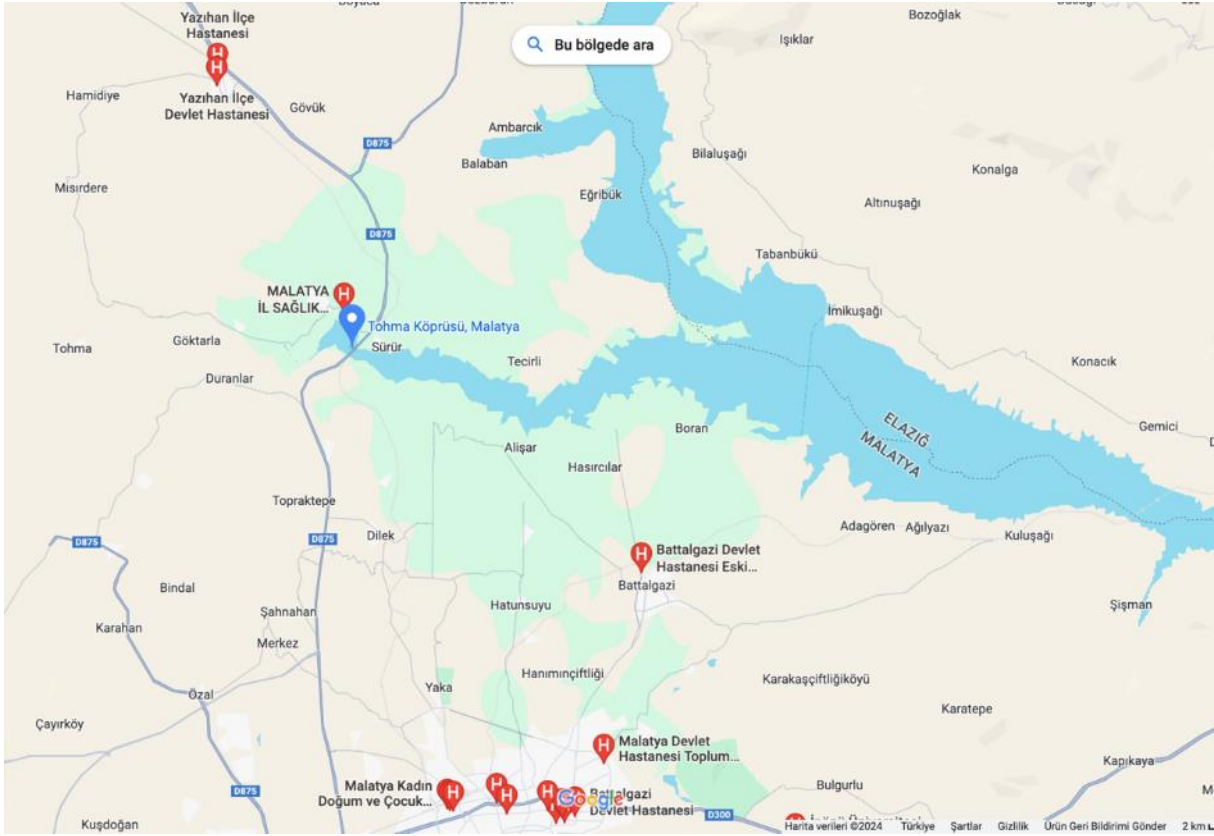


Figure 88. Hospitals Near the Tohma Construction Camp Site



Figure 89. Tohma Camp Site

Staff working within the scope of the project use teacher's lodge, rental houses and guesthouses for accommodation.

Project activities will not cause any population influx or demographic change on local communities, vulnerable groups or gender.

Ağın Construction Site

There is no accommodation at the construction site and 12-20 personnel work on bridge repair works. Any pressure on local infrastructure and services will not be occurred due to the Ağın Construction Site activities. There is no sewage infrastructure in the region, a septic tank will be utilized. The infrastructure is not ready yet, the septic system will be installed. Currently, the facilities at the nearby petrol station are being used. Approximately 10 workers use the temporary construction site established close to this area.

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Figure 90. Ağın Construction Site and Surrounding

Workers are accommodated in the highways' nursing home, 22 km away from the construction site, and are transported by shuttle service. There are no female employees. Workers have their meals from external providers. Temporary accommodation areas have electric radiators and air conditioning.

Considering that workers stay in guest houses within the settlements, training on social conflict and gender issues are defined in the impact assessment tables in the following sections.

Erkenek Construction and Accommodation Site

Erkenek Construction and Accommodation Site will be utilized within the scope of the sub-project P4 Malatya-Akçadağ-Gölbaşı Road & Erkenek Tunnel. The site has not been established yet. For the campsite installation, permissions and capacity determinations regarding the infrastructure used will be taken. There are no settlements around Erkenek Tunnel. Labor and working conditions will be planned and carried out in accordance with AIIB ESSs and national legislation.

In this context, mitigation measures defined in the impact assessment tables in the following sections will be implemented to monitor employee conditions, social compliance issues, include a code of conduct in contracts, and keep accommodation conditions at ILO standards.

4.10.2 Impact Assessment and Mitigation Measures

Since KGM is an official institution, it is subject to the relevant laws, regulations³³ and conventions. In this context, KGM and all contractors working under it are subject to Labor Law and ILO conventions to which Türkiye is a party³⁴.

In this context, as explained in the sub-sections below, KGM will ensure that the following actions are taken to ensure that all these laws, procedures and agreements are implemented throughout the Project, regulating the management of working conditions and labor relations, including the prevention of Child Labor and Forced Labor.

- Notifying the main contractor and all subcontractors of the contracts, policies and procedures to which they are parties and which they are obliged to comply with,
- Including the Contract, Policies and procedures and their determined main headings in the training given before starting work, and making contractor employee training a part of the induction training.

³³ <https://www.kgm.gov.tr/Sayfalar/KGM/SiteTr/Kurumsal/KanunMevzuat.aspx>

³⁴ https://www.ilo.org/sites/default/files/wcmsp5/groups/public/@europe/@ro-geneva/@ilo-ankara/documents/genericdocument/wcms_645630.pdf

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- Incorporating policies and procedures within the scope of all employee agreements into contracts, either as part of these agreements or by transferring them to codes of conduct.
- Making prohibitions, ethical principles and responsibilities visible in work areas (camp sites, work areas).
- Establishing a Grievance Redress Mechanism that is accessible to all employees of the Project, including subcontractor employees, and allowing anonymous complaints, and disclosing it to employees.

All contractors within the scope of the project are obliged to prohibit child labor, forced labor, and ensure equal treatment and gender equality for employees, including the AIIB ESSs and ILO conventions under the following headings: labor and working conditions, freedom of association, child labor, forced labor, equal treatment of employees, and gender equality.

4.10.2.1 Labour and Working Conditions

For all Construction and Accommodation Sites, the areas will be isolated from the outside to protect its boundaries for the stabilization of accommodation conditions, drinking water, health facilities, washing-bathroom conditions, changing rooms, food and beverage facilities, accommodation areas, rest areas, worker health and safety conditions.

Environmental, Social and M&E Specialists of the KGM RIU will review and analyze environmental, social, and occupational health and safety accidents in coordination with the PIU for the purpose of tracking and analysis. In addition, Contractor assigned for each sub-project implementation will carry out E&S inspections, monitoring and audits related to ESMP practices, monthly reporting to KGM RIU.

During the entire process of the project, main issues such as working at height, working with chemicals, fire and explosion, noise and vibration will be carried out in accordance with Turkish legislation and ILO standards. The main contractors will prepare an Emergency Preparedness and Response Plan and will implement the Occupational Health and Safety Management measures defined in Section 4.12. KGM will ensure that measures are implemented by all Contractors.

Regarding to the working conditions, the contractors will ensure a safe working environment for the workers in line with international best practice and Turkish Legislation including the health and safety measures. KGM will monitor and ensure that the contractor provide safe working conditions.

All employees will be informed about working conditions, job definitions, responsibilities, relations with the local community and potential work risks.

Starting from the working period, all workers will be issued written contract containing job description, work hours, salary, rights and duties, code of conduct, and information about GRM for workers.

Workers will be allowed to have access to the GRM and will be required to be aware about this Mechanism.

All workers will be given training on discrimination and codes of conduct. The trainings given to the employees will be explanatory about the concepts of GBV and SEA/SH. At the same time, through the trainings, it will be ensured that workers learn the Grievance redress mechanism of the Project (explained in detail in the Project's SEP document) and the steps to be followed in exercising their legal rights.

Full compliance with all Turkish Laws, AIIB ESSs and International Labor Organization Conventions regarding child labor, forced labor, discrimination, freedom of association, collective bargaining, working hours and minimum wage will be ensured, and the requirements



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of this compliance will be included in contractor, employee and supplier contracts and within the scope of the code of conduct.

In accordance with the social compliance in the working conditions, for preventing gender discrimination necessary measures as described in the project level GAP will be developed and implemented. In addition to the measures to be taken by the Project, enhancement measures will be implemented to increase women employment.

In this context, it is important to implement the following measures:

- Announcement of the Gender Action Plan implemented for the Project and required actions in the plan,
- Improving working conditions in a gender responsible manner.
- Improving the gender awareness of the Project security
- Code of Conduct will be included in the contracts of all sub-contractors and suppliers to prevent child labor, forced labor and gender discrimination.
- Providing induction trainings to the sub-contractor and suppliers social, HR and ISG OHS officials including;
- Child labor, forced labor, gender discrimination, social and cultural compliance, GM GRM, GBV, SEA/SH.
- Workers will be informed about the Project's Grievance Redress Mechanism and the steps to be followed. Within the scope of GRM, necessary information will be provided regarding GBV and SEA/SH complaints management.
- GRM, GBV, SEA/SH issues will be monitored through the Grievance Redress Mechanism for preventing potential Community Disturbance.
- Provide safety and health information meetings in the Project affected settlements of the Project, on the Project risks, mitigation measures including vulnerable groups and women.
- Encourage the participation of local communities, including women, in consultation during the project implementation.
- Record women's participation in terms of numbers, percentages, and how their suggestions and concerns have been addressed.

The minimum requirements defined above against Sexual Harassment and Gender-Based Violence will be implemented at all phases of the Project. Effective use of GRM for these measures is one of the most important tools to detect and prevent risks early.

4.10.2.2 Economy and Employment & Local Procurement

The project will create non-agricultural employment opportunities for local people.

Employment of the project should include women and vulnerable groups. Therefore, it is important to take enhancement measures to ensure that job opportunities are equally provided by local communities within the study area, PAPs. In addition, enhancement measures should be implemented on women's employment and employment of vulnerable groups.

Mukhtars can act as intermediaries for the employment of qualified and semi-skilled local people in the Project-affected settlements. In addition to the mukhtars, in villages, district municipalities should be considered as institutions to cooperate in an inclusive employment process that will include women's employment.

Based on this aim, in addition, cooperation and partnership should be developed with the local vocational institutions, NGOs working on the employment of vulnerable groups, at the beginning of the construction phase of the Project. In this regard, it is important to stakeholder engagement activities for inform the related organizations on employment opportunities.



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In order to contribute to local employment, appropriate personnel and contractors to be assigned during the construction phase and within the scope of related facilities will primarily be employed from settlements close to the Project site. The local employed population will continue to reside in existing settlements without creating additional pressure. Necessary transportation facilities will be provided.

For local procurement, in the interviews held in the villages, the mukhtars stated that the service purchases that can be obtained from the village are limited to tractors and equipment. However, district centers have more diversity in this regard. It is important for the project to meet the needs of the project such as food, cleaning, maintenance, service and the purchase of goods by giving priority to the districts, in terms of the project's goal of supporting local economy and development.

In this context, measures to ensure the implementation of the equal pay policy for equal work are also important.

- Equal pay for equal work will be provided to local workforce and non-local immigrant workforce and a transparent salary policy will be followed.
- Bank accounts will be opened for employees and salaries/payments will be made through the bank.
- In order to provide maximum benefit to the local workforce, vocational training will be provided to local people where appropriate.

When employment opportunities arise during the construction process, timely information will be provided to settlements close to the Project Area. Necessary information will be provided to mukhtars for the employment of women, disabled people, and the local young population.

Transportation to the project area will be provided by shuttle services provided by the Contractor, which will be organized to increase and facilitate women's employment and access to vulnerable groups and to increase the employment demands of these groups. The Project Owner is responsible for ensuring minimum legal labor standards (child/forced labor, non-discrimination, working hours, minimum wage) in accordance with AIIB ESSs and International Labor Organization (ILO) regulations.

4.10.2.3 Human Trafficking and Forced Labour in Project Aol

Due to the location of the Project, Gaziantep, Hatay can be considered as provinces where Syrian and other immigrant populations are densely populated and therefore there are groups at risk of being victims of human trafficking. As a similar issue, forced labor, as a form of human trafficking, refers to the usurpation of personal freedom and coercion to work. Forced labor through confiscation of foreign passports, debt, threats and violence is another form of human trafficking. Forced prostitution among women, abuse and forced labor of children, and forcing men to work in inhumane conditions are common within the scope of this human rights violation. Within the scope of the Project, measures and control mechanisms will be implemented to prevent the emergence of forced labor in provinces with high risk levels.

4.10.2.4 Risks Related to Child Labor

Agriculture is the sector where child labor is most common in Türkiye. 30.8% of working children are in agriculture, 23.7% in industry and 45.5% in service sector. 66.0% of working children work in a regular workplace, 30.4% work in the field-garden, 3.0% work in a mobile, non-fixed workplace or market place, and 0.5% work at home. When the provinces where the project is located are evaluated, it can be stated that the risk is high in Adana and Osmaniye provinces due to the intense temporary agricultural work.



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The risk of child labor is common among migratory agricultural workers who stay in tents that can be set up periodically and seasonally in areas close to the Project impact area. Since agricultural activities were carried out at a very low level in the region after the earthquake, the rate of agricultural labor in the region decreased to very low rates after 2023. It has been stated by the Mukhtars that, the proportion of women and children among the seasonal agricultural workers is high. For this reason, it can be stated that the risks of child labor and forced labor increase in the region, especially during the period when agricultural activities are intense.

Besides that, the project impact area does not intersect with the accommodation or working areas of migrant/temporary agricultural workers and within the scope of the Project activities, there are no activities that may trigger child labor or reveal the risk of child labor.

Based on this approach, Proposed Mitigation Measures are presented in Table 148.



Table 148. Impact Significances, Proposed Mitigation Measures and Value of Residual Impacts - Labor Management

Impact Description	Project Phase	Receptor	Impact Magnitude					Sensitivity/ Value of Resource/ Receptor	Impact Significance (prior to mitigation or with existing mitigation)	Proposed Mitigation Measures	Residual Impact Significance
			Extent	Reversibility	Duration	Frequency	Overall Magnitude				
Labour and Working Conditions	Construction	Local workforce and Project employees	Local Project construction and accommodation sites Project affected settlements	Short- term reversible	Short-term	Intermittent	Low	Low	Minor	Workers will be provided hygienic and adequate facilities. Workers will be allowed to have access to primary healthcare on site, enabling the provision of prescriptions. Discrimination based on language, race, gender, political thought, philosophical belief, and religion will be avoided in business relations. Rest Breaks, Leaves, Overtime Work, Labour disputes, Freedom of association, and Collective dismissal will be handled according to AIB ESSs and Turkish Labour Law-4857 and All employees will be informed about working conditions, job definitions, responsibilities, relations with the local community and potential work risks as a part of social induction trainings. Starting from the working period, all workers will be issued written contract containing job description, work hours, salary, rights and duties, code of conduct, and information about GRM for workers. Workers will be allowed to have access to the Grievance redress mechanism and will be required to be aware about this Mechanism. All workers will be given training on discrimination and codes of conduct. The trainings given to the employees will be explanatory about the concepts of GBV and SEA/SH. At the same time, through the trainings, it will be ensured that workers learn the Grievance redress mechanism of the Project (explained in detail in the Project's SEP document) and the steps to be followed in exercising their legal rights. Access to the Grievance redress mechanism will be easy and effective. The Grievance Redress Mechanism officer designated for the Project will be announced to all employees during the trainings to be given before starting work. There will be brochures and posters containing the Grievance Redress Mechanism and the contact information of the authorized person in places such as the cafeteria, canteen and service areas used by the employees.	Negligible
Local procurement and local employment	Construction	Local workforce and Project employees	Local Project construction and accommodation sites Project affected settlements	Short- term reversible	Short-term	One-off/rare	Low	Low	Minor	The Project will enhance local employment in and preferential employment will be given to qualified local people. Hiring preference criteria will prioritize settlements directly affected by the current activities of the Project. Formal, and transparent recruitment process will be implemented to provide equal opportunity to the applicants. The Worker Grievance redress mechanism will be established and implemented. Persons whose livelihoods are affected due to Project impacts will be given priority in Project employment. Vocational training will be provided to local people in order to provide maximum benefit to the local workforce. A Grievance Redress Mechanism will be established, and this mechanism will register gender-based grievances, labour grievances and PAPs grievances on the employment process and necessary measures will be taken accordingly. Equal pay for equal work will be provided to local and non-local workforce. Mukhtars will be constantly informed about the recruitment opportunities of the Project in order to increase local employment and reduce the need for non-local workforce, and local people will be informed through announcements, banners and posters.	Negligible
Employment of Women and Vulnerable Groups	Construction	Local workforce and Project employees	Local Project construction and accommodation sites Project affected settlements	Short- term reversible	Short-term	One-off/rare	Low	Low	Minor	Job postings will be prepared using an anti-discrimination language, and recruitment processes will be carried out in a transparent and accountable manner. Local people and women will be encouraged to apply for job opportunities. Publish vacancies will be posted to the settlements in the study area listing the required qualifications for all categories of employment Employment opportunities for the women, local human resources, vocational education or vulnerable groups will be provided to the NGOs, organizations or institutions who are working on the labour force or vulnerable groups and women. Employment of the local population and migrant workers will be ensured by providing training to employees on social harmony, gender issues, complaint mechanism, labor rights, and rules of conduct. Employees will be trained to prevent discrimination in the workplace. Necessary measures will be taken by contractor to make sure that workers coming from outside the city will be given a training program on dialogue and communication with local communities, and that there are no social or cultural issues between host communities and external workers.	Negligible
Human Trafficking, Forced Labour,	Construction	Local workforce and Project employees	Local Project	Short- term reversible	Short-term	One-off/rare	Low	Low	Minor	All contractors within the scope of the project are obliged to prohibit child labor, forced labor, and ensure equal treatment and gender equality for employees, including the AIB ESSs	Negligible



Impact Description	Project Phase	Receptor	Impact Magnitude					Sensitivity/ Value of Resource/ Receptor	Impact Significance (prior to mitigation or with existing mitigation)	Proposed Mitigation Measures	Residual Impact Significance
			Extent	Reversibility	Duration	Frequency	Overall Magnitude				
GBVH risks			construction and accommodation sites Project affected settlements						<p>and the ILO conventions listed below under the following headings: freedom of association, child labor, forced labor, equal treatment of employees, and gender equality.</p> <ul style="list-style-type: none"> ▪ Forced Labor Convention No. 29 ▪ Convention No. 105 on the Abolition of Forced Labor ▪ Minimum Age Convention No. 138 ▪ No. 182 Urgent Prohibition and Eradication of Worst Forms of Child Labor ▪ Action Agreement ▪ Convention No. 87 on Freedom of Association and Protection of the Right to Organize ▪ Convention on the Right to Organize and Collective Bargaining No. 98 ▪ Equal Pay Convention No. 100 ▪ Equality of Treatment (Social Security) Convention No. 118 ▪ Employment Policy Agreement No. 122 <p>All Project employees will sign a written employment contract that includes a description of the terms of employment, wages, working hours, rights and duties, Code of Conduct. The minimum working age will be 18.</p> <p>The work permits of the employees will be controlled within the scope of the Project, prohibiting, forced labour, and child labour under the age of 18.</p> <p>Contractors must address the risk of gender-based violence, through: Mandatory training and awareness-raising for the workforce about refraining from unacceptable conduct toward local community members, specifically women. Following trainings will be provided to workers and security personnel accommodating in the camp sites or other facilities.</p> <ul style="list-style-type: none"> ▪ SEA/SH ▪ Gender Based Violence and Harassment (GBVH) ▪ Workers' rights ▪ Project standards and human rights ▪ Community relations with local people ▪ Use of power (for security) ▪ Social and cultural induction <p>Informing workers about national laws that make sexual harassment and gender-based violence a punishable offense which is prosecuted; Adopting a policy to cooperate with law enforcement agencies in investigating complaints about gender-based violence. Informing workers about national laws that make sexual harassment and gender-based violence a punishable offense which is prosecuted, Implementing zero tolerance policy against violence and harassment, Announcement of the Gender Action Plan implemented for the Project and required actions in the plan, Improving working conditions in a gender responsible manner. Improving the gender awareness of the Project security Including Code of Conduct in the contracts of all sub-contractors and suppliers to prevent child labor, forced labor and gender discrimination. Providing induction trainings to the sub-contractor and suppliers social, HR and OHS, OHS officials including;</p> <ul style="list-style-type: none"> • Child labor, forced labor, gender discrimination, social and cultural compliance, GM GRM, GBV, SEA/SH. • Project's Grievance Redress Mechanism and the steps to be followed. • GBV and SEA/SH complaints management. <p>Monitoring the GRM, GBV, SEA/SH issues through the Grievance Redress Mechanism for preventing potential Community Disturbance. Providing health and safety meetings in the Project affected settlements of the Project, on the Project risks, mitigation measures including vulnerable groups and women. Encourage the participation of local communities, including women, in consultation during the project implementation. Record women's participation in terms of numbers, percentages, and how their suggestions and concerns have been addressed.t. Effective use of GRM for these measures is one of the most important tools to detect and prevent risks early.</p>		



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4.11 Community Health, Safety and Security

4.11.1 Methodology and Project Standards

This chapter provides baseline information on the local conditions related to community health and safety (CHS) and explains the Project's approach to CHS issues, ensuring compliance with applicable legislative requirements and international standards.

Traffic safety, pedestrian safety, and emergency preparedness and response are the most significant CHS issues for highway projects. Additionally, since the Project will involve blasting operations at certain quarries to extract materials during the construction phase, this chapter will also cover the potential impacts of explosives use and blasting operations on CHS. It should be noted that noise and vibration, air and GHG emissions, natural hazards (such as earthquakes, landslides, floods, meteorological hazards, etc.), water quality, wastewater, and waste are also considered as potential impact categories related to CHS.

The potential impacts of the Project on community health and safety have been assessed, taking into consideration the settlements located near the project routes, where reconstruction and rehabilitation works will be conducted, along with related and auxiliary facilities.

Main data sources and guidance used to compile the baseline information, conduct impact assessment and develop related mitigation measures are listed below:

- AIIB ESS 1,
- WBG General EHS Guidelines,
- WBG EHS Guidelines for Construction Materials Extraction,
- Turkish Statistical Institute (TurkStat) website and related statistics (www.tuik.gov.tr),
- General Directorate of Highways (KGM) website and related statistics and maps(www.kgm.gov.tr),
- General Directorate of Security Affairs Department of Traffic Services (trafik.gov.tr).

Assessment of potential community health and safety risks and impacts of the Project has been done in consideration of the existing local conditions, measures that will be inherently taken in accordance with the requirement of the national legislation, and benefit from the expert knowledge and experience of typical sectoral risks associated with the construction. International standards and guidelines have also been taken into consideration to develop additional measures for the management of community health and safety aspects.

In accordance with the international standards, the following general aspects have been covered in the scope of the assessment:

- Infrastructure and Equipment Design and Safety,
- Traffic and Road Safety,
- Community Exposure to Health Problems,
- Hazardous Materials Management and Safety,
- Emergency Preparedness and Response,
- Security Personnel.

In the assessment of impact significance, magnitude factors have been determined based on expert judgement. For the assessments related to community health and safety, the receptor sensitivity level has always been assumed as high when the safety of local communities is of concern. Sensitivity level has been assumed as moderate for other types impacts such as infrastructure, local healthcare capacity, etc.



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4.11.2 Baseline Conditions

Existing Road Transport Network (Before Reconstruction and Rehabilitation Works) and Traffic Conditions

According to the 2023 State Highways Traffic Volume Map published by KGM³⁵ (see Figure 91 and Figure 92),

- the annual average daily number of vehicles on the Antakya-Samandağ Road is approximately 25,000 vehicles/day, with 90% of this consisting of automobiles,
- the annual average daily number of vehicles on the Antakya-Reyhanlı Road ranges between 3,000-16,000 vehicles/day, with approximately 80% of this consisting of automobiles,
- the annual average daily number of vehicles on the İslahiye-Hassa-Kırıkhan Road ranges between 8,000-10,500 vehicles/day, with approximately 70% of this consisting of automobiles,
- the annual average daily number of vehicles on the TAG Highway-Aslanlı Tunnel-Nurdağı Junction Road ranges between 5,500-9,000 vehicles/day, with approximately %70 of this consisting of automobiles,
- the annual average daily number of vehicles on the Malatya-Akçadağ-Gölbaşı Road is approximately 5,555 vehicles/day, with approximately %60 of this consisting of automobiles,
- the annual average daily number of vehicles on the Beylerderesi Bridge is approximately 36,000 vehicles/day, with 78% of this consisting of automobiles,
- the annual average daily number of vehicles on the Tohma Bridge is approximately 6,500 vehicles/day, with 70% of this consisting of automobiles, and
- the annual average daily number of vehicles on the Ağın Bridge is approximately 950 vehicles/day, with 73% of this consisting of automobiles.

³⁵ <https://www.kgm.gov.tr/Sayfalar/KGM/SiteTr/Trafik/TrafikHacimHaritasi.aspx>





Figure 91. State Highways Traffic Volume Map (2023) for 5th Regional Directorate of KGM

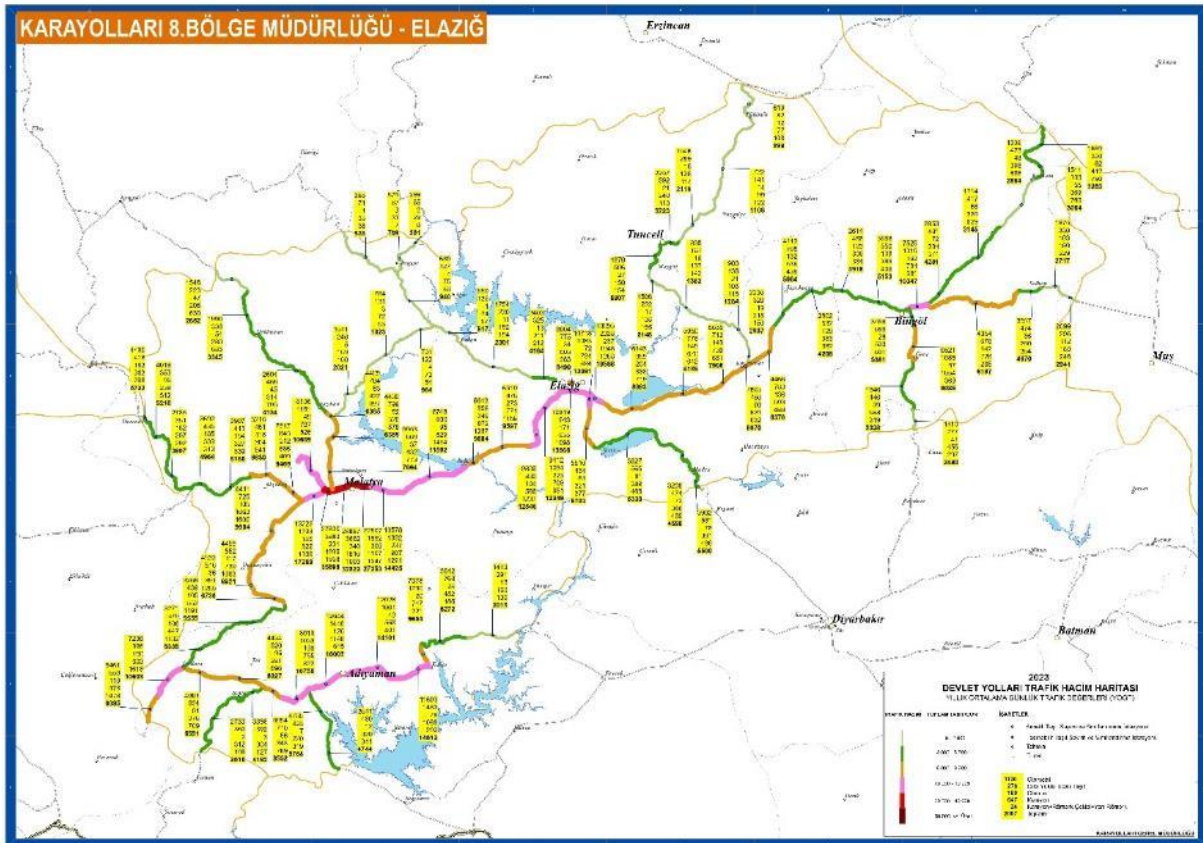


Figure 92. State Highways Traffic Volume Map (2023) for 8th Regional Directorate of KGM

In addition to the road renewal works carried out within the scope of the project, intensive infrastructure and superstructure improvement and construction works in the region increase heavy vehicle traffic and general traffic in the region. It is important to take the necessary precautions to reduce the risks of accidents that may occur in this process, to prevent traffic congestion and to disrupt daily life by closing the roads.

In the interviews held in the settlements within the Project Impact Area, Mukhtars and local people stated that there was a traffic congestion and heavy vehicle traffic due not only to the Project works, but also to all other infrastructure and superstructure works in the earthquake zone. However, in the meetings with the headman and PAPs, concerns were expressed that traffic safety would be at risk and community health and safety risks might occur if heavy vehicles were used within the scope of the Project activities.

Natural Disaster Risk

Natural Disaster (including landslide, flood, avalanche and forest fire) Map of Türkiye³⁶ is given in Figure 93. Among natural disasters, in addition to the earthquake risk, the project area located particularly within the boundaries of the 5th Regional Directorate of KGM (Hatay, Adiyaman and Gaziantep) are also at risk of forest fires, floods, and landslides (see also Chapter 4.1). Therefore, necessary precautions must be taken for infrastructure and equipment design and safety.

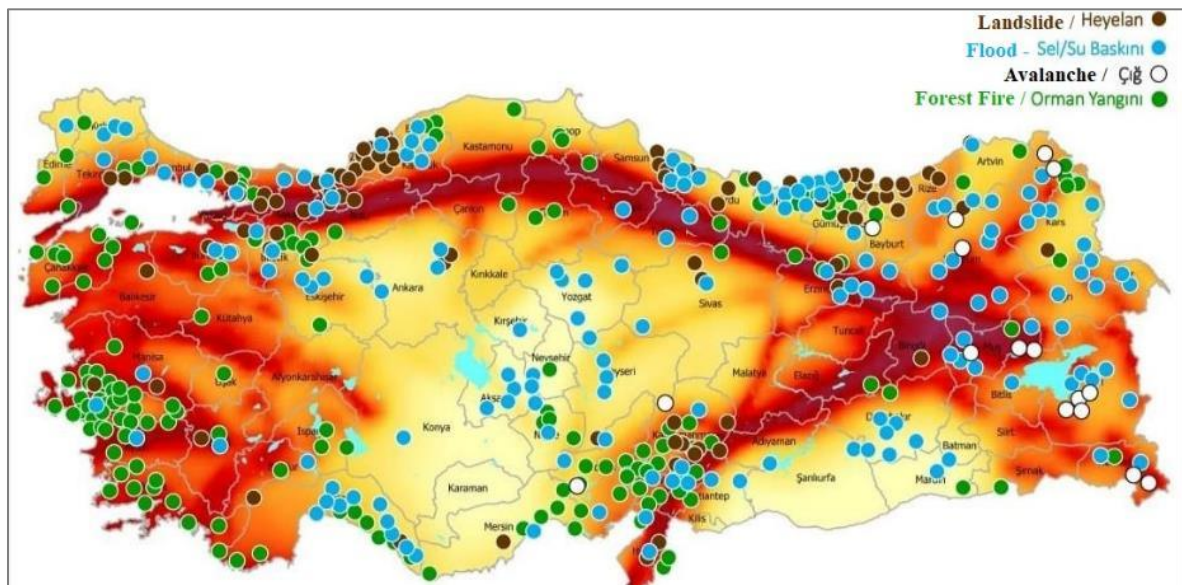


Figure 93. Natural Disaster Map for Türkiye (AFAD, 2022)

Accident statistics in Turkish Road Network

In 2023, a total of 1,314,136 traffic accidents occurred on the Turkish road network. Out of these, 1,079,065 accidents resulted in material damage, while 235,071 accidents resulted in fatalities or injuries. Of the fatal and injury-causing traffic accidents that occurred during the year, 83.1% took place within residential areas, while 16.9% occurred outside residential areas

³⁶ <https://www.icisleri.gov.tr/afad-turkiyenin-afet-risk-haritasini-cikardi>

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(TurkStat, 2023). On the other hand, according to the WHO Global Status Report on Road Safety³⁷ (2023), the estimated fatality rate per 100,000 population is 6.5.

4.11.3 Impact Assessment and Mitigation Measures

4.11.3.1 Land Preparation and Construction Phase

Traffic Impact

5th Regional Directorate of Highways Sub-Projects

The road under construction is the road leading to the Cilvegözü border gate and the roads are heavily used by many heavy vehicles/trucks. However, recently it has been closed to the passage of trucks and trailers. Heavy vehicles that want to go to the border pass through the neighborhood using the back roads (Alaattin Neighborhood). Even though it is independent of the KGM Project impacts, this situation occurs community health and safety risks and problems on the village roads used. Considering these risks and current impacts, not using roads other than the main road within the scope of the Project, and not allowing trucks and heavy vehicles to enter villages and neighborhoods are among the concerns highlighted by the local people and the mukhtars as an important issue. Within the scope of this sub-project, while the repairing works of the collapsed bridge in Demirköprü neighborhood, traffic problems and negative effects were experienced. The Mukhtar of the Demirköprü stated that heavy vehicles crashed into buildings and caused damage while using narrow roads. There are container areas, earthquake martyrs' cemetery and Tayinat Mound on the road where work will be carried out within the scope of the Project.

İslahiye-Hassa-Kırıkhan Road is approximately 80 km line passing through residential area, therefore necessary information sharing and mitigation measures should be developed and implemented to ensure that the daily lives of vulnerable groups affected by the earthquake are not slowed down. It should be ensured that their access to health and education services is not slowed down due to traffic congestion or road restrictions caused by road construction. Therefore, the sub-project will be managed and monitored with the traffic safety measures and trainings to be provided to the workers, drivers.

Samandağ Belt Highway is approximately 27 km line passing through residential areas. Especially for the sensitive points such as schools, container camps, hospitals etc. along the route will be considered and related stakeholders should be informed on the health and safety measures, construction schedule and road restrictions, if occurred.

Along the Antakya-Reyhanlı Road, there are temporary shelter areas in Üzümdalı location between Alaattin and Üzümdalı settlements. Necessary information sharing and mitigation measures should be developed and implemented to ensure that the daily lives of vulnerable groups affected by the earthquake are not slowed down. It should be ensured that their access to health and education services is not slowed down due to traffic congestion or road restrictions caused by road construction.

Hatay Airport Road is approximately 6 km line passing through agricultural areas. Therefore, the sub-project should be managed and monitored with the traffic safety measures especially on the agricultural and husbandry intense season from April to October.

Within the scope of the TAG Highway sub-project, transportation within the scope of the project activities will be provided via the KGM transportation road, without using village roads.

³⁷ https://cdn.who.int/media/docs/default-source/country-profiles/road-safety/road-safety-2023-tur.pdf?sfvrsn=bb10e4cf_3&download=true



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Başpınar Village, the closest village, has its own village road and work trucks do not use the village road.

Intense heavy vehicle traffic and excavation truck traffic may pose a risk for settlements and agricultural/husbandry activities near the construction activities and Project transportation roads including Construction Sites.

All sub-projects will be managed and monitored with the traffic impact mitigation measures with trainings to be provided to the drivers, workers especially for the sensitive points such as schools, container camps, hospitals etc. in the Aol.

8th Regional Directorate of Highways Sub-Projects

For the Malatya-Akçadağ-Gölbaşı Road & Erkenek Tunnel sub-project, there are several businesses within the Project's impact area around Erkenek Tunnel. During the construction works to be carried out here, accident risks due to heavy vehicle traffic may arise. In order to avoid this risk, it is important to place construction warning signs and reduce the speed limit. Businesses in this area will need to be informed about the Project and health and safety meetings will be held.

For the Repair Works of Technological Bridges sub-project, considering the proximity of Tohma and Ağin camping areas to residential areas, no dust or traffic impacts have been expected.

Dust Impact

Dust effects are expected to occur due to the project for the related/auxiliary facilities that are actively used within the scope of the project and will be put into operation and are listed in Section 4.3.

ESIA field study findings will reveal the negative effects of dust on the access roads to these areas, as well as these AFs, for people living in the surrounding houses, animals and cultivated agricultural areas.

Kırıkhan-Kızılkaya Construction Site is located next to the Kızılkaya Limestone Quarry in the Kızılkaya Village and the nearest settlement is Muratpaşakızılkaya. The Construction Site is not expected to have a direct dust impact on the close settlements. However, it was observed that some shepherds and local people are using the access roads of the Construction Site with their animals. Therefore, on the access roads of the Kızılkaya Construction Site, due to the heavy vehicle traffic, local people who are engaged in the husbandry activities may be adversely impacted due to the dust and traffic. Therefore, measures to mitigate the project's impacts on dust, livelihood, and traffic will be implemented as defined in Table 62, Table 145 and Table 149.

Hatay Airport Road may occur dust impacts on the agricultural activities and agricultural products. Therefore, taking measures to prevent the dust, not to close the passageways and livestock access roads used by the local people should be considered as mitigation measures.

Due to the heavy vehicle traffic and excavation works, dust impact may occur on the agricultural/husbandry activity near the construction activities and Project transportation roads including Kuruyer Construction Site.

The settlement in Tayfursökmen district is close to the road where the work will be carried out. The repair work of the collapsed bridge in Demirköprü neighborhood has been continuing for about one year. Interviews were held with the Demirköprü Mukhtar and business owners, and according to the information received, it was stated that even if precautions were taken, dust and noise were intense, and traffic problems and negative effects were experienced from time to time.



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Construction and Accommodation Sites Health and Safety Issues

For all Construction and Accommodation Sites, the areas will be isolated from the outside to protect its boundaries for the stabilization of accommodation conditions, drinking water, health facilities, washing-bathroom conditions, changing rooms, food and beverage facilities, accommodation areas, rest areas, worker health and safety conditions.

During the construction of the project, two-way security measures should be taken to ensure the safety of the local people against the risks arising from the project activities, to prevent the construction activities from creating risks and to prevent the entrance to the construction site from the outside, and to ensure the health and safety of the workers.

Project activities that may pose a risk to the health and safety of the public include unauthorized entry into the construction site of the Project, unauthorized passage from the construction site, bringing uncontrolled materials to the construction site or removing materials from the construction site without permission (food materials, building materials, chemical materials, construction equipment and tools, medical materials etc.).

Construction site area will be fenced off, and provided security to prevent the visitors uncontrolled entrance which may create security issues for both outside visitors and workers. For providing visitors health and safety, local community health and safety and workers health and safety, isolation and entrance safety measures need to be taken.

Security Issues

It is important that security personnel in these areas are primarily selected from among the local population with sufficient qualifications and certification.

If security personnel employment cannot be achieved through local employment, in addition to the selection of security personnel according to their qualifications such as having received the necessary training, having the appropriate certification, social and cultural awareness should also be developed as they will frequently encounter local communities.

While security personnel are performing their duties, measures will be taken to prevent possible use of force against employees and/or communities in the study area. For this sensitive work, the selection of security guards from the local will be beneficial in terms of facilitating communication with the local people.

The potential adverse impacts and/or risks on community health, safety and security during the construction phase, which are required to be managed within the scope of the project, are listed below.

- Increase of traffic accident risk due to the sub-project related activities, resulting in adverse impacts on daily life flow,
- Raising GBVH and SEA/SH due to the increase in regional workforce influx,
- Increased frequency of emergencies due to the sub-project related activities,
- Increased risk of exposure to disease due to the increase in regional workforce influx,
- Risks arising from the security personnel attitudes,
- Risk related to explosive use and blasting in the quarries/material borrow sites.

4.11.3.2 Operation Phase

The potential adverse impacts and/or risks on community health, safety and security during the operation phase, which are required to be managed within the scope of the project, are listed below.

- Communication issues with the stakeholders in case of poor management of stakeholder engagement,
- Risk on traffic, operation safety and pedestrian safety due to highway traffic,



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- Increased frequency of emergencies due to highway traffic related issues.

Impact significance and mitigation measures corresponding to relevant E&S impacts and risks are provided in Table 149. In addition, the requirements of the Emergency Preparedness and Response Plans, which have been prepared for each sub-project, will be implemented. Moreover, throughout the lifecycle of the project, complaints, opinions, feedback, and suggestions from the community will be recorded via a Grievance Redress Mechanism, which should be publicized. Guarantees shall be given that complaints received will be resolved to the maximum extent possible.



Table 149. Impact Significance, Proposed Mitigation Measures and Value of Residual Impact – Community Health, Safety and Security

Definition of Impact	Project Phase	Receptor	Magnitude of Impact					Sensitivity/ Value of Resource/ Receptor	Impact Significance (prior to mitigation or with existing mitigation)	Proposed Mitigation Measures	Residual Impact
			Extent	Reversibility	Duration	Frequency	Overall Magnitude				
Increase of the traffic accident risks	Land Preparation and Construction	Local communities Users of the existing roads	Restricted	Short-term reversible	Short-term	Continuous	Medium	High	Major	<ul style="list-style-type: none"> Investigate all construction areas and construction access routes for potential community interaction (with a particular attention to schools, children parks, etc.) with Project construction phase traffic. Based on results, develop and implement site specific measures (i.e., improve signage, visibility) and driver/operator trainings prior to initiation of any construction work. Implement access restriction at construction areas and access routes, by specifying restricted zones, (i.e. dangerous routes), fencing, barriers, etc. Avoid passage of construction traffic through the settlements, whenever alternative roads are present. Where passage through existing settlements is unavoidable, take all necessary measures (i.e. speed limits, traffic signs, driver trainings) to prevent safety risks on local communities, engage with community representatives to plan the traffic by taking the daily life of the communities into account (i.e. selection of routes, school transportation hours, market days, etc.) and inform the communities about the construction schedule, activities to be conducted and safety measures taken, through appropriate means such as meetings and leaflets, notices, signs, etc. Implement speed limits at all construction sites. Prepare a driver training plan to ensure that all drivers (including the sub-contractors' drivers) are provided with the traffic and road safety trainings Prepare driver code of conduct and the disciplinary procedures Evaluate training plan's performance and effectiveness and make the required improvements when necessary Provide regular safe driving training courses to all drivers Provide information to the local settlements and stakeholders on road safety, traffic measures and Project health and safety measures Provide health and safety information related to the Project CHS risks to children, elderly, women, non-Turkish speakers, disabled people, illiterate PAPs living in the Project Aol including pedestrian safety. Placing safety and traffic signs visibly on the access roads near and around the project site. 	Minor
Raising GBVH issues	Land Preparation and Construction	Project affected settlements	Local	Short-term reversible	Short-term	Intermittent	Medium	Medium	Moderate	<ul style="list-style-type: none"> Implementation of the Project Level Gender Action Plan (GAP). Establishment of the External Grievance Redress Mechanism (GRM) specific to External Stakeholders of the Project. Grievance redress mechanism and complaints line to be developed in a way to track GBV issues. GBVH focal points shall be assigned and trained to manage GBVH related complaints: The necessary application forms, tracking forms and registration and tracking log for the Grievance Redress Mechanism will be developed. This log will contain all the information defined in the Grievance Redress Mechanism procedure. All external complaints will be recorded in this log and managed in accordance with the procedure, and the entire complaint management process will be recorded and closed. 	Negligible
Emergency Preparedness and Response	Land Preparation and Construction	Local communities	Local	Short-term reversible to irreversible (depending on the consequences)	Short-term	One-off	Medium	High	Major	<ul style="list-style-type: none"> The project specific Emergency Preparedness and Response Plan will be implemented. Measures and systems for collaboration with local communities and other external parties, including local governmental agencies and media, will be implemented where necessary. Local communities will be notified using appropriate tools (e.g., telephone call lists, vehicle-mounted speakers) in case of emergencies arising from the project work or construction sites that may pose a risk to them. Where necessary, the details of the nature of the emergency, protection options, etc. will be communicated through trained personnel of the Contractor. KGM will cooperate with relevant authorities both for the prevention of emergencies and during emergency situations, where necessary. 	Negligible
	Operation	Local communities Users of the highways	Local	Short-term reversible to irreversible (depending on the consequences)	Long-term	One-off	Medium	High	Major	<ul style="list-style-type: none"> The project-specific Emergency Preparedness and Response Plan will be implemented for the operation phase. Cooperation with relevant authorities will be ensured for both preventing emergencies and responding to emergency situations. 	Minor
Increased risk of exposure to disease	Land Preparation and Construction	Local communities	Wide	Short-term reversible	Short-term	Intermittent	Medium	Medium	Moderate	<ul style="list-style-type: none"> Training on healthcare and general hygiene practices will be provided to all personnel. Periodic medical checks will be conducted for personnel, vaccinations will be provided, and other mitigating measures will be developed as required. Health-related awareness-raising activities will be implemented, covering local communities. In terms of worker accommodation, minimum space requirements, air conditioning, and ventilation appropriate for the existing climatic conditions will be ensured to avoid the spread of disease among the project workforces. 	Negligible
Security Personnel	Land Preparation and Construction	Local communities	Local	Short-term reversible	Short-term	Intermittent	Low	Medium	Minor	<ul style="list-style-type: none"> Legal inquiries will be conducted during the hiring process of security personnel to check for competency and any history of abuse incidents. Training will be provided to security personnel. The training will ensure that force is used only for preventive and defensive purposes and in proportion to the threat. 	Negligible



Definition of Impact	Project Phase	Receptor	Magnitude of Impact					Sensitivity/ Value of Resource/ Receptor	Impact Significance (prior to mitigation or with existing mitigation)	Proposed Mitigation Measures	Residual Impact
			Extent	Reversibility	Duration	Frequency	Overall Magnitude				
										<p>In this regard, it is important to provide the following training to workers and security personnel staying in the camping areas.</p> <ul style="list-style-type: none"> SEA/SH Gender Based Violence and Harassment (GBVH) Workers' rights Project standards and human rights Community relations with local people Use of power (for security) CHS Social and cultural induction <ul style="list-style-type: none"> The security personnel will not be allowed to carry firearms. Any grievance from local communities regarding the inappropriate conduct of security forces will be investigated immediately. 	
Explosive Use and Blasting	Land Preparation and Construction	Local communities in the vicinity of the quarries/borrow sites	Local	Short-term reversible	Short-term	Intermittent	Medium	High	Major	<ul style="list-style-type: none"> Blasting operations will adhere to a strict schedule, and all communities will be informed of the schedule through appropriate means, including leaflets and notices posted in public places such as Mukhtar offices, neighborhood/village noticeboards, etc. Local communities will be notified about any changes in the schedule, and blasting operations will proceed based on the new schedules only after the communities are informed. Restriction zones will be established around all blasting areas and access by unauthorized persons will be prevented. Explosives will be stored only in proper storage areas with relevant permits. Only licensed firms will be used for explosives delivery to ensure safety along the existing roads to be used for transport of explosives. In case of a grievance from local communities, potential impacts will be investigated, and corrective actions will be taken where necessary. Where required, additional structures that prevent pieces from scattering will be installed. 	Moderate
Communication issues with the stakeholders	Operation	Local communities	Local	Short-term reversible	Long-term	Intermittent	Medium	High	Major	<ul style="list-style-type: none"> Stakeholder Engagement Plan will be developed and implemented for the operation phase of the Project. Stakeholder Engagement Plan will be disclosed at the Project web site. 	Negligible
Risk on traffic, operation safety and pedestrian safety due to highway traffic	Operation	Users of the highways and connection roads	Local	Short-term reversible to irreversible (depending on the consequences)	Long-term	Continuous	Medium	High	Major	<ul style="list-style-type: none"> Fencing, walls, and similar restrictive structures will be installed along the highway route to prevent access by communities and wild animals. These structures will be checked regularly and maintained to ensure they continue to restrict access to the highway. All required signage (such as traffic signs, cautionary signs) and markings (traffic lines, flashing ground signage) will be installed along the route in compliance with KGM technical specifications. In case large-scale maintenance is required, the affected lanes will be closed to traffic, and necessary measures will be implemented to slow down the remaining traffic. Tow trucks will be distributed and maintained at sufficient intervals along the route to prevent congestion or road closures. This will mitigate related risks that may arise in high-speed sections of the road. In case of large-scale oil or hazardous material spillage events, the road surface will be washed to prevent a slippery surface. Regular maintenance will be conducted along the entire route to ensure continued compliance with the standards and KGM technical specifications. Chemical ice inhibition and de-icing (e.g., salt (NaCl), calcium chloride (CaCl₂), magnesium chloride (MgCl₂), etc.) as well as physical snow and ice removal will be performed before and after adverse weather conditions. Additional investigation and maintenance will be conducted in potentially affected areas following natural hazards (e.g., earthquakes, flooding, etc.) and traffic accidents. In times of increased heavy vehicle traffic or traffic congestion, inform local settlements, workplaces around the Project activities, and local people engaged in migratory agriculture and animal husbandry activities in the surrounding area, in a contractual and written form, regarding community health and safety regarding the location, duration, possible risks and precautions of the works. 	Minor

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4.12 Occupational Health and Safety

4.12.1 Impact Assessment and Mitigation Measures

This chapter will evaluate the project in terms of occupational health and safety during the land preparation, construction, and operation phases within the scope of the ESIA. Descriptions of the mitigation measures to be taken and assessments of the residual impacts are also covered in this chapter. In addition, national legislation and international standards which are complied with are provided in Chapter 2.

Before commencing the construction phase, a Health and Safety Plan will be prepared by all contractors. The Health and Safety Plan should take into account national and international practices and encompass all necessary instructions. In general, the Health and Safety Plan is a document prepared or ensured to be prepared by the responsible employer, project supervisor, or project coordinator to coordinate health and safety matters among different employers, subcontractors, self-employed individuals, and various work teams operating in the same construction area. This document defines the assessment of potential risks and determines when and by whom health and safety measures, organizational structure, work methods, and related tasks should be implemented.

Different types of projects may have different types of hazards and levels of risks related to OHS, and different individuals may be responsible for coordination. For instance, in construction projects, coordination is crucial for effectively implementing OHS requirements. Overall responsibility for the work site, continuous supervision of the ongoing work, and coordination tasks should be assigned to a specific manager, such as a project manager, construction manager, or supervising engineer. It is essential for the role of the site manager to be clearly understood and communicated to all contractors and their workers, and procedures should be in place to facilitate communication between contractors and the site manager. Both in the workplace and in social areas, ergonomic, healthy, and safe environments should be provided for project workers. Project workers will be provided with facilities appropriate to the circumstances of their work, including access to canteens, hygiene facilities, and appropriate areas for rest. Where accommodation services are provided to project workers, policies will be put in place and implemented on the management and quality of accommodation to protect and promote the health, safety, and well-being of the project workers, and to provide access to or provision of services that accommodate their physical, social, and cultural needs.

The risk assessment report, which will be prepared by the contractor during the construction period and by the KGM RIU during the operation period, will be kept updated by the same responsible parties. The risk assessment will be conducted to identify existing or potential hazards within the workplace, analyze and rank risks arising from these hazards by considering factors leading to their occurrence, and determine control measures. The risk assessment will be carried out by a team formed by the employer. Some OHS risks may be specific to female workers. To assist in designing policies and practices that respond to the needs of female project workers, it is recommended to have balanced representation of women in this team. The risk assessment team consists of the following:

- Employer or employer's representative.
- Occupational safety specialists and workplace physicians providing health and safety services at the workplace.
- Employee representatives at the workplace.

Employees designated to represent all units at the workplace and who possess knowledge about ongoing activities, existing or potential hazards, and risks within the workplace.



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In addition, the ESMPs and Emergency Preparedness and Response Plan (EPRP) documents prepared specifically for the project will be implemented during the construction and operation phases of the project. Furthermore, the details of emergency responses and the locations of the nearest hospitals to the project sites are included in the Emergency Preparedness and Response Plan (EPRP).

4.12.1.1 Land Preparation and Construction Phase

The majority of the project workforce will be utilized during the construction phase to carry out planned reinforcement works and road renewal activities. Additionally, blasting operations will be conducted at quarry sites. As stated in the basic conditions, site traffic, operation of construction machinery, and use of explosives are among the primary causes of occupational health and safety accidents. Therefore, these aspects must be managed properly to prevent fatal accidents or injuries during land preparation and construction phases of the project. During the Land Preparation and Construction Phase, there are potential hazards associated with the repair of roads damaged by earthquakes, the repair of damaged bridges, and the reinforcement of viaducts. Additionally, potential hazards exist in the production of materials such as stone, sand, and asphalt used for these works, as well as in the accommodation areas for the workers. The working conditions and occupational health and safety issues to be managed during the project's land preparation and construction phases are summarized in Table 150.

4.12.1.1.1 Working at Height

During the construction or maintenance of structures such as viaducts and bridges, working at heights is often necessary. During construction, workers may climb onto bridge piers or work on high platforms. For road maintenance or repairs, especially tasks under bridges or along roadsides, working at heights is also required. For instance, platforms or ladders may be used for asphalt repairs. In operations like quarries, where rocks are excavated or broken, high platforms or cranes are typically employed, further increasing the risk of working at heights.

Special precautions will be taken for work at height:

- The areas where work will be carried out should be of sufficient strength and durability, taking into account factors such as the working personnel, the maximum weight they may carry, and the distribution of this weight. It is essential to ensure that the supporting systems and other components of these work areas are structurally sound.
- Before commencing work at heights, it is crucial to check for any hazards or risks posed by energy transmission lines or other potential danger sources in the area. Work should only begin once these hazards have been eliminated or mitigated.
- Depending on the nature of the work being performed at heights, only personnel who are both qualified and experienced in working at heights and are in good health should be assigned to such tasks.
- Safe access to work areas should be provided for employees, along with appropriate ascent and descent equipment and tools.
- The safety of workers in work areas should primarily be ensured through collective protection measures such as safety railings, fall prevention platforms, barriers, covers, work scaffolds, safety nets, or airbags.
- In cases where collective protection measures cannot be implemented, and the risk of falling cannot be entirely eliminated, lifelines should be installed, and full-body harness systems (parachute-type safety harness) or similar safety systems should be used.
- Workers in these areas should be informed about the hazards and risks associated with working at heights and should receive the necessary training.



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- Work at heights should be carried out under the supervision and control of a competent person appointed by the employer.
- Measures should be taken to prevent the falling of hand tools and other materials used in work at heights.
- Waste materials or surplus items generated during work at heights should not be dropped directly to the ground from any height. Instead, they should be lowered down in a balanced and safe manner and properly stored in a suitable location. Safe methods for waste material removal, such as chute systems, should be preferred.
- Personnel without parachute-type safety harnesses or working in areas without a lifeline will not have their work permits approved, and they will not be allowed to work.

4.12.1.1.2 Working with Chemicals

Chemical hazards denote the potential for sickness or injury arising from either a single acute exposure or repeated chronic exposure to substances that are toxic, corrosive, sensitizing, or oxidative. There is also a risk of uncontrolled reactions, such as fire and explosion, if incompatible chemicals are unintentionally mixed. The most effective prevention of chemical hazards involves a hierarchical approach encompassing the following strategies:

- Substituting the hazardous substance with a less harmful alternative.
- Implementing engineering and administrative controls to prevent or minimize the release of hazardous substances into the work environment, thereby maintaining exposure levels below internationally established limits.
- Minimizing the number of employees exposed or likely to be exposed.

During the construction phase, the use of chemical substances is not of a concerning magnitude. However, in cases where working with chemical substances is necessary:

The EHS Team/OHS Specialist will conduct assessments related to the chemicals used, and hazard cards will be created. These hazard cards, along with Safety Data Sheet (SDS) and, will be posted at accessible points in areas where chemicals are stored and used. Personnel working with chemicals will be provided with suitable equipment and PPE in accordance with the working conditions and the chemicals, and the procurement and stock process will be overseen by the respective departments.

4.12.1.1.3 Noise

During construction, the sources of noise are typically construction equipment and blasting in quarries. The contractor should consider the noise emission characteristics of equipment when selecting equipment for the project and select the least noisy machine available to perform the specific work. Employees should be provided with ear protection (PPE) to prevent them from being harmed by the noise.

Every employee who will work in areas with a noise level of 80 dB(A) or higher should receive training before starting work. This training should cover the potential effects of noise on hearing, the purpose of ear protectors, their advantages and disadvantages, proper usage, determining the appropriate type of protection, maintenance, and cleaning. Hearing protectors (PPE) should be distributed to employees. These training sessions should be renewed annually. Additionally, regular annual examinations and audiometric tests should be conducted for employees before and after employment to monitor potential hearing damage.

Exposure action values and exposure limit values to be complied with throughout the construction phase are provided below according to the relevant legislation:

- Minimum exposure action values: 80 dB(A). When the ambient noise level reaches 80 dB(A), hearing protectors (PPE) should be readily available.



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- Maximum exposure action values: 85 dB(A). The effect of ear protectors is not considered in exposure action values. When the ambient noise level reaches 85 dB(A), hearing protectors (PPE) must be used.
- Exposure limit values: 87 dB(A). When applying exposure limit values, the protective effect of the personal hearing protection devices used by employees is also taken into account when determining the employee's exposure.

4.12.1.1.4 Vibration

During the construction phase, the source of vibration is once again the work equipment. To prevent employees from being harmed by vibration, regular maintenance of the work equipment will be carried out. Additionally, working hours for employees will be organized.

Exposure action values and exposure limit values to be complied with throughout the construction phase are provided below according to the relevant legislation.

For hand-arm vibration:

- Daily exposure limit value for an eight-hour working period: 5 m/s².
- Daily exposure action value for an eight-hour working period: 2.5 m/s².

For whole-body vibration:

- Daily exposure limit value for an eight-hour working period: 1.15 m/s².
- Daily exposure action value for an eight-hour working period: 0.5 m/s².

To prevent or reduce exposure;

- Risks originating from exposure to mechanical vibration are eliminated or minimized at the source, considering the feasibility of combating risks with technical developments.
- Compliance with the principles of risk prevention specified Law No. 6331 is observed for preventing or reducing exposure.
- In case it is determined that the exposure action values mentioned the employer creates and implements an action plan specifically aimed at minimizing exposure to mechanical vibration and the risks it may cause, considering the following aspects.
 - Choosing alternative working methods that reduce exposure to mechanical vibration.
 - Selecting ergonomically designed appropriate work equipment that generates the lowest possible level of vibration considering the performed task.
 - Providing auxiliary equipment such as seating that effectively reduces whole-body vibration exposure, handholds that reduce transmitted vibration to the hand-arm system, and similar equipment to reduce exposure to vibration.
 - Implementing appropriate maintenance programs for the workplace, workplace systems, and work equipment.
 - Designing and arranging the workplace and working environment appropriately.
 - Providing necessary information and training to employees on using work equipment correctly and safely to reduce exposure to mechanical vibration.
 - Limiting the duration and level of exposure.
 - Regulating working hours with adequate rest periods.

4.12.1.1.5 Rotating and Moving Equipment

Injury or death can occur from unexpected starting of equipment or unapparent movements during operations, leading to entanglement, trapping, or impact on machine parts. Designing machines to eliminate trap hazards and preventing extremities from harm under normal operating conditions. Examples of proper design considerations include two-hand operated machines to prevent amputations or the availability of emergency stops dedicated to the machine and strategically positioned.



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If a machine or equipment has an exposed rotating part or an open pinch point that could jeopardize the safety of any worker, the machine or equipment should be equipped with a guard or another device that prevents access to the rotating part or pinch point. Guards should be designed and installed in accordance with appropriate machine safety standards.

The rotating components of machinery and lifting equipment used during material handling, as well as the rotating parts of hand tools that may be used during the assembly phase, can pose potential hazards. It is important to adhere to work instructions and prioritize the use of machine guards and PPE during these operations.

4.12.1.1.6 Electrical

Exposed or faulty electrical devices, such as circuit breakers, panels, cables, wires, and hand tools, can pose a serious risk to workers. Overhead wires can be struck by metal devices like poles, ladders, or vehicles with metal booms. Vehicles or grounded metal objects in contact with overhead wires can create an arc between the wires and the object without actual contact. All energized electrical devices and lines must be marked with warning signs. Check all electrical cords, cables, and hand power tools for frayed or exposed wires, and follow the manufacturer's recommendations for the maximum permitted operating voltage of portable hand tools. Double insulating / grounding all electrical equipment used in environments that are, or may become, wet; using equipment with ground fault interrupter protected circuits. Power cords and extension cords should be shielded or suspended above traffic areas to protect against damage from traffic.

4.12.1.1.7 Working Environment Temperature

Exposure to hot or cold working conditions in indoor or outdoor environments can result in temperature stress-related injuries or death. The use of PPE for protection against other occupational hazards may accentuate and exacerbate heat-related illnesses. Extreme temperatures in permanent work environments should be avoided, and engineering controls and ventilation practices should be implemented for this purpose. In cases where this is not feasible, as in the assembly of the project, the following precautions should be taken:

- Monitoring weather forecasts for outdoor work to provide advance warning of extreme weather and scheduling work accordingly.
- Adjustment of work and rest periods based on temperature stress management procedures provided, considering both temperature and workload.
- Providing temporary shelters to protect against the elements during working activities or for use as a rest area.
- Use of protective clothing.
- Ensuring easy access to adequate hydration, such as drinking water or electrolyte drinks.

4.12.1.1.8 Ergonomics, Repetitive Motion, Manual Handling

Injuries caused by ergonomic factors, such as repetitive motion, overexertion, and manual handling, develop with prolonged and repeated exposures, typically requiring weeks to months for recovery. These occupational health and safety (OHS) issues should be minimized or eliminated to maintain a productive workplace. Controls may include:

- Using mechanical aids to eliminate or reduce the exertion required for lifting materials, holding tools and work objects, and implementing multi-person lifts if weights exceed set thresholds.
- Selecting and designing tools that decrease force requirements and holding times while improving postures.



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- Providing user-adjustable workstations.
- Incorporating rest and stretch breaks into work processes and implementing job rotation.
- Implementing quality control and maintenance programs that reduce unnecessary forces and exertions.
- Considering additional special conditions, such as those applicable to left-handed individuals

4.12.1.1.9 Over-exertion

Over-exertion, ergonomic injuries, and illnesses such as repetitive motion, excessive effort, and manual handling are among the most common causes of injuries in constructions. To prevent and control these, construction workers should be trained in lifting and material handling techniques. Weight limits requiring mechanical assistance or two-person lifts should be determined and communicated to the workers. Additionally, planning the layout of the work area to minimize the need for manual handling of heavy loads is essential.

4.12.1.1.10 Slips and Falls

Slips and falls on the same level associated with poorly organized work areas, especially due to factors like excessive waste material, loose construction materials, liquid spills, and uncontrolled electrical cables and ropes on the ground, are among the common workplace accidents in construction. Methods to prevent slips and falls on the same level include:

- Implementing good organization practices, such as arranging waste materials or demolition debris in designated areas away from pedestrian paths
- Regularly cleaning up excessive waste material and liquid spills
- Positioning electrical cables and ropes in common areas and marked corridors
- Using slip-resistant footwear

4.12.1.2 Operation Phase

During the operational phase, personnel will be employed at service areas, and maintenance centers. In addition, snow removal teams, road cleanup crews following accidents and incidents, tunnel operations staff, landscaping teams, and routine maintenance crews will be exposed to occupational health and safety risks. Specific OHS impacts related to operational activities are defined in Table 150

4.12.1.2.1 Working at Height

Fall prevention and protection measures should be implemented whenever a worker is exposed to the hazard of falling more than two meters; through an opening in a work surface. Fall prevention/protection measures may also be required for specific situations when there are risks of falling from lower heights. According to national regulations, all areas with level differences are considered hazardous, posing a risk of falling.

- It is necessary to install guardrails with mid-rails and toe boards at the edge of any fall hazard area.
- The use of fall prevention devices, including safety belts and lanyard travel limiting devices to prevent access to the fall hazard area, or fall protection devices such as full-body harnesses used in conjunction with shock-absorbing lanyards or self-retracting inertial fall arrest devices attached to a fixed anchor point or horizontal lifelines, should be considered.
- Appropriate training should be provided on the use, functionality, and integrity of the necessary PPE.



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- Rescue and/or recovery plans and equipment should be included in responding to workers after an arrested fall.
- The areas where work will be carried out should be of sufficient strength and durability, taking into account factors such as the working personnel, the maximum weight they may carry, and the distribution of this weight. It is essential to ensure that the supporting systems and other components of these work areas are structurally sound.
- Before commencing work at heights, it is crucial to check for any hazards or risks posed by energy transmission lines or other potential danger sources in the area. Work should only begin once these hazards have been eliminated or mitigated.
- Depending on the nature of the work being performed at heights, only personnel who are both qualified and experienced in working at heights and are in good health should be assigned to such tasks.
- Safe access to work areas should be provided for employees, along with appropriate ascent and descent equipment and tools.
- The safety of workers in work areas should primarily be ensured through collective protection measures such as safety railings, fall prevention platforms, barriers, covers, work scaffolds, safety nets, or airbags.
- In cases where collective protection measures cannot be implemented, and the risk of falling cannot be entirely eliminated, lifelines should be installed, and full-body harness systems (parachute-type safety harness) or similar safety systems should be used.
- Workers in these areas should be informed about the hazards and risks associated with working at heights and should receive the necessary training.
- Work at heights should be carried out under the supervision and control of a competent person appointed by the employer.
- Measures should be taken to prevent the falling of hand tools and other materials used in work at heights.
- Waste materials or surplus items generated during work at heights should not be dropped directly to the ground from any height. Instead, they should be lowered down in a balanced and safe manner and properly stored in a suitable location. Safe methods for waste material removal, such as chute systems, should be preferred.
- Personnel without parachute-type safety harnesses or working in areas without a lifeline will not have their work permits approved, and they will not be allowed to work.

4.12.1.2.2 Electrical

During road maintenance and repair, there is a risk of contact with electrical lines and cables. Temporary lighting systems are used for tunnel operations or work in dark conditions, and attention must be paid to electrical connections during their installation and use. When cleaning roads after accidents, electrical poles, traffic lights, or other electrical installations may have been damaged, posing an electrical hazard. It is important to be aware of these potential dangers and to train workers to handle such situations. Adhering to electrical safety procedures can help prevent accidents and damage.

4.12.1.2.3 Working with Chemicals

During operational periods, chemical exposure can occur during maintenance and repairs, snow removal operations, and road cleaning after accidents. Chemical hazards denote the potential for sickness or injury arising from either a single acute exposure or repeated chronic exposure to substances that are toxic, corrosive, sensitizing, or oxidative. There is also a risk of uncontrolled reactions, such as fire and explosion, if incompatible chemicals are unintentionally mixed. The most effective prevention of chemical hazards involves a hierarchical approach encompassing the following strategies:



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- Substituting the hazardous substance with a less harmful alternative.
- Implementing engineering and administrative controls to prevent or minimize the release of hazardous substances into the work environment, thereby maintaining exposure levels below internationally established limits.
- Minimizing the number of employees exposed or likely to be exposed.

During the construction phase, the use of chemical substances is not of a concerning magnitude. However, in cases where working with chemical substances is necessary:

The Health and Safety (H&S) Unit will conduct assessments related to the chemicals used, and hazard cards will be created. These hazard cards, along with Safety Data Sheet (SDS) and, will be posted at accessible points in areas where chemicals are stored and used. Personnel working with chemicals will be provided with suitable equipment and PPE in accordance with the working conditions and the chemicals, and the procurement and stock process will be overseen by the respective departments.

4.12.1.2.4 Noise

During the operation phase, the source of noise is the work equipment. The noise emission characteristics of equipment should be considered when selecting equipment for the project and the least noisy machine available to perform the specific work should be selected. Employees should be provided with ear protection (PPE) to prevent them from being harmed by the noise.

Every employee who will work in areas with a noise level of 80 dB(A) or higher should receive training before starting work. This training should cover the potential effects of noise on hearing, the purpose of ear protectors, their advantages and disadvantages, proper usage, determining the appropriate type of protection, maintenance, and cleaning. Hearing protectors (PPE) should be distributed to employees. These training sessions should be renewed annually. Additionally, regular annual examinations and audiometric tests should be conducted for employees before and after employment to monitor potential hearing damage.

Exposure action values and exposure limit values to be complied with throughout the construction phase are provided below according to the relevant legislation:

- Minimum exposure action values: 80 dB(A). When the ambient noise level reaches 80 dB(A), hearing protectors (PPE) should be readily available.
- Maximum exposure action values: 85 dB(A). The effect of ear protectors is not considered in exposure action values. When the ambient noise level reaches 85 dB(A), hearing protectors (PPE) must be used.
- Exposure limit values: 87 dB(A). When applying exposure limit values, the protective effect of the personal hearing protection devices used by employees is also taken into account when determining the employee's exposure.

4.12.1.2.5 Vibration

During the operation phase, the source of vibration is once again the work equipment. To prevent employees from being harmed by vibration, regular maintenance of the work equipment will be carried out. Additionally, working hours for employees will be organized.

Exposure action values and exposure limit values to be complied with throughout the construction phase are provided below according to the relevant legislation.

For hand-arm vibration:

- Daily exposure limit value for an eight-hour working period: 5 m/s².
- Daily exposure action value for an eight-hour working period: 2.5 m/s².



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For whole-body vibration:

- Daily exposure limit value for an eight-hour working period: 1.15 m/s².
- Daily exposure action value for an eight-hour working period: 0.5 m/s².

To prevent or reduce exposure;

- Risks originating from exposure to mechanical vibration are eliminated or minimized at the source, considering the feasibility of combating risks with technical developments.
- Compliance with the principles of risk prevention specified Law No. 6331 is observed for preventing or reducing exposure.
- In case it is determined that the exposure action values mentioned the employer creates and implements an action plan specifically aimed at minimizing exposure to mechanical vibration and the risks it may cause, considering the following aspects.
 - Choosing alternative working methods that reduce exposure to mechanical vibration.
 - Selecting ergonomically designed appropriate work equipment that generates the lowest possible level of vibration considering the performed task.
 - Providing auxiliary equipment such as seating that effectively reduces whole-body vibration exposure, handholds that reduce transmitted vibration to the hand-arm system, and similar equipment to reduce exposure to vibration.
 - Implementing appropriate maintenance programs for the workplace, workplace systems, and work equipment.
 - Designing and arranging the workplace and working environment appropriately.
 - Providing necessary information and training to employees on using work equipment correctly and safely to reduce exposure to mechanical vibration.
 - Limiting the duration and level of exposure.
 - Regulating working hours with adequate rest periods.

4.12.1.2.6 Working Environment Temperature

Exposure to hot or cold working conditions in indoor or outdoor environments can result in temperature stress-related injuries or death. The use of PPE for protection against other occupational hazards may accentuate and exacerbate heat-related illnesses. Extreme temperatures in permanent work environments should be avoided, and engineering controls and ventilation practices should be implemented for this purpose. In cases where this is not feasible, as in the maintenance of the project, the following precautions should be taken:

- Monitoring weather forecasts for outdoor work to provide advance warning of extreme weather and scheduling work accordingly.
- Adjustment of work and rest periods based on temperature stress management procedures provided, considering both temperature and workload.
- Providing temporary shelters to protect against the elements during working activities or for use as a rest area.
- Use of protective clothing.
- Ensuring easy access to adequate hydration, such as drinking water or electrolyte drinks.

4.12.1.2.7 Ergonomics, Repetitive Motion, Manual Handling

Injuries caused by ergonomic factors, such as repetitive motion, overexertion, and manual handling, develop with prolonged and repeated exposures, typically requiring weeks to months for recovery. These occupational health and safety (OHS) issues should be minimized or eliminated to maintain a productive workplace. Controls may include:



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- Using mechanical aids to eliminate or reduce the exertion required for lifting materials, holding tools and work objects, and implementing multi-person lifts if weights exceed set thresholds.
- Selecting and designing tools that decrease force requirements and holding times while improving postures.
- Providing user-adjustable workstations.
- Incorporating rest and stretch breaks into work processes and implementing job rotation.
- Implementing quality control and maintenance programs that reduce unnecessary forces and exertions.
- Considering additional special conditions, such as those applicable to left-handed individuals

4.12.1.2.8 Over-exertion

Over-exertion, ergonomic injuries, and illnesses such as repetitive motion, excessive effort, and manual handling are among the common causes of injuries in maintenance. To prevent and control these, workers should be trained in lifting and material handling techniques. Weight limits requiring mechanical assistance or two-person lifts should be determined and communicated to the workers. Additionally, planning the layout of the work area to minimize the need for manual handling of heavy loads is essential.

4.12.1.2.9 Slips and Falls

Slips and falls on the same level associated with poorly organized work areas, especially due to factors like excessive waste material, liquid spills, and uncontrolled electrical cables and ropes on the ground, are among the common workplace accidents in maintenance. Methods to prevent slips and falls on the same level include:

- Implementing good organization practices, such as arranging waste materials or demolition debris in designated areas away from pedestrian paths
- Regularly cleaning up excessive waste material and liquid spills
- Positioning electrical cables and ropes in common areas and marked corridors
- Using slip-resistant footwear

4.12.1.2.10 Communicable Disease

After accidents, there is a risk of contact with vehicles of injured or infected individuals, or with their feces or other bodily fluids. During road maintenance and repair, workers may come into contact with various surfaces and equipment, increasing the risk of spreading pathogens such as viruses and bacteria.

To manage these potential risks, workplace safety measures should be implemented. It is important for workers to use personal protective equipment, adhere to hygiene standards, and apply appropriate cleaning and disinfection protocols in high-risk areas. Furthermore, employees should receive training and awareness about infectious diseases.



Table 150. Impact Significances, Mitigation Measures and Value of Residual Impacts – Occupational Health and Safety

Definition of Impact	Project Phase	Receptor	Magnitude of Impact					Sensitivity/ Value of Resource/ Receptor	Impact Significance (prior to mitigation or with existing mitigation)	Proposed Mitigation Measures	Residual Impact
			Extent	Reversibility	Duration	Frequency	Overall Magnitude				
Possible impact of document, training, or inspection deficiencies	Land preparation and Construction Operation	Project personnel	Restricted	Irreversible	Short term	One-off/Rare	Medium	Medium	Moderate	<ul style="list-style-type: none"> ▪ Basic and technical OHS trainings should be tracked and completed of employees, including environmental and social trainings. ▪ Health and Safety Plans, OHS Risk Assessments, and Emergency Response Plans will be prepared and implemented ▪ Monthly and quarterly inspections will be conducted by the OHS unit and reported accordingly for construction phase. ▪ An adequate OHS organizational structure will be established as defined in local legislation, and the required number of OHS officers should be assigned to be on-site during working hours. ▪ OHS Personnel will inspect the site on a daily basis, and if any additional risks are observed, relevant plans and trainings will be renewed. ▪ Employment of individuals under the age of 18 will be prohibited during project construction. ▪ Records of occupational accidents and near-miss incidents will be kept systematically, and after each incident. ▪ A root cause analysis will be conducted to take measures to prevent the recurrence of the incident. ▪ When a workplace accident occurs, an incident report must be prepared at the scene of the accident. ▪ Notification to the relevant official authority specified in local regulations must be made within three (3) days following the occurrence of the workplace accident. ▪ Following occupational accidents or significant environmental and social incidents requiring emergency response, KGM and AIIB will be informed. ▪ Until the faulty condition and faulty behavior determined through root cause analysis are eliminated, work should not be allowed to continue. ▪ Informational training should be provided after a workplace accident. The employee who experienced the accident should be re-examined by the occupational physician, and only after receiving a fitness-for-work health report, they should resume work. ▪ The OHS unit to be formed by the contractor's project team will include staff(s) (OHS expert with a Class A specialization certificate and Occupational physician). Additionally, a full-time OHS professional who will take part in full-time and effectively control the implementation of the Project should be on site. She/he shall monitor the site implementations. ▪ Emergency response trainings will be provided, and drills will be conducted. ▪ Workers involved in asphalt work should receive training on potential hazards they may encounter, measures for emergency situations, and safe working methods. Training programs should also cover information about the content of asphalt mixtures, which may vary according to their intended use and requirements, along with safety precautions related to these contents. 	Minor
Possible impact of incidents requiring emergency intervention	Land preparation and Construction Operation	Project personnel	Restricted	Irreversible	Short term	One-off/Rare	High	Medium	Major	<ul style="list-style-type: none"> ▪ Develop and implement the Emergency Preparedness and Response Plan. ▪ Ensure communications equipment are available for all personnel and maintained properly. ▪ Provide related trainings and conduct drills. ▪ Ensure personnel and equipment for first aid are provided for all workers, at all work sites, during all work hours. ▪ Safe zones should be selected for emergency assembly areas, and employees should be informed about the location and boundaries of these areas. ▪ In case of emergencies on the construction site, paths for emergency vehicles such as ambulances and fire trucks to navigate within the site without causing further accidents and reach their destination should be pre-planned. During this process, the actions that workers need to take should be included in the relevant plans. 	Minor
Possible impact of adversities during excavation works	Land preparation and Construction	Project personnel	Restricted	Irreversible	Short term	One-off/Rare	High	Medium	Major	<ul style="list-style-type: none"> ▪ Work permits will be obtained before commencing work involving excavation. ▪ The areas designated for excavation will only be accessible to authorized personnel. Loading and unloading activities will be conducted under the supervision of personnel overseeing the operations. ▪ Excavation areas will be enclosed with barriers, marked with signs, and entry to excavated areas without implementing collapse prevention measures will be prohibited. ▪ Excavation work will be halted during windy or rainy weather. ▪ Measures for collective protection against hazards such as landslides or soil collapse (such as net and barrier systems, and stepped slope applications) should be ensured in work areas. 	Minor

Definition of Impact	Project Phase	Receptor	Magnitude of Impact					Sensitivity/ Value of Resource/ Receptor	Impact Significance (prior to mitigation or with existing mitigation)	Proposed Mitigation Measures	Residual Impact
			Extent	Reversibility	Duration	Frequency	Overall Magnitude				
Potential hazards during road clearing for snow and ice removal	Land preparation and Construction Operation	Project personnel	Restricted	Irreversible	Short term	One-off/Rare	High	Medium	Major	<ul style="list-style-type: none"> The snow removal vehicle carries a risk of slipping and overturning, so well-trained operators and appropriate machinery should be selected. Outdoor work in cold weather conditions can lead to hypothermia, frostbite, and other cold-related illnesses; therefore, proper protective measures should be taken. Reduced visibility due to snowfall or wind can increase the risk of accidents involving moving vehicles or machinery. Manual snow shoveling or removal can lead to fatigue and overexertion if workers are untrained or lack appropriate equipment. The correct usage of de-icing chemicals or salt is crucial due to the potential risks of causing skin irritation, respiratory problems, and environmental pollution. 	Moderate
Possible impact of noise from machinery used on workers	Land preparation and Construction Operation	Project personnel	Restricted	Irreversible	Short term	One-off/Rare	Medium	Medium	Moderate	<ul style="list-style-type: none"> The Contractor will ensure that the exhausts of machinery used in excavation works are equipped with silencers (where possible). Construction vehicles and machinery will be well maintained and not kept idling when not in use. Earplugs will be provided for workers placed in high noise areas. 	Minor
Possible impact of vibration from machinery used on workers	Land preparation and Construction Operation	Project personnel	Restricted	Irreversible	Short term	One-off/Rare	High	Medium	Major	<ul style="list-style-type: none"> The source of vibration is the work equipment. All body vibration values of the equipment in use will be measured. If the measured value exceeds the exposure action value of 0.5m/s², preventive measures will be taken. To prevent employees from being harmed by vibration, regular maintenance of the work equipment will be conducted. Additionally, the working hours of employees will be adjusted. 	Minor
Possible impacts resulting from the overturning of machinery used	Land preparation and Construction Operation	Project personnel	Restricted	Irreversible	Short term	One-off/Rare	High	Medium	Major	<ul style="list-style-type: none"> Employees will be required to use machinery, equipment, vehicles, tools, hazardous substances, transportation devices, and other production tools in accordance with regulations, correctly utilizing their safety features, and refraining from arbitrarily removing or altering them. Employees will be encouraged to immediately inform the employer or a representative if they encounter a serious and immediate health or safety hazard in machinery, equipment, vehicles, tools, facilities, or buildings in the workplace, or if they detect any deficiencies in protective measures. No one will be allowed to operate or use construction machinery unless the operator is adequately competent and reliable, informed about the risks associated with the operation, and subjected to regular medical examinations. The employee tasked with operating work equipment will need to possess a G-class driver's license, a psychotechnical report, a defensive driving certificate, and a professional competency training document (SRC (Driver) certificate). The contractor will ensure that no person is engaged in driving or operating construction machinery unless they are sufficiently competent and reliable, possess the knowledge of risks involved in the operation and undergo periodic medical examinations. Standing behind large operating plant machinery or under suspended loads will never be permitted. Individuals will be advised to avoid working close to moving objects and to be cautious of their surroundings, especially if those objects do not have lights or beepers. There will always be a requirement to ensure a flagman is present to guide plant vehicles. 	Negligible
Possible impact of contact with overhead electrical wires while using machinery	Land preparation and Construction Operation	Project personnel	Restricted	Irreversible	Short term	One-off/Rare	High	Medium	Major	<ul style="list-style-type: none"> Work permits will be obtained before commencing work involving working with electricity. Strict compliance with work instructions will be enforced. 	Negligible
Possible impact of working at heights on employees	Land preparation and Construction Operation	Project personnel	Restricted	Irreversible	Short term	One-off/Rare	High	High	Major	<ul style="list-style-type: none"> If possible, the necessity of working at height should be avoided. Collective measures will be implemented in situations where working at height cannot be avoided in order to prevent falls. For example, using equipment such as a scaffold with double guardrails or edge protection will be considered. Additionally, to minimize fall consequences, safety nets will be provided. Special precautions will be taken for working at height. Personnel without parachute-type safety harnesses or working in areas lacking a lifeline will not have their work permits approved, and will not be allowed to work. Work permits will be obtained before commencing work involving working at heights. 	Minor
Asphalt Fumes and Contact with Asphalt	Land preparation and Construction Operation	Project personnel	Restricted	Irreversible	Short term	One-off/Rare	Medium	Medium	Moderate	<ul style="list-style-type: none"> Use the correct asphalt type specific to each specific application. Use pavers with exhaust ventilation systems and ensure adequate maintenance. Ensure use of PPEs, including suitable clothing, during pavement works. 	Minor
Explosives Use and Blasting	Land preparation and Construction	Project personnel	Restricted	Irreversible	Short term	One-off/Rare	High	High	Major	<ul style="list-style-type: none"> Ensure technical supervisors oversee all blasting related work, including scheduling. 	Negligible



Definition of Impact	Project Phase	Receptor	Magnitude of Impact					Sensitivity/ Value of Resource/ Receptor	Impact Significance (prior to mitigation or with existing mitigation)	Proposed Mitigation Measures	Residual Impact
			Extent	Reversibility	Duration	Frequency	Overall Magnitude				
Possible Risks due to Traffic	Land preparation and Construction Operation	Project personnel	Restricted	Irreversible	Short term	One-off/Rare	High	High	Major	<ul style="list-style-type: none"> Ensure only certified and competently trained blasters or explosives experts conduct blasting activities, including transport, storage, preparation of the explosives, preparation of the site, removal of materials remained unblasted, etc. Ensure blasting follow a strict schedule and all related workers are informed of the schedule. Inform workers of any change in schedule immediately and conduct blasting based on the new schedules only after the workers are notified. Establish restriction zones around all blasting areas and restrict access of unauthorized persons. Where required, install additional structures that prevent pieces from scattering. Schedule blasting only during daytime (08:00-18:00), from Monday to Saturday. Schedule blasting based on weather conditions and avoid blasting during heavy rain/snow/ storm events. Store explosives only in proper storage areas with relevant permits. 	Negligible
Working Environment Temperature	Land preparation and Construction Operation	Project personnel	Restricted	Irreversible	Short term	One-off/Rare	High	High	Major	<ul style="list-style-type: none"> Outdoor work should monitor weather forecasts to provide early warnings of extreme weather conditions and plan activities accordingly. Work and rest periods should be adjusted based on heat stress management procedures, taking into account both temperature and workload. Temporary shelters should be provided to protect from weather conditions during work activities or for use as rest areas. Protective clothing should be worn. Easy access to sufficient fluids, such as drinking water or electrolyte drinks, should be ensured. 	Minor
Potential risks associated with ergonomics, repetitive motions, and manual handling.	Land preparation and Construction Operation	Project personnel	Restricted	Irreversible	Short term	One-off/Rare	High	Medium	Major	<ul style="list-style-type: none"> Mechanical aids should be used to eliminate or reduce the exertion required for lifting materials, holding tools, and work objects, and multi-person lifts should be implemented if weights exceed set thresholds. Tools that decrease force requirements and holding times while improving postures should be selected and designed. Rest and stretch breaks should be incorporated into work processes, and job rotation should be implemented. Quality control and maintenance programs that reduce unnecessary forces and exertions should be implemented. Additional special conditions, such as those applicable to left-handed individuals, should be considered. 	Negligible
Possible dangers from pests	Land preparation and Construction Operation	Project personnel	Restricted	Irreversible	Short term	One-off/Rare	High	Medium	Major	<ul style="list-style-type: none"> In rural areas, such as forest roads and agricultural lands, measures should be taken to ensure safety against diseases that can be transmitted to humans through biological agents such as water, air, animal bites, and insect stings. Personnel should be educated about biological risks such as animal bites and insect stings. Regular health check-ups should be conducted, and employees should be monitored for any effects of biological risks. Additionally, if the risk of rabies is identified, a vaccination program can be implemented. Employees should be provided with appropriate protective clothing (long-sleeved shirts, long pants) and personal protective equipment (gloves, face masks, eye protection). Insect repellent sprays and lotions should be used against insect bites. 	Minor



Definition of Impact	Project Phase	Receptor	Magnitude of Impact					Sensitivity/ Value of Resource/ Receptor	Impact Significance (prior to mitigation or with existing mitigation)	Proposed Mitigation Measures	Residual Impact
			Extent	Reversibility	Duration	Frequency	Overall Magnitude				
										<ul style="list-style-type: none"> Regular environmental inspections should be conducted to control biological hazard sources such as insect nests and animal shelters. Pest control programs should be implemented. 	
Possible risk due to improper hazardous and chemical materials management	Land preparation and Construction Operation	Project personnel	Restricted	Irreversible	Short term	One-off/Rare	High	High	Major	<ul style="list-style-type: none"> Safe handling procedures will be implemented for the storage, transportation, and use of hazardous and chemical materials. Designated storage areas equipped with appropriate containment measures will be provided to prevent leaks or spills. Material Safety Datasheet (MSDS) will be available. Proper labeling and packaging of hazardous and chemical materials will be ensured to facilitate safe handling and identification. Workers will be provided with adequate personal protective equipment, such as gloves, goggles, and respirators, to minimize exposure to hazardous materials. Comprehensive training will be provided to employees on the safe handling and management of hazardous and chemical materials, including emergency response procedures. Emergency preparedness and response plan will be implemented to address spills, leaks, or other incidents involving hazardous materials, ensuring prompt containment and cleanup. Proper waste management procedures will be established for the disposal of hazardous and chemical materials, including recycling and disposal at licensed facilities. In case of storing hazardous substances included in Annex-1 Part 1 and Part 2 of the Regulation Regarding Prevention of Major Industrial Accidents and Mitigation of Their Effects, a declaration will be made to the BEKRA Notification System. 	Minor
Potential impacts of road cleaning after accidents	Operation	Project personnel	Restricted	Irreversible	Short term	One-off/Rare	High	High	Major	<ul style="list-style-type: none"> Appropriate clothing should be clothes and instructions should be followed to protect against diseases or infections that can be transmitted from injured or dead animals. PPE should also be used to protect against zoonotic diseases that can be transmitted via blood, body fluids, or parasites from injured or dead animals on the highway (such as work clothes, coveralls, gloves, masks, face shields, etc.). If the animal has sharp bones or teeth, approach with caution. PPE should be used to protect against health risks from contact with fuel, oil, or other chemicals present on the road after an accident 	Minor

5 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

Within the scope of the project, separate ESMPs have been prepared specifically for each sub-project described in Table 2. The ESMPs consist of impact reduction and monitoring measures to eliminate, balance, or reduce environmental and social risks and impacts arising from project activities, as well as institutional measures. The ESMPs also include the necessary measures and actions for the implementation of these measures. Additionally, the ESMPs identify interventions that can be undertaken against potential adverse effects; requirements for the effective and timely implementation of these interventions are specified, along with explanations on how these requirements will be fulfilled.

5.1 Impact Mitigation

In the ESMPs, measures and actions have been identified in accordance with the impact mitigation hierarchy (see Figure 94), prioritizing avoidance and minimization over mitigation and offset, to reduce potential adverse environmental and social impacts to acceptable levels.

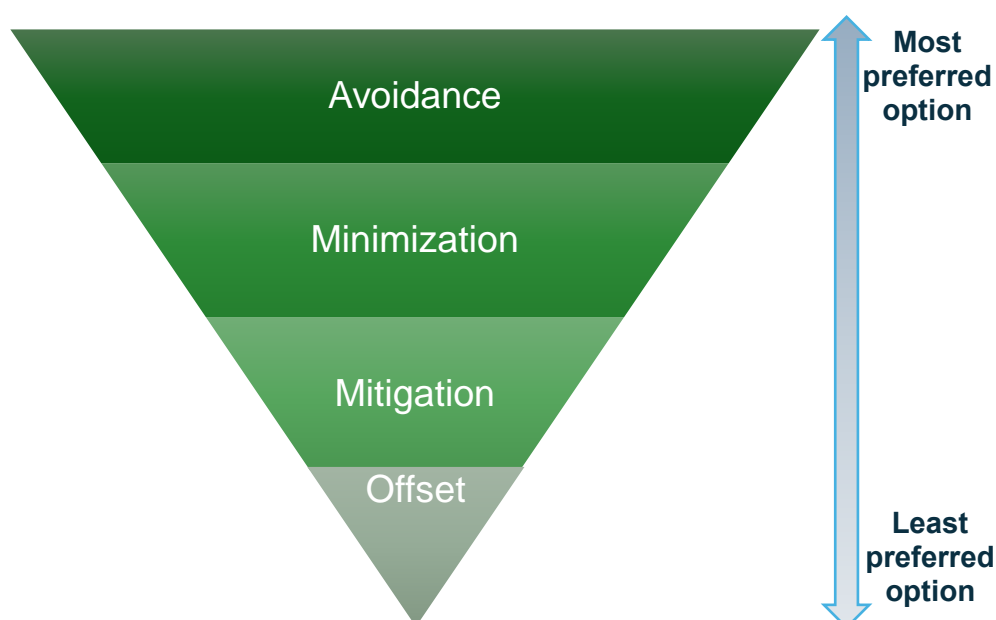


Figure 94. Mitigation Hierarchy

The plans also include compensatory measures based on relevance. Specifically, in the ESMPs:

- All anticipated adverse environmental and social impacts have been identified.
- Each mitigation measure has been explained in terms of the type of activity it pertains to and the conditions under which it is necessary.
- The residual environmental and social impacts have been predicted.
- Other mitigation plans required for the project have also been considered, and a methodology has been designed to be consistent with them.

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5.2 Monitoring

In the ESMPs, monitoring objectives have been determined, and the type of monitoring to be conducted has been defined by establishing connections between the impacts assessed in the environmental and social assessment and the respective mitigation measures. Specifically, the monitoring section of the ESMPs includes:

- A specific description and technical details of monitoring measures, including monitoring parameters, monitoring locations, methods to be used, monitoring frequency, legal requirements for monitoring, key performance indicators, responsible parties and corresponding budget, and
- Monitoring and reporting procedures.

The KGM RIUs and the Contractors are obliged to carry out the relevant reporting by conducting the monitoring/audit activities required by the Project. Regular internal audits and environmental and social monitoring will be carried out by the Contractors. The Contractors will prepare and submit monthly E&S Progress Reports covering the status of the construction activities and relevant E&S issues to the Supervision Consultant, consisting of Environmental and Social Specialists within the body of KGM RIUs. Afterwards, Supervision Consultant will prepare and submit monthly Environmental and Social Monitoring Report including monthly E&S Progress Report prepared by the Contractors to the RIUs. The AIIB team will be informed by the RIUs semi-annually on the progress and updates via Environmental and Social Monitoring Reports.

5.3 Institutional Arrangements, Roles, and Responsibilities

KGM is a public institution affiliated to the MoTI with a special budget for finance. KGM has a range of responsibilities related to the planning, construction, maintenance, and management of the country's road infrastructure KGM's duties are summarized below.

- **Planning and development of highways:** KGM is responsible for developing plans and strategies for the construction and expansion of Türkiye's highway network.
- **Construction and maintenance of highways:** KGM oversees the construction, maintenance, and repair of highways throughout Türkiye, including both urban and rural areas.
- **Traffic management:** KGM is involved in managing traffic flow, implementing safety measures, and improving transportation efficiency on highways.
- **Road safety:** KGM works to improve road safety by implementing measures such as signage, speed limits, and traffic enforcement.
- **Environmental protection:** KGM considers environmental factors in highway construction and maintenance projects to minimize their impact on the environment.
- **Coordination with other agencies:** KGM collaborates with other government agencies, local authorities, and private sector entities involved in transportation and infrastructure development.

Headquartered in Ankara, KGM operates through a network of 18 Regional Directorates strategically located throughout the country. KGM serves as the implementing agency for the Project, operating through its central offices in Ankara and two of its Regional Directorates (5th and 8th). Sub-projects are being implemented and supervised by the Regional Directorate responsible for the area where they are located.

The project will have one Project Implementation Unit (PIU) in Ankara and two Regional Implementation Units (RIUs) within Regional Directorates 5 and 8. The PIU will primarily coordinate project preparation and implementation, while the RIUs will manage day-to-day activities, procurement, supervision, and monitoring specific to their respective subprojects.



The PIU established within KGM consists of the Project Director, PIU Head, Environmental and Social Specialist(s), a Procurement Specialist, a Financial Management (FM) Specialist, a Technical Specialist and a Monitoring and Evaluation (M&E) Specialist along with two RIUs. The PIU and each RIU have E&S staff to be able to manage effective implementation of the project.

The Contractors carrying out the execution of the rehabilitation and reconstruction works within the scope of the sub-projects will be responsible for all of its staff (including subcontractor staff, if any) to have E&S responsibility awareness to ensure that E&S requirements are implemented smoothly on site. The ESMS structure to be executed by KGM and the Contractors will be managed with the organizational structure defined in Figure 95.

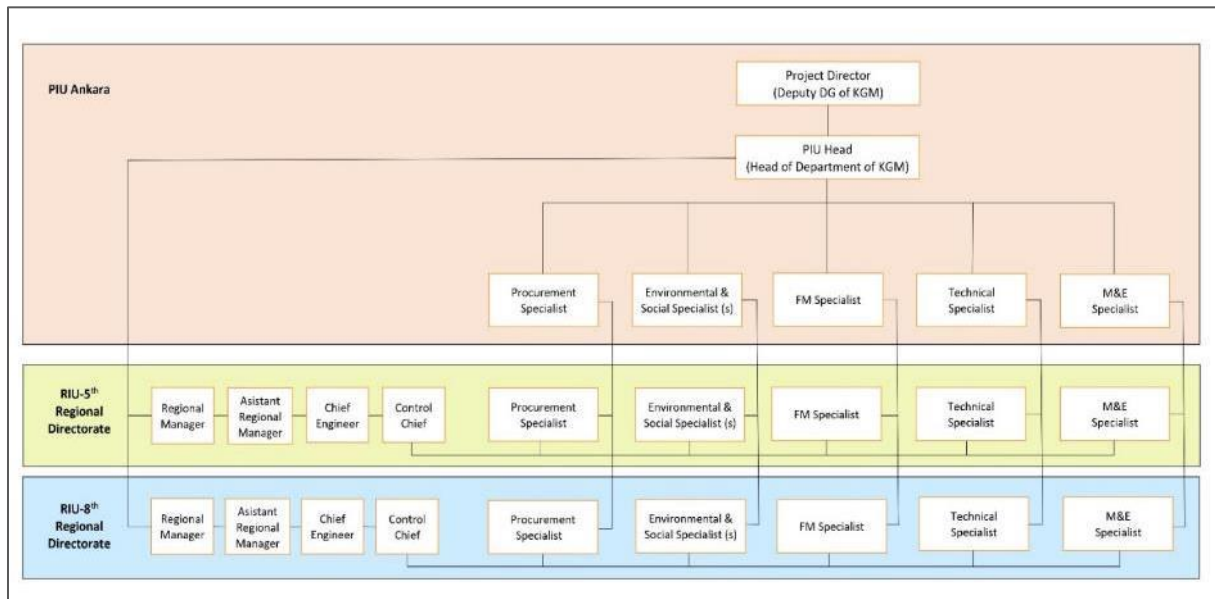


Figure 95. Organizational Structure of the Project

As the project owner, it is the responsibility of KGM to manage the environmental and social issues of the project and to ensure that the necessary mechanisms are developed and implemented by the Contractors. A framework regarding the roles and responsibilities of KGM PIU/RIU, Supervision Consultant and the Contractors is presented in Table 151.

Table 151. Roles and Responsibilities Regarding the Implementation of the ESMS

KGM PIU
<p><u>Project Director and PIU Head</u></p> <ul style="list-style-type: none"> ▪ Responsible for the overall coordination and management of the project or program at the central level. ▪ Ensuring the effective implementation of the ESMP and related environmental and social sub-management plans by the KGM Regional Implementation Unit (RIU), and the fulfillment of all commitments under the ESMP. ▪ Ensuring the incorporation of the ESMP into the Contractors' civil work contract and sharing the ESMP with the Contractor by the RIU. ▪ Ensuring coordination with the RIU in sharing the updated ESMP, as revised by the RIU when necessary, along with additional commitments with the Contractor. ▪ Ensuring the submission of the periodic (semi-annual) reports to the Bank by the RIU regarding the implementation of the ESMP. ▪ Ensuring the employment of competent EHS personnel and external experts by the RIU for the project by coordinating the RIU, if necessary. ▪ Coordinating actions and assessments made by the RIU in the event of changes due to engineering/design modifications, route/location alterations, changes in applicable environmental and social regulations,

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amendments to authority provisions, introduction of new environmental/social data (considering impacts of the project on stakeholders), changes in construction/operation strategies.

Environmental, Social and M&E Specialists

- Coordinating with the RIU to provide EHS training (including ESMP training) to relevant project personnel if necessary.
- To ensure coordination in the conduct of environmental and social investigations, monitoring and inspections and evaluation of results regarding ESMP applications by the RIU. To review and analyze environmental, social, and occupational health and safety accidents in coordination with the RIU for the purpose of tracking and analysis.
- Ensuring stakeholder participation in coordination with the RIU, implementing the grievance redress mechanism, and facilitating continuous information sharing through transparent communication channels.
- Ensuring immediate reporting to the Bank by the RIU of any incident or accident related to the Project that has or may have significant adverse effects on the environment, the affected communities, the public or workers including but not limited to; incidents and accidents encountered during construction works, environmental spills, etc.
- Coordinating with the RIU to ensure the provision of sufficient details regarding incidents or accidents and Root Cause Analysis (RCA) findings; specifying emergency measures or corrective actions taken or planned to resolve the issue, compensation paid, and any information provided by contractors and supervisors, as appropriate. Furthermore, upon request from the Bank, ensuring the preparation of a report by the RIU on the incident or accident and proposing necessary measures to prevent recurrence.

Financial Management (FM) Specialist

- Assuming leadership in financial management duties pertaining to the project, with oversight provided by the PIU situated in KGM Ankara.
- Supervising day-to-day financial operations, delegating tasks to the RIUs.
- Undertaking key tasks including budget planning, financial reporting, approval of payments, and preparation of withdrawal applications.
- Coordinating closely with RIUs, the Ministry of Transport and Infrastructure (MoTI), KGM's Accounting Department, and other relevant entities to secure necessary approvals for payment processing.
- Ensuring accurate accounting of project activities, with regional Accounting Departments responsible for this aspect.
- Oversee the consolidation of accounting data by the Accounting Department at KGM Ankara, utilizing it to prepare project financial statements and other pertinent financial records.
- Collaborating with the Bank to establish templates for both unaudited and audited project financial statements.
- Submitting quarterly Interim Unaudited Financial Reports (IUFs) to the Bank within 45 days following each calendar quarter.
- Preparing and deliver annual external audit reports to the Bank within 6 months following the financial year-end.

Technical Specialist

- Contributing to project planning, design, and implementation by offering technical insights and recommendations.
- Analyzing complex technical challenges and propose innovative solutions to overcome them.
- Ensuring the quality of project deliverables by conducting reviews, inspections, and tests to verify compliance with technical standards and specifications.
- Assessing technical risks associated with project activities and develop risk mitigation strategies to prevent potential issues from impacting project objectives.
- Collaborating with cross-functional teams, including project managers, engineers, technicians, and subject matter experts, to coordinate technical activities and align project objectives.

Procurement Specialist

- Ensuring strict adherence to the specific procurement provisions delineated in Section II of the Interim Operational Directive on Procurement Instructions to Recipients (PIR) (2016), governing the procurement processes for the project.
- Supervising the financial aspects concerning civil works contracts awarded through the Negotiated Procedure stipulated in Article 21b of Türkiye's Public Procurement Law No. 4734, particularly addressing urgent situations necessitating the utilization of such procurement methods.
- Participating actively in the procurement process for additional contracts by meticulously adhering to the procedures outlined in the Country Procurement Systems, while ensuring alignment with the financing considerations of the AIIB.
- Collaborating closely with the PIU and RIUs to orchestrate and oversee procurement activities, ensuring stringent compliance with pertinent regulations and guidelines.



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- Contributing significantly to the development of a comprehensive Project Delivery Strategy (PDS) through effective negotiation strategies, aimed at optimizing project outcomes and ensuring strategic alignment.
- Assisting in the formulation and refinement of a detailed Procurement Plan (PP), articulating intricate procurement arrangements such as contract packaging, financial allocations, procurement methodologies, and timelines, thereby establishing a robust framework for project procurement activities.
- Facilitating the seamless submission of any updates or revisions to the Project Delivery Strategy (PDS) and Procurement Plan (PP) to the Bank for meticulous review and subsequent approval, thereby upholding principles of transparency and ensuring alignment with overarching project objectives.

RIU

- Responsible for the implementation of project activities at the regional or local level according to the guidelines and instructions provided by the KGM PIU.
- Ensuring the implementation of ESIA requirements including ESMP and related sub-management plans and fulfilling all commitments within the scope of ESMP.
- Stopping the work in any situation that threatens the environment, human health, and safety, and when encountering an accidental circumstance.
- Ensuring the follow-up and analysis of environmental, social, and occupational health and safety accidents.
- Incorporating the ESMP into the civil work contract, sharing the ESMP with the Contractor, guiding the Contractor in preparing the implementation plans, approving these plans.
- Ensuring the effective implementation of the project and address local concerns through interaction with local stakeholders, including communities, government officials, and civil society organizations.
- Carrying out the purchasing processes and contract management of the goods, services and works required for the implementation of the project in their region.
- Identification and addressing of implementation challenges and bottlenecks at the regional level, collaborating with KGM PIU and other stakeholders to find solutions.
- Monitoring of contractor activities in accordance with the ESMP requirements.
- Informing AIIB of progress and updates through Environmental and Social Monitoring Reports on a semi-annual basis.
- Ensuring compliance with project standards and requiring the contractor to make necessary emergency corrections in case of non-compliance.

Supervision Consultant

- Supervision of construction and/or rehabilitation works and installation of equipment,
- Monitoring and evaluating the performance of the services provided by the Contractor,
- Ensuring initiation of corrective actions where necessary, ensuring implementation of mitigation measures by the Contractor,
- Follow up and audit the Contractor's activities periodically in line with the measures and commitments given in the ESMP,
- Monitoring and semiannually reporting to the KGM RIU regarding the implementation of the ESMP.

Contractor assigned for each sub-project implementation

- Fulfillment of all requirements of the ESIA, ESMP and related E&S sub-management plans.
- Implementation of additional commitments determined by KGM RIU and/or AIIB.
- Developing its own site-specific Contractor's ESMP (C-ESMP) including relevant E&S sub-management plans and implementing this C-ESMP throughout the construction works after obtaining approval before the commencement of the construction works.
- Ensuring compliance with project standards, obtaining all relevant permits and licenses.
- Monitoring construction activities (including subcontractor activities, if any) and taking measures within the scope of the ESMP.
- Development of implementation and monitoring plans/procedures in line with the ESMP structure, implementation after the approval of the KGM RIU.
- Employment of competent EHS staff (at least one environmental and social expert, one full-time OHS expert and/or obtaining consultancy services) within the scope of the project.
- Providing the necessary trainings to all project staff including sub-contractor staff on environmental, social and occupational health and safety issues.
- Providing follow-up and analysis of environmental, social occupational health and safety accidents.
- E&S inspections, monitoring and audits related to ESMP practices, at least monthly reporting to KGM RIU and PIU.
- Prompt notification of accident and incidents and keeping an incident register at construction site throughout the Project life.



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- Carrying out the management of change process via filling the Management of Change Process (MCP) Form (see Appendix-1 of the ESMPs) and informing the KGM RIU/PIU and AIB about the details and the results of the process including at the final design stage.

5.3.1 Capacity Building and Training

The Project Owner is set to implement an ESMP training and awareness program that will focus on the identified social and environmental risks, along with the measures in place to prevent, minimize, and mitigate any adverse impacts.

The training program/modules for the sub-project will encompass a comprehensive range of topics to ensure that all project participants are well-informed and equipped to handle their roles effectively and responsibly. The curriculum will include, but is not limited to, the following subjects:

- **Purpose of the Environmental and Social Management Plan (ESMP):** Understanding the role and importance of the ESMP in relation to the project activities.
- **Management Plan Requirements and Monitoring Activities:** Details on the requirements specified in management plans and the monitoring activities to be conducted within the scope of these plans.
- **Environmental and Social Sensitivities:** Recognizing and understanding the sensitive environmental and social receptors within and around the project area.
- **Awareness of Potential Risks and Impacts:** Raising awareness about the possible risks and impacts associated with the project activities.
- **Grievance Redress Mechanism:** Information on the grievance redress mechanism developed for the project, including its process, procedures, service standards, contact channels, and employee rights.
- **Occupational Health and Safety, First Aid, and Emergency Preparedness:** Training in health and safety at the workplace, first aid techniques, and preparedness for emergencies.
- **Code of Conduct:** Instructions on the professional code of conduct.
- **Community Communication:** Techniques and principles for effective communication with the local community.
- **Training on Gender-Based Violence and Harassment:** Training that includes aspects of gender-based violence (GBV), sexual exploitation and abuse/sexual harassment (SEA/SH).
- **Traffic and Road Safety Principles:** Training on principles of traffic and road safety, particularly relevant to the project area.
- **Waste Management Training:** Instruction aimed at the sorting, storage, and environmental planning of waste.
- **Training on Pollution Prevention and Resource Efficiency:** Understanding pollution sources and types and the importance of pollution prevention in environmental protection along with concepts of resource efficiency and sustainability.
- **Training on Biodiversity:** The value of biodiversity for ecosystems, economies, and human well-being and the role of biodiversity in maintaining ecosystem health and function.
- **Training on Cultural Management:** The importance of cultural heritage and contemporary culture and conservation/preservation techniques for tangible and intangible cultural heritage.

This training program is designed to cover a wide array of critical topics, ensuring that all project participants are well-prepared to contribute to the project's success while adhering to the highest standards of safety, ethics, and environmental stewardship.



Details of the trainings prepared for the Contractor and the RIUs within the scope of requirements of this ESIA are also presented in Table 152.

Table 152. Consolidated Training Program

Training Items	Specific Training Topics	Responsible Party	Target Group	Period	Budget
Induction Training	<ul style="list-style-type: none"> ▪ Introduction to the organization ▪ Workplace Culture and Environment ▪ Role specific training ▪ Compliance and legal requirements ▪ Introduction to teams and departments 	<ul style="list-style-type: none"> ▪ Contractor 	<ul style="list-style-type: none"> ▪ Newly recruited Personnel ▪ Personnel of newly contracted subcontractor-service provider 	Whenever needed	No additional cost
Environmental Management	<ul style="list-style-type: none"> ▪ Pollution Prevention and Resource Efficiency ▪ Waste Management ▪ Requirements of the National Legislation and Project Standards along with the ESMP 	<ul style="list-style-type: none"> ▪ Contractor ▪ KGM RIUs ▪ Supervision Consultant 	Project all personnel	Once before the commencement of construction activities and quarterly throughout the lifecycle of the sub-project	No additional cost
OHS Management	<ul style="list-style-type: none"> ▪ Introduction to Occupational Health and Safety ▪ Workplace Hazards and Risk Assessment ▪ Emergency Procedures ▪ Personal Protective Equipment (PPE) ▪ Construction and Site-Specific Safety ▪ Incident Reporting, Root Cause Analysis and Investigation 	<ul style="list-style-type: none"> ▪ Contractor ▪ KGM RIUs ▪ Supervision Consultant 	Project all personnel	Once before the commencement of construction activities and whenever needed	No additional cost
Biodiversity Management	<ul style="list-style-type: none"> ▪ Introduction to biodiversity ▪ Threats to Biodiversity ▪ Sustainable Practices 	<ul style="list-style-type: none"> ▪ Contractor ▪ KGM RIUs ▪ Supervision Consultant 	Project all personnel	Once before the commencement of construction activities and quarterly throughout the lifecycle of the sub-project	No additional cost
Cultural Heritage Management	<ul style="list-style-type: none"> ▪ Introduction to cultural heritage ▪ Conservation/preservation techniques for tangible and intangible cultural heritage 	<ul style="list-style-type: none"> ▪ Contractor ▪ KGM RIUs ▪ Supervision Consultant 	Project all personnel	Once before the commencement of construction activities and quarterly throughout the lifecycle of the sub-project	No additional cost
Labor Management	<ul style="list-style-type: none"> ▪ Code of Conduct ▪ Gender-based violence (GBV), sexual exploitation and abuse/sexual harassment (SEA/SH) ▪ Worker's GRM ▪ SEP requirements 	<ul style="list-style-type: none"> ▪ Contractor ▪ KGM RIUs ▪ Supervision Consultant 	Project all personnel	Once before the commencement of construction activities and quarterly throughout the lifecycle of the sub-project	No additional cost
Community Health, Safety Management	<ul style="list-style-type: none"> ▪ Traffic and Road Safety Principles ▪ Environmental and Social Sensitivities 	<ul style="list-style-type: none"> ▪ Contractor ▪ KGM RIUs ▪ Supervision Consultant 	Project all personnel	Once before the commencement of construction activities and	No additional cost



Training Items	Specific Training Topics	Responsible Party	Target Group	Period	Budget
	<ul style="list-style-type: none"> ▪ SEP and GRM ▪ Community Communication 			quarterly throughout the lifecycle of the sub-project	

5.4 Implementation Schedule and Cost Estimates

For all aspects related to impact mitigation, monitoring, and capacity development, the ESMPs provide:

- Implementation schedules demonstrating the phases, general project implementation plans, and coordination for actions that need to be applied within the scope of the project.
- Estimate of capital and operational expenditures related to the implementation of the ESMPs, along with the projected financial sources.

The ESMPs prepared specifically for each sub-project, covering the main points set out above, are given in Appendix-6 by considering both construction and operation phases.



6 STAKEHOLDER ENGAGEMENT

In addition to the Proposed Mitigation Measures, the Project has established a Stakeholder Engagement Plan (SEP) including GRM which all stakeholders can easily and safely report their complaints and concerns. The Project will inform all Project-affected settlements, PAPs, Mukhtars and stakeholders about this SEP and GRM.

GRM also includes workers' grievance redress mechanism for receiving, managing and solving the complaints, concerns of the Project workers.

The project will operate the GRM according to the GRM Procedure as a part of the SEP document of the Project which has been prepared in accordance with AIIB standards. KGM is responsible for ensuring that all Project contractors implement and manage the GRM appropriately.

The overall purpose of the SEP is to define a program for stakeholder engagement, including public information and consultations, throughout the Türkiye Emergency Road Rehabilitation and Reconstruction Project cycle.

The SEP outlines the ways the project team can communicate with stakeholders and includes a mechanism through which stakeholders can raise concerns, provide feedback or lodge complaints about project activities or any project-related activities. The SEP establishes a systematic approach to stakeholder engagement that will help the Project identify stakeholders and establish and maintain constructive relationships with stakeholders in accordance with AIIB ESS1.

Based on this general approach, the scope of SEP is as follows;

- Determining the legal framework of stakeholder engagement activities,
- Identifying stakeholders and developing a stakeholder map,
- Determining the policy that will form the framework of stakeholder participation,
- Determining the roles and responsibilities of human resources that will manage the stakeholder engagement process,
- Preparation of stakeholder consultation plan,
- Developing a Grievance Redress Mechanism,
- Determining the record keeping and reporting structure,
- Establishing a monitoring and reporting framework.

Stakeholders of the Project defined as follow:

Table 153. Stakeholders of the Project

Stakeholder Groups	Stakeholders	Affected Parties		Other Interested Parties
		Direct Stakeholders	Indirect Stakeholders	
Internal Stakeholders	General Directorate of Highways 5th Regional Directorate of Highways 8th Regional Directorate of Highways Employees, Contractors and Workers	x		
Governmental agencies	Ministry of Culture and Tourism, General Directorate of Investment and Enterprises, General Directorate of Cultural Heritage and Museums, Ministry of Energy and Natural Resources (MoENR), Petroleum Pipeline Corporation (BOTAŞ),			x



Stakeholder Groups	Stakeholders	Affected Parties		Other Interested Parties						
		Direct Stakeholders	Indirect Stakeholders							
	BOTAŞ Akdeniz Operation Directorate BOTAŞ, Natural Gas Transmission III. Regional Directorate NATO Oil Pipeline Ministry of Agriculture and Forestry (MoAF), 7th Regional Directorate MoAF, 3rd Regional Directorate MoAF, 15th Regional Directorate Hatay Governorship Provincial Directorate of Environment, Urbanization and Climate Change (PDoEUCC) Malatya Governorship PDoEUCC Elazığ Governorship PDoEUCC Adıyaman Governorship PDoEUCC Hatay Governorship, Provincial Directorate of Culture and Tourism (PDoCT), Gaziantep Governorship PDoCT Adıyaman Governorship, PDoCT Elazığ Governorship, PDoCT, Cultural Affairs Branch Directorate Hatay Cultural Heritage Preservation Regional Board Directorate (KVKBKM) Gaziantep KVKBKM Adana KVKBKM Hatay Airport Hatay Governorship Provincial Directorate of Agriculture and Forestry (PDoAF) Malatya Governorship PDoAF Elazığ Governorship PDoAF									
PAPs	Communities living in the neighborhood settlements of the sub-project routes Mukhtars of the settlements <table border="1"> <thead> <tr> <th>Sub-Project</th> <th>Settlements</th> </tr> </thead> <tbody> <tr> <td>P1: TAG Highway Aslanlı Tunnel (Km:214+490)-Nurdağı Junction (Km: 223+115) Section, Repair of All Kinds of Damages and Strengthening of Viaducts Against Earthquakes in This Section Construction Work</td> <td>Kızlaç Olucak Kurudere Başpınar Bademli</td> </tr> <tr> <td>P2: Islahiye-Hassa-Kırıkhan Road (Km:24+500-84+500), Antakya-Reyhanlı Road (Km:0+000-42+500) Hot Bituminous Mixture Repair Work, Hatay Airport Road Soil Works, Art Structures and</td> <td>Narlıca İlica Üzümdalı Madenboyu Demirköprü Melekli Telakrat</td> </tr> </tbody> </table>	Sub-Project	Settlements	P1: TAG Highway Aslanlı Tunnel (Km:214+490)-Nurdağı Junction (Km: 223+115) Section, Repair of All Kinds of Damages and Strengthening of Viaducts Against Earthquakes in This Section Construction Work	Kızlaç Olucak Kurudere Başpınar Bademli	P2: Islahiye-Hassa-Kırıkhan Road (Km:24+500-84+500), Antakya-Reyhanlı Road (Km:0+000-42+500) Hot Bituminous Mixture Repair Work, Hatay Airport Road Soil Works, Art Structures and	Narlıca İlica Üzümdalı Madenboyu Demirköprü Melekli Telakrat	x		
Sub-Project	Settlements									
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Stakeholder Groups	Stakeholders	Affected Parties		Other Interested Parties
		Direct Stakeholders	Indirect Stakeholders	
	<p>Superstructure Construction Work</p> <p>Vazvaza Kötübüyük Sıçanlı Behlile Akserçayırı Bayır Yenişehir Harran İbrahimpaşa Osmanağa Paşaköy Arpadan Amik Ovası Ahrazlı Alaybeyli Ilıkpınar Karamağara Karaçağıl Güzelce Saylak Bektaşlı Demrek Yuvalı Küreci Eğribucak Ardıçlı Aşağıkarafakılı Girne Dervişpaşa Tiyek Akbez Salmanuşağı Sapanözü Esenler Dolan Sulumağara Aydınnoğlu Kerküt Değirmencik Kırıkçalı Fevzipaşa Cevdetpaşa Bahçelievler</p>			
	<p>P3: Antakya-Samandağ Road (Including Samandağ Crossing) Km: 0+000-26+850 Section Supply Construction Works</p>	<p>Kapısuyu Mağaracık Kurtderesi Deniz Çiğdede Yeni Atatürk</p>		

Stakeholder Groups	Stakeholders		Affected Parties		Other Interested Parties
			Direct Stakeholders	Indirect Stakeholders	
		Sutaşı Kuşalanı Koyunoğlu Yeşilköy Değirmenbaşı Uzunbağ Karaçay Defne Hancağız Tavla Koçören Meydancık Güney Söğüt Subaşı			
	P4: (Malatya-Akçadağ) Junction - Gölbaşı Road (Construction Works of Erkenek Tunnel Damaged in Earthquake and Erkenek Tunnel-Karanlıkdere Section Damaged in Earthquake)	Hürriyet Karanlıkdere Kınalıtaş Harmanlı/Yeni Harmanlı Cumhuriyet Canlara Karabahşılı Reşadiye			
	P5: Repair of Technological Bridges Damaged in Earthquake (Tohma, Ağın, Beylerderesi Bridges Earthquake Damage Repair)	Sütlüce Sürür Durucasu Yakınca Cevatpaşa Yedibağ Akpınar			
Municipalities	Metropolitan Municipalities of the affected Provinces: Hatay Gaziantep Malatya Adıyaman Elazığ				x
	Municipalities of the affected districts: Nurdağı Islahiye Hassa Kırıkhan Reyhanlı Samandağ Antakya Doğanşehir Gölbaşı Akçadağ			x	

Stakeholder Groups	Stakeholders	Affected Parties		Other Interested Parties
		Direct Stakeholders	Indirect Stakeholders	
	Darende Ağın			
NGO's and organizations	Turkish Drivers and Automobile Association International Transporters Association Interested national NGOs Interested international NGOs Local logistics and transporters associations			x
Local sector	Service or Good Providers Local businesses Chamber of Tradesmen and Craftsmen			x
Academics	Universities Institutes			x
Vulnerable/ Disadvantaged Individuals or Groups	People with physical or mental disabilities PAPs with chronic diseases or bedridden people Female heads of households Poor people living on government or association aid within Project Aol Elderly people in need of care and social assistance Unemployed (even though they are looking for a job) People who are homebound due to chronic illness Illiterate adults Earthquake victims Refugees, migrants, citizens with limited Turkish language abilities Villagers who do not own land and work on other people's lands as daily wage earners.	x		
Media including social media	Regional and local media			x

Information Disclosure, Methods and Tools of Stakeholder Engagement and GRM are defined in the project SEP. Information sharing and consultation issues, participation methods and implementation tools foreseen for the stakeholders of the project are also defined and presented in the SEP of the Project.



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7 GRIEVANCE REDRESS MECHANISM

7.1 Project-level Grievance Redress Mechanism (GRM)

The main purpose of the GRM is to help resolve project-related notifications and complaints in a timely, effective and efficient manner to the satisfaction of all stakeholders.

GRM is also one of the most important tools of the stakeholder participation management process, which enables stakeholders to convey their problems, complaints and concerns about the project to the relevant units of the project, and to resolve the complaints with correct methods and healthy communication.

GRM sets standards and principles to establish safe and constructive effective stakeholder communication.

The GRM developed in this context;

- Clearly disclosed and informed to all stakeholders,
- Complaints from stakeholders are recorded,
- Complaints are evaluated and concluded within the framework and time period determined by the procedure,
- Designed as a completely free, accessible and secure system in which no information is shared with third parties as adverse data.

GRM defines the management of the anonymous grievances and Sexual Exploitation and Abuse/Sexual Harassment (SEA/SH) grievances.

Currently, complaints can be submitted to KGM using the "Complaint Notification Form for Natural Persons" and "Complaint Notification Form for Legal Entities" available on the website.

Within the scope of the Project, GRM will continue to be integrated and used in accordance with AIIB's ESF.

Complaints submitted to KGM regarding the Project will be recorded with the phrase "Türkiye Emergency Road Rehabilitation and Reconstruction Project" and evaluation and solution steps will be taken. Notifications/complaints recorded in the data file and included in the evaluation process will be concluded through mutual communication and consultations with stakeholders.

When both external and internal stakeholders have problems, concerns or difficulties in providing their contact information and identity information, the complaints submitted by the stakeholders will be evaluated first and recorded as Anonymous complaints or anonymous suggestions.

Stakeholders can convey all their wishes and complaints through the forms on the website for external stakeholders³⁸, which have been revised with the addition of an "anonymous" option.

Addressing Sexual Exploitation and Abuse/Sexual Harassment (SEA/SH): In line with the notifications received, the units and employees who first handle the notification will be trained on how to manage SEA/SH related complaints. All relevant units and staff of the project will be trained with the basic skills to respond to SEA/SH disclosures in a compassionate and non-judgmental manner and to know how to intervene.

The operation of the GRM will be carried out in accordance with the workflow in the GRM Procedure explained in the SEP.

³⁸ <https://www.kgm.gov.tr/Sayfalar/KGM/SiteTr/Root/SikayetGeriBildirim.aspx>



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7.2 Internal Grievance Redress Mechanism (Worker GRM)

Worker Grievance Redress Mechanism is defined as the internal grievance mechanism that receives complaints from Project workers³⁹ in accordance with the AIIB ESS 1.

As described in the SEP, each sub-project' Contractors establish and implement a GRM for the workforce, including subcontractors, in the early stages of the construction process. GRM is open to all employees within the scope of the Project including all construction contractors' workers. The Contractor GRM ensures that any employee who raises a grievance will not be subject to any retaliation.

7.3 GRM Tools

The Project's methods and tools for GRM are described below, including the consultation tools currently used by KGM. These methods and tools will also be actively used within the scope of the Grievance Redress Mechanism which is identified under the Section 7 of SEP document (CNR-KGM-TERRRP-SEP-001).

Grievance Redress Mechanism (GRM): The GRM, which will include the operation of the process where the notifications, records, information and complaints of the stakeholders including workers will be kept, the complaints will be evaluated and monitored and the results will be communicated to the stakeholders including workers with the feedbacks.

KGM Websites: The websites given below will be active tools in the stakeholder engagement process and GRM throughout the life of the Project.

- KGM Website: <https://www.kgm.gov.tr/Sayfalar/KGM/SiteTr/Root/SikayetGeriBildirim.aspx>
- Project Website: <https://www.kgm.gov.tr/Sayfalar/KGM/SiteTr/Projeler/DisKrediliProjeler.aspx>

E-mail address to external stakeholders: Project authorized persons can reach stakeholders via e-mail addresses in order to reach stakeholders and/or provide feedback.

- KGM e-mail: info@kgm.gov.tr
- 5. Regional Directorate e-mail: bol05@kgm.gov.tr
- 8. Regional Directorate e-mail: bol08@kgm.gov.tr
- Project e-mail: diskrediliprojeler@kgm.gov.tr

Alternative Tools: The following tools and methods are planned to be used simultaneously in order to ensure stakeholder participation of vulnerable/disadvantaged individuals/groups such as illiterate population, people with disabilities and refugee groups who do not have access to the internet, smart phones, social media or e-mail.

Letter/post: Project brochures (including project information, grievance redress mechanism, etc.), postings, reports or announcements can be sent to disadvantaged or vulnerable groups or individuals who do not have access to the internet, smartphone, social media or e-mail.

Public boards: Announcements and information posters of communication channels related to the Project can be used in common public areas in surrounding settlements, mukhtar offices, municipalities.

³⁹ Project workers include: (a) persons engaged directly by the Client (whether full-time, part-time, temporary, seasonal or migrant), to work specifically on the Project; and (b) personnel of contractors engaged by the Client to work on the Project and of subcontractors hired by these contractors to work on the Project.



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Posters/brochures/flyers: Brochures/flyers with communication channels, announcements and information about the Project can be posted in the common public areas in the surrounding settlements, headman's offices, municipalities, provincial directorates, when necessary.

Local media: Announcements will be made in the printed and visual media at the stages and situations required by the Project.

Stakeholder visits: Face-to-face meetings will be held with stakeholders during the project process, and stakeholder visits will be made when necessary for monitoring and evaluation processes.

Consultation meetings: Consultation meetings can be held during the project process when needed and when stakeholders demand. Meetings will be held in places and places that will facilitate the participation of stakeholders.

7.4 AIIB's Project-Affected People's Mechanism (PPM)

AIIB has established a Project-affected People's Mechanism (PPM) to provide an opportunity for an independent and impartial review of submissions from Project-affected people who believe they have been or are likely to be adversely affected by AIIB's failure to implement the ESP when the Complaints cannot be addressed satisfactorily through Project-level GRM or AIIB Management's processes. AIIB Policy on the Project-affected People's Mechanism and Rules of Procedure of the PPM guide the PPM. The Complaints-resolution, Evaluation, and Integrity Unit (CEIU) is responsible for the functioning of the PPM. AIIB PPM is also open to complaints may be received from the Project. AIIB PPM is independent of the Project's own GRM, in addition it is a channel Project complaints can be submitted which has been explained in the GRM Procedure in the SEP document.

7.5 CİMER: Turkish Presidential Communication Center

Third national GRM is "CİMER" which is "Cumhurbaşkanlığı İletişim Merkezi - Turkish Presidential Communication Center" which is also a leg of the Project GRM.

Grievances can be conveyed by:

- Hotline "Alo 150" (established by Türk Telecom),
- Written - Online via www.cimer.gov.tr, and
- Written – Post via T.C Cumhurbaşkanlığı Külliyesi 06560 Beştepe, Ankara, TÜRKİYE

CİMER conveys 99% of received complaints to related governmental institutions.



APPENDIX-1 LIST OF THE INDIVIDUALS/ORGANIZATIONS PREPARED OR CONTRIBUTED TO ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA)

Individual/Organization	Position/Expertise	Relevant ESIA Chapter
Müge Yeniceli	Environmental Engineer	Full ESIA
Emre Erciyas	Environmental Engineer	Full ESIA
Canan Erkoçođlu	OHS Specialist	Chapter 2 Regulatory Framework Chapter 4.13 Occupational Health and Safety Chapter 5 ESMP
Ph.D. Levent Biler	Ecologist	Chapter 2 Regulatory Framework Chapter 4.7 Biological Environment Chapter 5 ESMP
Mert İnanç Öрге	Geological Engineer	Chapter 2 Regulatory Framework Chapter 4.1 Land Use, Soils and Geology Chapter 4.4 Water Resources
Özlem Ersavaş	Social Specialist	Chapter 2 Regulatory Framework Chapter 4.8 Socio-Economic Environment Chapter 4.9 Labor and Working Conditions Chapter 4.10 Community Health and Safety Chapter 4.12 Resettlement and Land Acquisition and Livelihood Chapter 5 ESMP Chapter 6 Stakeholder Engagement Chapter 7 Grievance Redress Mechanism