REPUBLIC OF TURKEY
MINISTRY OF TRANSPORT
AND INFRASTRUCTURE

AYGM
Altyapı Yatırımları Genel Müdürlüğü

ÇINAR®
ENGINEERING
CONSULTANCY INC.



DİVRİĞİ-KARS-GEORGIA BORDER RAILWAY LINE REHABILITATION AND MODERNIZATION PROJECT

POLLUTION PREVENTION AND WASTE MANAGEMENT PLAN

CNR-ETMIC-PPWMP-001

(Final)

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ABBREVIATIONS & ACRONYMS

AIIB	Asian Infrastructure Investment Bank
AYGM	Directorate General of Infrastructure Investments
BMP	Biodiversity Management Plan
BTK	Baku-Tbilisi-Kars
CHMP	Cultural Heritage Management Plan
CHSMP	Community Health and Safety Management Plan
ÇINAR	Çınar Engineering Consultancy Inc.
CTC	Centralized Traffic Control
DAS	Distributed Acoustic Detection
EHS	Environmental, Health, and Safety
EIA	Environmental Impact Assessment
EPRP	Emergency Preparedness and Response Plan
ESF	Environmental and Social Framework
ESIA	Environmental and Social Impact Assessment
ESIRT	Environment and Social Incidence Response Toolkit
ESMP	Environmental and Social Management Plan
ESS	Environmental and Social Standard
ETMIC	Eastern Türkiye Middle Corridor Railway Development Project
GIIP	Good International Industry Practice
IsDB	Islamic Development Bank
KPI	Key Performance Indicators
LMP	Labor Management Procedure
MoEUCC	Ministry of Environment, Urbanization and Climate Change
MoTAT	Mobile Waste Tracking System
PPWMP	Pollution Prevention and Waste Management Plan
RAP	Resettlement Action Plan
RCA	Root Cause Analysis
RF	Resettlement Framework
SEP	Stakeholder Engagement Plan
TMP	Traffic Management Plan
WB	World Bank
WBG	World Bank Group

1. INTRODUCTION

The Divriği-Kars-Georgia Border Railway Line Rehabilitation and Modernization Project (covered under Component 1 of Eastern Türkiye Middle Corridor Railway Development Project (ETMIC)) stands as a transformative initiative poised to rejuvenate and upgrade the existing railway infrastructure spanning several provinces in Türkiye. This ambitious project, overseen by the General Directorate of Infrastructure Investments (AYGM) under the Ministry of Transport and Infrastructure (MoTI), seeks not only to modernize rail transportation but also to catalyze regional economic growth and fortify cross-border connectivity.

The multifaceted project unfolds in several strategic components. The preliminary phase involves meticulous land preparation activities, setting the stage for an extensive construction phase encompassing the refurbishment of railway tracks, bridges, and stations. The operational phase is dedicated to ensuring the seamless and sustainable operation of the revitalized railway infrastructure.

The ETMIC project consists of two main components:

- Component-1. Rehabilitation and Modernization of the Divriği-Kars-Georgia Border Railway Line
  - Sub-component 1.1. Design, Infrastructure and Superstructure Works, Electrification, and Signalization of the Divriği-Kars-Georgia Border Railway Line
  - Sub-component 1.2. Design Supervision and Construction Supervision Services for the Rehabilitation and Modernization of the Divriği-Kars-Georgia Border Railway Line
- Component-2. Project Management
  - This component focuses on the effective management and oversight of the project implementation process. It involves the financing and mobilization of specialized firms to provide project management, engineering, social and environmental monitoring, and evaluation services.

The environmental and social risk rating of ETMIC identified as “Substantial” according to the Environmental and Social Framework (ESF) of the World Bank.

A contract was signed between AYGM and Çınar Engineering Consultancy Inc. (ÇINAR) in November 2023, for conducting the Environmental and Social Impact Assessment in accordance with the WB standards. The contract entails the preparation of an ESIA Package, which includes the following components:

- Environmental and Social Impact Assessment Report (ESIA)
- Environmental and Social Management Plan (ESMP),
- Community Health and Safety Management Plan (CHSMP),
- Emergency Preparedness and Response Plan (EPRP),
- Traffic Management Plan (TMP),
- Biodiversity Management Plan (BMP),
- Pollution Prevention and Waste Management Plan (PPWMP),
- Cultural Heritage Management Plan (CHMP),
- Labor Management Procedure (LMP),
- Resettlement Framework (RF),
- Occupational Health and Safety Management Plan (OHSMP)
- Stakeholder Engagement Plan (SEP).

During these studies; environmental, social, and culturally sensitive areas in the project impact area were specified in the ESIA reports, and mitigation measures were proposed.

This PPWMP has been prepared to cover all phases (construction and operation) of the Project in accordance with the World Bank (WB) Environmental Social Standards (ESSs), Asian Infrastructure Investment Bank (AIIB) ESSs, the regulatory frameworks of the Republic of Türkiye, World Bank Group (WBG) General and Sector-Specific Environmental, Health, and Safety (EHS) Guidelines, and applicable Good International Industry Practice (GIIP).

The main purposes of this PPWMP are to manage the activities that may cause pollution effectively during the construction and operation phases of the Project and to define the necessary corrective and preventive actions and steps. This involves identifying best practices in waste management to ensure that all actions align with the Project Standards.

The PPWMP also provides a clear outline of actions to prevent the release of pollutants or spills into the air, water, and land during the Project's execution. If avoiding and minimizing them entirely is not possible, the PPWMP emphasizes mitigation of their release.

This PPWMP therefore:

- Outlines the key policies, legislation and standards relating to pollution prevention and waste management,
- Defines roles and responsibilities,
- Identifies actions and measures necessary for the effective prevention of pollution and management of waste,
- Covers both accidental and intended emissions to air, water and soils,
- Details specific control measures to be implemented by AYGM and its contractors/subcontractors/service providers,
- Incorporates the requirements of the Environmental and Social Impact Assessment (ESIA) Report findings, international standards, national legislation, Lender(s)/Bank(s)' requirements and Project-specific construction permits.

The standards and requirements detailed in this plan primarily target the construction phase of the Project. However, they can serve as a valuable reference for creating plans and procedures for other phases. Plans for the operation phase will be prepared to sync with the Project's operational procedures, which will be built upon this PPWMP. These operational plans will evolve alongside the development of operational procedures during the construction phase.

1.1. Scope and Objectives

The main goal of PPWMP is to outline the necessary steps related to organization, responsibilities, measures, planning and system implementation. This comprehensive approach is aimed at preventing the Project's environmental impact on key components such as soil, air, and water during its implementation. PPWMP has been produced to include both the construction and operational phases of the Project, ensuring compliance with the Project Standards.

The contractor will fulfil the requirements outlined in this PPWMP by customizing them to suit its own operations. Before commencing construction, the Contractor should formulate its own site-specific PPWMP and procedures which will be approved by AYGM as well.

The objective of the PPWMP is to enhance resource efficiency and capacity management and outline requirements for pollution prevention and waste management. This involves two processes: General Monitoring and Management System Verification. Both of these processes necessitate the establishment of robust Key Performance Indicators (KPIs). These indicators can take the form of numerical values or qualitative characteristics that aid in assessing performance over time. They serve as valuable tools to determine the effectiveness of control measures. The particular KPIs pertinent to this PPWMP are indicated in Table 1.

Table 1. Key Performance Indicators for this PPWMP

Key Performance Indicator	Target	Timeframe	Record	Responsibility
Noise measurement results	No parameter exceeds the project standards	Every 6 months	Analysis Results	Contractors
Air quality measurement results	No parameter exceeds the project standards	Every 6 months	Analysis Results	Contractors
Surface water sampling and analysis results	No parameter exceeds the project standards	Every 6 months	Analysis Results	Contractors
Groundwater monitoring results	No parameter exceeds the project standards	Every 6 months	Analysis Results	Contractors
Soil Quality	No parameter exceeds the project standards	Every 6 months	Analysis Results	Contractors
Records on waste removal	All types of waste send to licensed recycling/recovery/disposal facilities	Weekly	Waste Disposal Records	Contractors
Records on wastewater removal	No wastewater discharge into the receiving environment	Weekly	Wastewater Delivery Records	Contractors
Records of complaints about noise and dust	Gradual decrease by achieving zero grievances	Daily	Grievance records	Contractors
Vehicle exhaust emission control records along with periodic maintenance/repair records	Vehicle exhaust emissions comply with project standards and maintenance of all vehicles used in the project performed within their maintenance period	Annually	Maintenance reports	Contractors
Number of non-compliance with the requirements of this PPWMP	Zero non-compliances	Once in a year	Monitoring reports	Contractors
Percentage of all staff who have received relevant and adequate trainings	%100	Annually	Training minutes	Contractors

2. ROLES AND RESPONSIBILITIES

An all-encompassing approach to pollution prevention encompasses a diverse group of stakeholders, including the Project Owner, Contractors (and subcontractors), local authorities, regulatory agencies, and the public. This comprehensive system necessitates well-structured processes related to the distribution of information, training, and assignment of responsibilities, management actions, monitoring, control, and remedial measures.

AYGM will monitor the implementation of the PPWMP through auditing and inspections. Specifically, the following roles and responsibilities will apply:

- Develop and maintain project-specific pollution prevention and waste management requirements and effectively communicate these requirements to contractors.
- Supervise and control/monitor the implementation of the PPWMP and its procedures by contractors through activities by means of periodic audits.

The Contractor(s) will ensure that subcontractors work in compliance with the requirements of the PPWMP. The Contractor(s) will develop a site-specific PPWMP and Procedures for pollution prevention measures which will cover all Project aspects related to; air emissions, noise, water sources and wastewater management. In addition, site-specific PPWMP should be approved by AYGM prior to commencement of construction works. Specifically, the following roles and responsibilities will apply:

- Develop, implement, and maintain a detailed site-specific PPWMP that meets or exceeds the minimum requirements and precautions outlined in this PPWMP,
- Make sure that all activities are performed according to the requirements of this PPWMP and the site-specific PPWMP and its procedures by means of regular inspections within the scope of internal and external audits,
- Notify local communities on the start of activities,
- Provide trainings to the staff on the site-specific PPWMP and its procedures,
- Conduct necessary noise, air, water and soil measurements through accredited laboratories,
- Prepare quarterly and annual environmental reports that will include details on the implementation of the pollution prevention and waste management measures (including risks, non-conformities and remedial measures) and share with AYGM,
- Promptly notify any incident or accident related to the Project which has, or is likely to have, a significant adverse effect on the environment, the affected communities, the public or workers to AYGM,
- Immediately take necessary measures to remedy any non-conformity,
- Within the project, the responsibility for pollution prevention belongs to the Contractor(s), according to the principle of “polluter pays”.

3. LEGAL FRAMEWORK/PROJECT STANDARDS

3.1. National Legislation

Turkish Environment 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 Environment Law provides a legal framework for the development of environmental regulations in accordance with national and international standards.

The regulations that come into prominence in the project management are summarized in Table 2.

Table 2. Prominent Regulations Covered by National Legislation

Regulation	Official Gazette Date	Official Gazette Number
Regulation on Environmental Impact Assessment	29.07.2022	31907
Regulation on Environmental Permit and License	10.09.2014	29115
Regulation on Environmental Audit	12.06.2021	31509
Regulation Concerning Environmental Management Services	01.11.2022	32000
Regulation on Traffic in Highway	18.07.1997	23053 (Duplicate)
WASTES		
Regulation on Waste Management	02.04.2015	29314
Regulation on Waste Oil Management	21.12.2019	30985
Regulation on the Control of Vegetable Waste Oils	06.06.2015	29378
Regulation on Packaging Waste Control	26.06.2021	31523
Regulation on Landfilling of Wastes	26.03.2010	27533
Regulation on Control of Waste Vegetable Oils	06.06.2015	29378
Regulation on Control of Waste Batteries and Accumulators	31.08.2004	25569
Regulation on Control of End-of-Life Tires	25.11.2006	26357
Regulation on the Control of Waste Electrical and Electronic Equipment	26.12.2022	32055
Regulation on Zero Waste	12.07.2019	30829
Regulation on Control of Medical Wastes	25.01.2017	29959
Regulation on Control of Excavation Soil, Construction and Demolition Wastes	18.03.2004	25406
AIR		
Regulation on Industrial Air Pollution Control	03.07.2009	27277
Regulation on Air Quality Assessment and Management	06.06.2008	26898
Regulation on Exhaust Gas Emission Control	11.03.2017	30004
LAND USE AND SOIL		
Regulation on Control of Soil Pollution and Point Source Contaminated Sites	08.06.2010	27605
Regulation on Protection, Use and Planning of Agricultural Lands	09.12.2017	30265
Regulation on the implementation of articles 17 and 18 of the Forest Law No. 6831	30.11.2021	31675
Regulation on Land Consolidation and On-farm Development Services Implementation	07.02.2019	30679
Regulation Concerning the rehabilitation of the Lands Disturbed by Mining Activities	23.01.2010	27471
Regulation on Pastures	31.07.1998	23419
NOISE		
Regulation on Environmental Noise Control	30.11.2022	32029
Regulation on Environmental Noise Emission Caused by Equipment Used Outdoors	30.12.2006	26392
WATER		

Regulation	Official Gazette Date	Official Gazette Number
Regulation on Water Pollution Control	31.12.2004	25687
Regulation on Surface Water Quality	30.11.2012	28483
Regulation on the Quality and Treatment of Drinking Water Supply	06.07.2019	30823
Regulation on Water Intended for Human Consumption	17.02.2005	25730
Regulation on the Protection of Groundwater against Pollution and Deterioration	07.04.2012	28257
Regulation on Control of Pollution Caused by Hazardous Substances in and around Water Bodies.	26.11.2005	26005
Regulation on the Procedures and Principles to be Followed in Determining the Tariffs of Wastewater Infrastructure and Domestic Solid Waste Disposal Facilities	27.10.2010	27742
Regulation on Identification of Sensitive Water Bodies and the Areas affecting this Water Bodies	23.12.2016	29927
Regulation on Monitoring of Surface Waters and Groundwater	11.02.2014	28910
Regulation on Protection of Drinking and Utility Water Basins	28.10.2017	30224
MANAGEMENT OF CHEMICALS		
Regulation on Prevention of Major Industrial Accidents and Lessening Their Adverse Impacts	02.03.2019	30702
Regulation on Classification, Labelling and Package of Materials and Mixtures	11.12.2013	28848
Regulation on Safety Information Forms on Hazardous Substances and Mixtures	13.12.2014	29204
Regulation Regarding Transport of Hazardous Materials on Highways	18.06.2022	31870
BIODIVERSITY		
Regulation on the Protection of Wetlands	04.04.2014	28962
Regulation on Wildlife Preservation and Wildlife Development Areas	08.11.2004	25637
CLIMATE CHANGE		
Regulation on Minimization of Ozone Depleting Substances	07.04.2017	30031
Regulation on Monitoring of Greenhouse Gas Emissions	17.05.2014	29003

3.2. International Standards

As the WB, AIIB and IsDB are the lending institutions/banks for the project, the project activities should be performed in line with international standards and GIIP in addition to national legislation.

The environmental and social policies called the Environmental and Social Framework (ESF) has been adopted by the World Bank in August 2016. The ESF enhances the World Bank's commitment to sustainable development through ten (10) Environmental and Social Standards (ESSs) that are designed to support Borrowers' E&S risk management. The ESF enables Borrowers to better manage project risks as well as improve environmental and social performance, consistent with good international practices[1]. The ESSs are listed below:

- ESS1: Assessment and Management of Environmental and Social Risks and Impacts
- ESS2: Labor and Working Conditions
- ESS3: Resource Efficiency and Pollution Prevention and Management
- ESS4: Community Health and Safety
- ESS5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement
- ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources

1 Environmental and Social Framework, retriewed 07.06.2023 from the official web site of the World Bank https://www.worldbank.org/en/projects-operations/environmental-and-social-framework

- ESS7: Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities
- ESS8: Cultural Heritage
- ESS9: Financial Intermediaries
- ESS10: Stakeholder Engagement and Information Disclosure

Moreover, WBG General Environmental, Health and Safety (EHS) Guideline (2007) is another document that should be taken into consideration when carrying out project activities. In addition, WBG Environmental, Health and Safety (EHS) Guideline for Railways (2007) will applicable within the scope of this Plan.

The Environmental and Social Safeguards Policy of the Islamic Development Bank (IsDB), as of February 2020, outlines the institution's commitment to promoting sustainable development while minimizing adverse environmental and social impacts associated with its projects.

On the other hand, AIIB incorporates its own policy addressing environmental and social impacts into ESF which was approved in February 2016 and amended through February 2019, May 2021 and November 2022. The ESF consists of three (3) ESSs which are indicated below:

- ESS1: Environmental and Social Assessment and Management
- ESS2: Land Acquisition and Involuntary Resettlement
- ESS3: Indigenous Peoples

It should be noted at this point that evaluations will be made based on WB ESSs among international standards.

3.3. Gap Analysis

Table 3 shows a gap analysis that identifies the requirements for WB ESS3, the scale the national ES legislation covers, gaps and recommended actions/measures to address the gaps in the current project, specifically for pollution prevention and waste management.

Table 3. Gap Analysis

ESS	Requirements	Coverage by National Legislation	Identified Gaps / Actions to Bridge the Gaps
ESS3: Resource Efficiency and Pollution Prevention	Minimize resource use, waste generation, and pollution during project implementation. Implement measures to reduce energy consumption, water usage, and emissions.	Turkish environmental legislation includes regulations on pollution prevention and resource management.	Most Turkish national laws and regulations are in line with European Union (EU) directives. There is no major gap between ESS3 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 ESS3, 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. 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 ESS3 on major environmental issues such as waste, air pollution, water resources, wastewater, noise level. On the other hand, ESS3 requires application of pollution prevention and control technologies and practices under the Project

ESS	Requirements	Coverage by National Legislation	Identified Gaps / Actions to Bridge the Gaps
			consistent with international good practice, as reflected in internationally recognized standards, such as the World Bank Group (WBG) Environmental, Health and Safety (EHS) Guidelines. To address these identified gaps, the project has implemented several recommended actions aimed at enhancing resource efficiency and pollution prevention measures. Firstly, comprehensive sub-management plans have been developed, integrating ESS3 standards to minimize resource consumption and pollution generation throughout the project lifecycle. These plans outline specific strategies, technologies, and best practices for reducing waste generation, optimizing resource use, and mitigating pollution risks. Additionally, the project has invested in advanced pollution control technologies and treatment systems to ensure compliance with stringent pollution prevention standards. Regular monitoring and reporting mechanisms have also been established to track resource consumption, waste generation, and pollution levels, enabling timely interventions and continuous improvement. Through these proactive measures, the project aims to align with ESS3 requirements, mitigate environmental risks, and promote sustainable resource management practices. Besides, the relevant requirements of the WBG EHS Guidelines have been applied to the Project in accordance with the ESS3. 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.

4. MITIGATION MEASURES AND MANAGEMENT CONTROLS

4.1. Waste Management Practices

Project activities result in generation of a wide range of wastes that require an adequate planning to be in compliance with the Applicable E&S Standards. Accordingly, in order to manage wastes effectively, internationally well accepted "Waste Management Hierarchy" shall be used with a focus on waste prevention, and then a decreasing focus on waste reuse, recycling, recovery, and disposal as it can be seen from Figure 1.

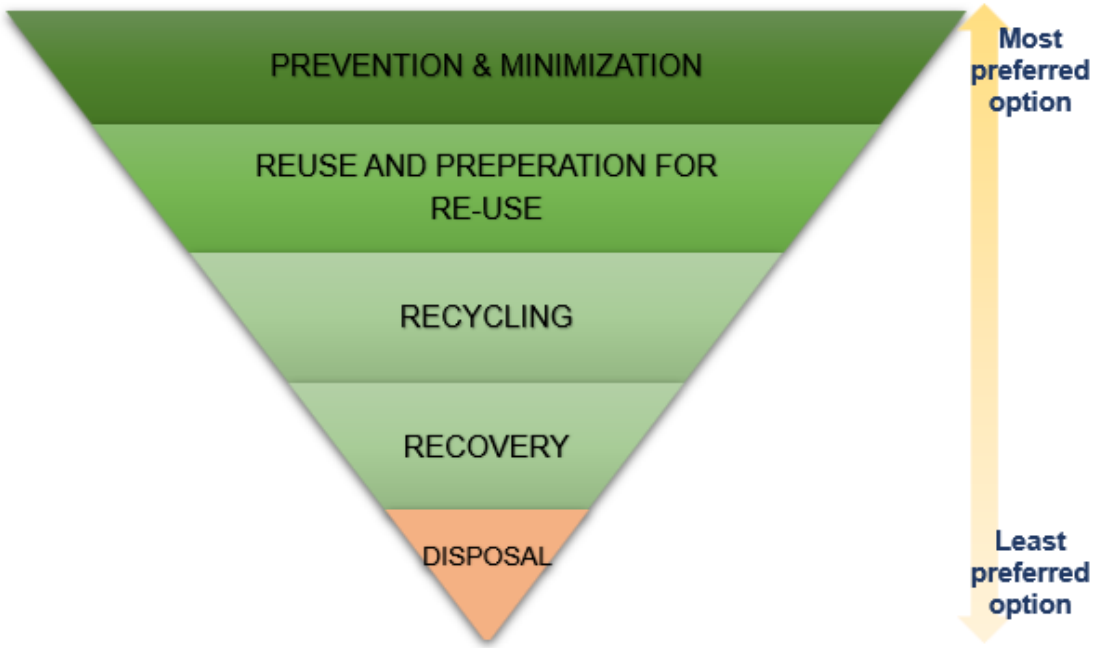


Figure 1. Waste Management Hierarchy

Definitions of the hierarchical steps presented above are given below:

- As the option with the highest priority, generation of wastes shall be prevented / minimized as much as possible by implementation of practical and/or embedded measures, for instance design measures of manufacturing processes,
- As the option with secondary priority, generated wastes shall be re-used or prepared for re-use without any treatment,
- The wastes which could not be re-used, shall be recycled,
- Recovery options, such as energy recovery, shall be evaluated as the quaternary priority, and
- As the option with lowest priority, after evaluation and implementation of all above steps, remaining wastes shall be sent to final disposal, such as landfilling, incineration, etc.

4.1.1. Waste Generation and Classification

4.1.1.1. Land Preparation, Construction and Rehabilitation Phases

During the phases of land preparation and construction, various types of waste, both hazardous and non-hazardous, are anticipated. These encompass domestic waste

generated by employees, construction waste, potential waste oils from vehicles, end-of-life tires, vegetable oils, waste batteries and accumulators, packaging waste, and surplus excavated material, among others.

Even though the number of workforce and construction machinery and equipment to be involved in the construction will be high and significant volumes of earthworks will take place, the Project will avoid and/or minimize impacts due to waste generation by complying with the requirement of national legislation and applying international standards on waste management.

Municipal Solid Waste (Non-hazardous)

Domestic solid waste from the personnel will be collected in closed containers located at various points of the project area including camp sites. They will be transported to the solid waste collection system belonging to the nearest municipality and be disposed of at licensed facilities/sanitary landfills. To effectively handle these waste quantities, agreements for waste reuse, recycling, and disposal will be established with the relevant Municipality.

The collection, storage, recovery and disposal of solid waste will be performed in accordance with the provisions of “Waste Management Regulation”.

Excavation and Construction Waste

The Project will aim to maximize the use of excavated material to ensure resource efficiency, minimize amount of material to be extracted from material borrow sites and reduce associated costs. Excavated material having sufficient quality for fill operations will be reused in the construction works with the requirements in Regulation on Control of Excavated Soil, Construction and Demolition Wastes.

In all sections along the construction route, such as wetlands, steeply sloping areas, and agricultural zones, the topsoil – destined for use in bio-restoration – will be carefully removed and preserved, following guidelines established, for potential future use. Throughout excavation activities, an ample quantity of suitable and reusable excavation soil necessary for backfilling will be segregated and stored on-site.

The topsoil will be stored separately from excavation materials and will be used again in land rehabilitation activities after the construction works are completed.

During these processes, the provisions of Excavation Soil, Construction and Demolition Waste Control Regulation regarding the storage of topsoil will be complied with as follows:

- Topsoil will be stored in a suitable area and necessary protection measures will be taken to prevent dispersion by wind or water flow or other factors, mixing with foreign substances and deterioration of its original properties.
- The area where the topsoil will be stored will not have a slope of more than 5%.
- Possible losses will be prevented and soil quality will be maintained during storage of topsoil.
- If the topsoil is to be stored for a long time, the surface will be covered with fast growing plants.

Waste material generated from excavation works carried out during land preparation and construction phases will not be disposed into streams with or without flow in accordance with the Prime Ministry 2006/27 “Stream Beds and Floods Circular”.

The Contractor 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.

Packaging Wastes (Paper, Glass, Plastic etc.)

Throughout the land preparation, construction, rehabilitation phases and the operational phase, various packaging wastes such as paper-cardboard, plastic, and glass are expected to be generated. There would be packaging waste from the packaging materials used in the transport of equipment, from the packaging of the materials used and from the personnel in land preparation, construction and rehabilitation phases of the Project.

Packaging waste, including packing paper, plastic, and glass bottles, will be separately collected apart from other waste streams. These materials will be directed to authorize recycling facilities, aligning with Article 23 of the Regulation on Control of Packaging Waste. The collection and proper disposal of these packaging materials within the camp sites will be executed in full adherence to relevant regulation of the national Packaging Waste Control Regulation.

Medical Wastes

The medical wastes should be placed inside red plastic bags which are resistant to tearing, piercing, bursting and carrying; originally from moderate density polyethylene material, with double bottom seam and without pleats, with double ply thickness of 100 microns, with at least 10 kg holding capacity, carrying on both sides the warning symbol of "International Biohazard" and "Attention! Medical Waste" with at an easily readable size. The bags would be filled to a maximum of 3/4 capacity and would be tightly closed and when necessary double bagging would be done having the same specifications in order to ensure absolute leak-proofing.

Medical wastes that have cutting and piercing properties would be collected separately from the other waste in a plastic or laminated cardboard having the same specification as piercing, tearing, breaking and bursting resistant, waterproof and leak-proof, could not be opened or tampered with, having the warning symbol of "International Biohazard" and warning of "Attention! Cutting And Piercing Medical Waste". These collection containers would be filled a maximum of 3/4, would be tightly closed and put into red plastic bags and once the waste boxes are filled, they would absolutely not be compressed, opened, emptied or recycled.

Medical wastes collected in the camp sites will be disposed of by delivering to the nearest health institution or municipal medical waste collection system. Medical wastes that are produced under the Project will be regularly recorded according to the Regulation on Control of Medical Waste. Waste generation amount and delivery information must be processed in online platform of Ministry of Environment, Urbanization and Climate Change (MoEUCC) via Integrated Environmental Information System/Waste Management System Application.

End-of-Life Tires

It is anticipated that end-of-life tires will not pose a concern within the project area, as tire replacements will take place at facilities located outside of the project zone. Nevertheless, should end-of-life tires be generated due to maintenance activities conducted on-site, their disposal will strictly adhere to the guidelines stipulated in the Regulation on the Control of End-of-Life Tires.

Waste Batteries and Accumulators

The maintenance process of the vehicles to be used in land preparation and construction period of the Project would be done in authorized services. However, when it is not possible, the maintenance procedure will be carried within the facility. In cases where the maintenance

process of the vehicles used in the Project are carried out within the facility, possible waste batteries that come out would be stored in a closed containers with a leak-proof floor according to the Regulation on Control of Waste Batteries and Accumulators and Electrical and Electronic Equipment Control Regulation, respectively. Batteries will be delivered to the collection points established by the municipalities or by the companies distributing or selling batteries and waste accumulators (vehicle batteries) will be delivered to the temporary storage areas established by the companies distributing or selling accumulator products and maintenance companies.

Waste Oils

The maintenance and repair of vehicles designated for project activities will be conducted by authorized services situated outside the project area. In the event of activities like vehicle maintenance and oil changes within the project vicinity, any waste oils generated will be collected in impermeable tanks, kept distinct from other waste streams, and subsequently managed in alignment with the provisions laid out in the Waste Oil Management Regulation.

Waste generation amount and delivery information to the licensed disposal facility must be processed in online platform of MoEUCC via Integrated Environmental Information System/Waste Management System Application.

Waste Vegetable Oil

Within the scope of the project, if the catering of the personnel will be provided at the project area, the vegetable waste oil from cooking activities will be of concern.

Vegetable waste oils that will be generated within the scope of the project (mostly from the kitchens of the camp sites) will be collected in clean and covered containers apart from other wastes. Vegetable waste oils will not be discharged into sewers, soil, sea and similar receiving environments in order to protect the environment. Vegetable oil will be collected in separate containers having a waste label on them and they will be sent to licensed firms.

Hazardous Wastes

During the land preparation and construction phases of the Project, the following hazardous and special wastes are anticipated to be generated due to the associated activities:

Chemical Wastes: Chemical wastes can arise from the use of solvents, paints, coatings, and cleaning agents during surface preparation, painting, and maintenance activities. These may include substances such as paints containing heavy metals, solvents like acetone or xylene, and corrosive cleaners containing acids or alkalis.

Contaminated Soils: Excavation and earthmoving activities may result in the generation of contaminated soils containing petroleum hydrocarbons, heavy metals, or other pollutants. Contaminated soils may require special handling and disposal measures to prevent contamination of surrounding areas and groundwater.

Hazardous Construction Materials: Construction materials such as asbestos-containing materials (ACMs), lead-based paints, and treated wood products may be encountered during demolition, renovation, or repair work. These materials can pose health risks if not properly managed and disposed of in accordance with regulatory requirements.

Spent Lubricants and Oils: Machinery and equipment used in railway construction and maintenance may require lubricants and oils for proper operation. Spent lubricants and oils can become hazardous wastes if they become contaminated with heavy metals, PCBs, or other toxic substances during use.

Railway Ties and Infrastructure Materials: Old railway ties treated with preservatives such as creosote or pentachlorophenol may be replaced during rehabilitation projects. These

materials can be hazardous due to their chemical composition and may require proper handling and disposal to prevent environmental contamination.

Waste Batteries: Machinery and equipment used and electrical systems may involve the use of batteries. Spent batteries, such as lead-acid batteries, nickel-cadmium batteries, or lithium-ion batteries, are considered hazardous wastes due to their potential to release heavy metals and corrosive electrolytes.

The first step in managing hazardous wastes is to identify and classify the types of hazardous materials being generated. This involves conducting waste assessments, chemical analyses, and risk evaluations to determine the potential hazards associated with each waste stream.

Hazardous wastes will be collected and segregated at the point of generation to prevent contamination and ensure proper handling. Designated containers, labeling, and signage to clearly identify hazardous waste streams and separate them from non-hazardous waste streams will be used.

The designated storage areas or facilities for temporarily storing hazardous wastes prior to disposal will be established. These storage areas will be secure, well-ventilated, and equipped with secondary containment measures to prevent leaks, spills, and unauthorized access. an inventory management system to track the quantity, location, and condition of hazardous waste containers will be implemented.

Hazardous wastes will be packaged in suitable containers that are compatible with the waste material and capable of containing leaks or spills.

After that these wastes will be given to the licensed firms for final disposal.

Proper management of hazardous and special wastes is essential to prevent significant impacts on both environmental receptors and human health.

4.1.1.2. Operation Phase

During the operation phase, maintenance of project components including railway connection lines, stations and underpasses, overpasses and bridges and their use by staff and visitors will result in waste generation. Therefore, waste management will focus on recyclable waste and solid waste management. However, hazardous waste generated during maintenance activities should also be managed properly. Generation of the following types of wastes is anticipated during the operation phase:

- Solid waste generated at railway connection lines, stations and underpasses, overpasses and bridges and their use by staff and visitors,
- Railway litter (including illegally dumped non-hazardous waste),
- Sediment and sludge removed from storm water drainage systems, and
- Vegetation waste such as vegetation trimmings and mowed grass (non-hazardous)
- Metal waste (rivets, screws, sheet-machine parts, washers, locks, etc.),
- Dust seals, electric cables, polyethylene and polypropylene parts,
- Cabin glasses and wagon wood, loading crossbars,
- Waste engine and gear oils,
- Welding and paint burrs,
- Oily cloth, gloves, etc.
- Waste batteries.

Wastes from Maintenance and Repair Operations

During the operation phase, the formation of wastes that will result from the maintenance and repair of the trains will occur. Maintenance-repair wastes can be generally described as follows:

Ballast Cleaning: In this activity, which is repeated once every 5 years on average, it is estimated that waste generation (substance without ballast properties) will be released.

Superstructure Renovation/Renewal: Wastes to be caused by concrete sleepers (concrete blocks on which rails sit) resulting from superstructure renewal activities performed every 30 years on average.

Infrastructure Renovation/Renewal: Infrastructure renewal works to be carried out in extraordinary situations during the operation of the railway line, and its frequency cannot be estimated.

Accordingly, wastes listed below will be generated due to maintenance and repair works;

- Metal waste (rivets, screws, sheet-machine parts, washers, locks, etc.),
- Dust seals, electrical cables, polyethylene and polypropylene parts,
- Cab glasses and wagon woods, loading sleepers,
- Waste engine and gear oils,
- Welding and paint burrs,
- Oily cloth, gloves, etc.
- Waste batteries.

The maintenance / repair work on the railway lines will be carried out at large intervals or in one-off situations. Once the maintenance / repair work is completed, the generated wastes will be temporarily stored at the designated and permitted areas and will be collected by the licensed firms weekly for final disposal.

No intensive waste generation is expected during the operation phase. All waste management activities will be carried out in accordance with the “Waste Management Regulation”.

Municipal Solid Waste (Non-hazardous)

During the operation phase, solid waste will be generated due to the daily activities of the personnel to be employed at the stations. Likewise, there is solid waste generation from the visitors at the stations. In the later stages of financial modeling, the amount of waste expected to occur at each station will be calculated as soon as the number of operational staff and visitors is determined.

Solid wastes to be generated at the stations will be collected through the solid waste collection trucks of the relevant Municipalities from the collection areas that will be located during the operation period and taken to the municipal sanitary landfills.

In addition, visual control and periodic collection of wastes will be ensured along the railway routes, separation of these wastes according to their recyclability status, and the segregated wastes will be stored in separate containers and disposed in accordance with the Waste Management Regulation.

Hazardous and Special Waste

The limited amount of hazardous and special waste to be generated during the operation phase will include the following:

- 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.),

- Removed paint materials,
- Landscape and vegetation related waste (herbicide and pesticide containers),
- Waste batteries (used for powering signaling equipment, lighting, and other electrical systems. Spent batteries, such as lead-acid batteries, nickel-cadmium batteries, or lithium-ion batteries, are considered hazardous wastes due to their potential to release heavy metals and corrosive electrolytes).

The hazardous wastes will be collected separately from the non-hazardous wastes. They will be temporarily stored at the designated and permitted areas and will be collected by the licensed firms weekly for final disposal.

All types of waste to be generated during the construction and operation phases and their characteristics are given in following section. Waste codes listed in Table 4 are determined according to Annex-4 in (National) Waste Management Regulation.

Table 4. Waste Codes to be Generated During the Project Implementation

07 WASTES RESULTING FROM ORGANIC CHEMICAL PROCESSES

07 02 Wastes Resulting from Manufacturing, Formulation, Supply and Usage of Plastics, Synthetic Rubber and Synthetic Fiber

07 02 16	Wastes containing harmful silicon	(M)*

*** (M)** Whether waste is hazardous or not is determined by looking threshold concentration that is given in Waste Management Regulation (Appendix 6)

- Waste originated from materials used for insulation

07 04 Wastes Resulting from Manufacturing, Formulation, Supply and Usage of Organic Plant Protection Products (excluding 02 01 08 and 02 01 09), Materials (Agents) used for Wood Preservative (excluding 03 02) and Other Biocides

07 04 13	Wastes containing hazardous material	(M)

- These wastes will be generated as a result of shaping, scission, maintenance of lubricated and preservative-treated materials such as wood, 5/10 lumber, plywood etc.

08 WASTES RESULTING FROM MANUFACTURING, FORMULATION, SUPPLY AND USAGE OF LINING (DYES, VARNISHES AND VITREOUS ENAMELS), ADHESIVES, PUTTY AND PRINTING INKS)

08 01 Wastes Resulting from Manufacturing, Formulation, Supply and Usage and Detachment of Dye and Varnish

08 01 11	Waste dyes and varnish containing organic solvent or other hazardous materials	(M)
08 01 13	Sludge with dye and varnish, containing organic solvents and other hazardous materials	(M)
08 01 21	Wastes of dye and varnish remover	(A)*

*** (A)** Certainly hazardous waste regardless of properties

- These wastes will be generated as a result of usage of dye, varnish, hardening agents etc.

08 03 Wastes Resulting from Manufacturing, Formulation, Supply and Usage of Printing Inks

08 03 17	Waste printing toners containing hazardous materials	(M)

- These wastes include cartridges and toners used in offices.

08 04 Wastes Resulting from Manufacturing, Formulation, Supply and Usage of Adhesives and Insulators

08 04 09	Adhesive and filling compound waste containing organic solvents or other hazardous materials	(M)

- These wastes will be generated as a result of processes like agglutination, puttying etc.

13 WASTE OIL AND FUEL OIL (EDIBLE OILS, EXCLUDING O5 AND 12)

13 01 Waste Hydraulic Fluid

13 01 10	Mineral based hydraulic fluid	
13 01 11	Synthetic hydraulic fluid	
13 01 12	Biodegradable hydraulic fluid	

13 02 Waste Engine, Transmission and Lubrication Oils

13 02 06	Synthetic oils related to engine, transmission and lubrication	
13 02 07	Easily biodegradable engine, transmission and lubrication oils	

- These wastes classified in groups 13 01 and 13 02 include oils originating from instantaneous and periodic maintenance of vehicles and heavy machinery

13 03 Waste Insulating and Heat Transfer Oils

13 03 08	Synthetic insulating and heat transfer oils	

- These wastes include waste oils originating from energy equipment such as transformers, capacitors, generators

13 05 Oil/Water Separator Contents

13 05 02	Sludge generated from oil/water separator	(A)
13 05 06	Oil generated from oil/water separator	(A)

- These wastes include kitchen waste, wastes from storage areas, oils from upper part of Oil/Water separators, bottom sediments (settling oily matters) etc.

13 07 Waste Liquid Fuels

13 07 01	Fuel oil and diesel fuel	(A)
13 07 02	Gasoline	(A)

- These wastes consist of residual fuel from pouring tray accumulating during fuel delivery and residual fuel during cleaning of fuel tank

14 06 Waste Organic Solvents, Refrigerators and Foam/Aerosol Propellant Gases

14 06 01	Chlorofluorocarbons, HCFC, HFC	(A)

- These wastes contain packaged waste gas to be generated during repair and maintenance of cooling elements

15 WASTE PACKAGES; UNSPECIFIED ABSORBERS, MOPS, FILTER MATERİALS AND PROTECTIVE SUITS

15 01 Package (including waste packages collected separately by municipality)

15 01 10	Packages including residuals of hazardous materials or contaminated with of hazardous materials	(M)

- These wastes contain contaminated packages, packaging waste, container having hazardous materials.

15 02 Absorbers, Filter Material, Swabs and Protective Suits

15 02 02	Absorbers contaminated with hazardous materials, filter materials (oil filter provided that not defined differently),swabs, protective suits	(M)

- These wastes contain spill kit contaminated with hazardous materials, clothing and textile wastes such as workers' suit, shoe, glove etc. and also wastes coming from air and oil filters

16 WASTES NOT PREDEFINED IN THE LIST

16 01 Scrap Vehicles (including heavy machinery) and Wastes Resulting from Detachment of Pieces and Vehicle Maintenance (excluding 13,14, 16 06 and 16 08)

16 01 07	Oil filters	(A)
16 01 14	Antifreeze liquid containing hazardous materials	(M)

- These wastes contain oils resulting from periodic and instant maintenance of vehicles and heavy machinery.

16 02 Waste Electrical and Electronic Equipment

16 02 11	Waste equipment containing chlorofluorocarbons, HCFC, HFC	(M)

- These wastes are originated from periodic and instant maintenance and change of electrical and electronic equipment. Capacitors and transformers are so important to be collected very dangerous PCB (polychlorinated biphenyl) and PCT (polychlorinated terphenyls)

16 06 Batteries and Accumulators

16 06 01	Lead batteries	
16 06 02	Ni-Cd batteries	(A)
16 06 03	Mercury cell	
16 06 06	Electrolytes collected separately from batteries and accumulators	(A)

- These wastes include all kinds of electrolytes from batteries and accumulators in camps and stations.

17 CONSTRUCTION AND DESTRUCTION WASTES (INCLUDING EXCAVATION FROM POLLUTED AREAS)

17 01 Concrete, Brick, Roof Tile and Ceramic

17 01 06	Concrete, brick, roof tile and ceramic mixture or separate groups containing hazardous materials	(M)

17 02 Wood, Glass and Plastics

17 02 04	Wood, glass or plastic including or contaminated with hazardous materials	(M)

17 03 Bituminous Mixtures, Coal Tar and Tarred Products

17 03 01	Bituminous mixtures including coal tar	(M)

17 04 Metals (Including alloys)

17 04 09	Scrap metal contaminated with hazardous materials	(M)
17 04 10	Cables containing oil, tar and other hazardous materials	(M)

17 05 Soil (Including Excavation from Polluted Areas), Rocks and Dredging Sludge

17 05 03	Soil and rocks containing hazardous materials	(M)
17 05 04	Soil and rocks except from 17 05 03	

17 08 Gypsum-Based Construction Materials

17 08 01	Gypsum-based construction materials contaminated with hazardous materials	(M)

17 09 Other Construction and Demolition Wastes

17 09 03	Other construction and demolition wastes containing hazardous wastes (including mixed waste)	(M)

- All wastes in this section cover all excavation soil, ruins, and construction wastes contaminated with hazardous materials that are not included in the “Regulation on Control of Excavation Soil, Construction and Demolition Wastes”.

18 WASTES RESULTING FROM STUDIES ON HUMAN AND ANIMAL HEALTH AND/OR SIMILAR (EXCLUDING KITCHEN AND RESTAURANT WASTES THAT ARE NOT DIRECTLY RELATED TO HEALTH)

18 01 Wastes Resulting from Birth, Diagnosis, Cure or Disease Prevention Studies For Humans

18 01 03	Wastes which are collected and disposed according to specific procedures in order to prevent infections	(A)
18 01 08	Cytotoxic and cytostatic medicine	(A)

- These wastes contain contaminated medical wastes formed after medical attention and cutting, drilling and infectious wastes from infirmary, health cabinet and first aid center. They are disposed of according to Regulation on Control of Medical Wastes. These medical wastes could be removed by municipalities that are licensed for medical waste collection.

20 MUNICIPAL WASTES INCLUDING FRACTIONS COLLECTED SEPARATELY (DOMESTIC WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES)

20 01 Fractions Collected Separately (Excluding 15 01)

20 01 21	Fluorescent lamps and other wastes containing mercury	(A)
20 01 29	Detergents containing hazardous substances	(M)

- These wastes contain exhausted fluorescent lamps used in camps for lightening, cleaning agents including hazardous materials, pesticides (in bag or container), battery, cell, accumulator, and other hazardous wastes.

4.1.2. Mitigation Measures and Management Controls

In waste management, it is primarily aimed to prevent waste generation or to reduce it when it is not possible. Processes should be designed and operated in accordance with the WBG General and Sector-specific EHS Guidelines, WB ESSs and national legislation to prevent or minimize the quantities of waste generated and the hazards associated with the waste generated. Accordingly, the actions to be taken for the wastes are listed below:

- It should be ensured that all waste is separated on-site and implementing recycling procedures.
- Good maintenance and housekeeping procedures should be implemented to minimize waste generation.
- A recording and reporting process for waste generated at the sites should be established.
- Hazardous waste generation should be minimized by preventing the mixing of non-hazardous and hazardous wastes.
- Wastes will be stored separately according to the classification and labels indicating the type of waste will be placed for each type of waste.
- Training covering waste generation according to the waste management hierarchy (the prevention, reduction, reuse, recycling and finally disposal) will be provided for personnel to raise awareness.
- Wastes must be recycled or disposed of by licensed companies specialized in the field.
- Hazardous wastes and non-hazardous wastes should be stored separately from each other.
- Hazardous wastes should be stored in closed containers where they will not be directly exposed to sunlight, rain and wind.
- Absorbents, firefighting equipment, etc. will be kept ready on site for immediate response, in case of an emergency such as spills and fires.

- There will not be any waste burning, disposing or burying activities under any circumstances.
- The Grievance Mechanism of the project will be in place. In case of any grievance, urgent corrective and preventive action(s) will be taken.
- Regular on-site inspections of solid waste management will be performed. Corrective and preventive actions will be taken when any non-compliance is detected.
- It will be ensured by trainings that wastes are not dumped at locations other than areas specifically designated for this purpose.
- Hazardous and non-hazardous wastes will be sent to licensed disposal facilities. In other words, waste recycling/recovery/disposal agreements with the authorized municipality or licensed firm will be executed for the management of hazardous and non-hazardous wastes. Especially, hazardous waste delivery should be made through the MoTAT (Mobile Waste Tracking System) Application on the online platform of the MoEUCC.
- The Waste Declaration Form will be filled and approved every year by the end of March with the previous year's information using the online platform (Integrated Environmental Information System/ Waste Management Application) of the MoEUCC and a copy will be stored for five years.
- Topsoil and excavation soil should be stored separately during earthworks. Necessary measures should be taken to protect the topsoil from wind and water erosion, and it should be reused for environmental landscape. Excavation materials should either be used for backfilling purposes or sent to approved areas designated by local authorities.
- Construction/demolition wastes and excavation materials will not be mixed, and the principle will be followed to recycle construction wastes and especially reusing them as infrastructure materials in line with the Regulation on Control of Excavation Soil, Construction and Demolition Wastes (Official Gazette: 18.03.2004 -25406).

In case temporary waste storage area is established within the scope of the project activities (especially in the camp sites and stations), the following points should be taken into consideration:

- The Temporary Waste Storage Area should be located separately from the facilities and buildings. Licensed vehicles should be able to pick up waste easily.
- Necessary measures should be taken against fires that may occur in the Temporary Waste Storage Area. In this context, portable fire extinguishers should be placed at an accessible point near the area. Periodic maintenance of fire extinguishers should be conducted regularly.
- Hazardous wastes and non-hazardous wastes should be stored separately from each other according to their types and their entrances should be different.
- The Temporary Waste Storage Area must be closed, lockable and the key must be in the waste storage area officer.
- It is important to have the drainage channel and the blind shaft where this channel will reach, in case the leakage and spillage that may occur.
- The Temporary Waste Storage Area should be designed in accordance with the following requirements:
    - The floor of the area should be covered with impermeable concrete.
    - The area should be constructed with its top and four sides covered in order to be protected from external factors such as precipitation. The doors and front faces of the area will be covered with wire mesh or sheet metal. The waste area will be designed in such a way that it will not pass rainwater in any way.
    - Materials such as absorbent sawdust or spill kits should be kept in the area for cases such as overflow, spillage and leakage.

  - There should be a sign at the entrance of the Temporary Waste Storage Area containing the contact information of the waste area responsible.
  - There should be warning signs regarding the waste area and waste.
  - Wastes should be labelled with the waste code and description.
- Hazardous Materials and Hazardous Waste Compulsory Liability Insurance will be executed for the hazardous waste temporary storage area.
- An Industrial Waste Management Plan will be prepared as per the format defined by the MoEUCC.

Besides, the waste management in Kars Province, where no sanitary landfill is available, will be conducted as flows:

- Designated and secure temporary waste storage areas will be established at construction site in Kars to prevent uncontrolled/wild dumping. These areas will be equipped with proper signage and waste segregation facilities to encourage responsible disposal practices among construction workers.
- Regular inspections and monitoring of waste management practices in Kars construction site will be conducted to identify and address any deviations from the prescribed guidelines. Strict penalties for illegal dumping will be implemented to deter such activities and maintain the integrity of the local environment.
- Specialized training on effective waste management practices will be provided to construction personnel in Kars. This includes guidance on waste segregation, handling, and disposal methods to ensure compliance with environmental standards.
- Through the implementation of these mitigation measures, the project aims to address the specific challenges associated with waste management in Kars Construction Site, fostering a cleaner and more sustainable local environment.

4.2. Soil and Groundwater Pollution Prevention and Control

Liquid and solid products may enter the environment when they leak or spill from containers during use or transfer. Also, these materials may then directly enter nearby storm drains or receiving waters, or storm water may carry them. PPWMP identifies measures to prevent, contain, clean up and dispose of material leaks or spills.

The Contractor(s) will implement measures to ensure the safe storage and transportation of all fuels, greases, and oils on the site. This is crucial to prevent soil and groundwater pollution near fuel, oil, hazardous substance storage, maintenance, and transport areas. These measures will include, but are not limited to, the following:

- When determining the locations of temporary fuel or oil storage areas, location of 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.
- Fuels, oils, and chemicals will be stored in tightly sealed containers that are clearly labeled.
- Hazardous materials storage will be equipped with secondary containment structures/bunds or spill trays,
- Fuel, oil, and chemical storage will take place on an impermeable floor within an area featuring an impermeable leakage control reservoir.
- Prior to use, all vehicles, equipment, and installations will be inspected for fuel and oil leaks. Regular monitoring for leak will also be conducted.
- Maintenance procedures, aligned with the available manufacturing requirements, will be established for all machinery and equipment.
- If required, maintenance activities including fueling, re-fueling and oil change will occur in designated areas positioned away from environmentally sensitive zones (e.g., water courses, areas with high groundwater levels).

- Adequate quantities of suitable absorbents will be present in the "Designated Maintenance Area" to manage minor leakages effectively.
- Vehicles will never be left unattended in cases of jammed valves during maintenance or fueling.
- Regular checks will be conducted on taps and valves to detect signs of wear. These will be securely closed and locked when not in use.
- Equipment and storage areas will be properly secured with safety fences. Gateways will be locked to prevent pollution resulting from vandalism and theft.
- Site personnel will be trained in spill response and the use of spill response equipment, and they will also carry absorbents in their vehicles.
- Good housekeeping practices will be in place at camps, construction areas, and locations where construction-related activities take place.
- All containers for fuel, lubricant oil, and chemicals will be situated on containment bunds. The bunds will have sufficient capacity to hold at least 110% of the volume of the largest tank.
- If a containment bund is not feasible, dip trays will be used for stored chemicals and fuels.
- Any soil contamination identified during construction activities will be addressed in accordance with the Regulation on Control of Soil Contamination and Contaminated Lands by Point Sources (Official Gazette: 08.06.2010-27605).
- Emergency Preparedness and Response Plan will be implemented.

4.3. Surface Water and Groundwater Pollution Prevention and Control

The aim of pollution control is to protect the water environment from potential harm caused by the discharge of pollutants. There are various ways through which pollutants, including waste products, chemicals, oil, and sewage, can be introduced into the water environment. Typically, these discharges are made directly into the water bodies.

The measures related to the surface water and groundwater pollution prevention will include but not limited to the following:

- Direct access of vehicles and mechanical equipment to the waterway will be minimized. If necessary, all vehicles and mechanical equipment will undergo checks for fuel and oil leaks before entering the waterway.
- Spill response kits will be positioned at river crossing points to address spills into the rivers from construction and transportation equipment, particularly diesel tankers.
- During excavations conducted in areas with a high-water table, water discharge will adhere to the standards set by relevant national legislation.
- If groundwater resources are to be used, the required permits will be obtained in accordance with "Law on Groundwater No. 167."
- Sediment barriers will be provided between earthworks and the watercourse to avoid contamination of waterbodies with sediment.
- To collect and reduce the flow of surface runoff originated from construction sites, camp sites and other areas of impermeable surfaces; drainage systems and related strategies will be planned and implemented.
- Establishing vegetative buffer zones along water bodies adjacent to the railway line can act as a natural barrier, reducing the transport of pollutants into the water during floods.

4.4. Water Supply and Wastewater Management

Site-specific Pollution Prevention Plan will be prepared and implemented by the Contractors to manage water usage and wastewater generation during the construction phase, with careful consideration of environmental sensitivities.

For the land preparation and construction stages, the required drinking water will be purchased as bottled water from the closest settlements to the project area, while utility water will be supplied by tankers.

All relevant provisions along with necessary legal and technical standards outlined in the “Water Pollution Control Regulation”, dated 31.12.2004 and numbered 25687, will be fulfilled for the wastewater generated during the construction phase with the aim of prevention water pollution in alignment with sustainable development goals. No unauthorized discharge should be made into the receiving environment.

Wastewater generated due to land preparation and construction activities will be deposited in septic tank 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 within the scope of the protocol to be made with the municipality that has a licensed wastewater infrastructure system.

It shall be noted that the relevant wastewater generated and collected will be sent to Sivas WWTP, Erzincan WWTP, Erzurum WWTP and Kars (Sarıkamış) WWTP (according to the city it was generated in) It shall be noted that Kars Central WWTP is being constructed and

once completed and commenced, this WWTP will also be used to send the collected sewerage.

4.5. Noise & Vibration

Regulation on Environmental Noise Control, dated 30.11.2022 and numbered 32029, aims to mitigate the adverse effects of environmental noise on both the environment and human health. It seeks to achieve this by enforcing noise control measures that reduce environmental noise and by informing the public about the measures taken to manage such noise. The Regulation encompasses various sources of noise, including industrial plants, transportation centres, music-playing establishments, sea vehicles, construction sites, and other outdoor activities that have the potential to generate environmental noise. The Regulation introduces specific restrictions for these activities, including time limits, permission prerequisites, and ongoing monitoring requirements.

All necessary measures will be taken in order to control noise and vibration. Those measures will include but not limited to the following:

- Measures will be taken to ensure that noise impacts from all construction activities are avoided in the vicinity of noise-sensitive receptors, such as settlements, schools, hospitals, and vulnerable ecosystems.
- Noise and vibration monitoring will be conducted for residential areas near the construction site.
- Nighttime work will be avoided and subject to AYGM approval. If unavoidable, nighttime activities will be minimized to reduce disturbance to local communities from noise and vibration. If necessary, local authorities and communities will be informed 48 hours in advance.
- Third-party vehicle access to Project-related activities will be restricted.
- Regular maintenance programs will be implemented for Project vehicles and equipment.
- Engine covers will be kept closed during equipment operation to minimize noise emissions. Quieter methods and equipment will be used whenever possible. Equipment will be situated as far away as possible from residential buildings, and noise barriers will be employed to mitigate noise levels for sensitive receivers that will experience significant noise impacts.
- Relevant Turkish legislation and WBG EHS Guidelines will be adhered to in order to minimize noise during the construction stage.
- Project traffic through community areas will be minimized whenever feasible.
- 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.
- Project access roads will be maintained to reduce noise associated with vibration and vehicle noise.
- High-efficiency mufflers will be utilized on all construction equipment.
- Components generating excessive noise will be repaired or replaced.
- Noise barriers will be installed near sensitive areas.
- The possibility of blasting will be considered by the contractor during construction. If blasting is decided upon, an assessment of noise and vibration will be conducted, taking into account the location, amount, and type of explosives, as well as the timing of the blasting.
- Grievance mechanism for vibration-related complaints will be established, and quarterly vibration monitoring studies will be conducted for vibration management.
- The contractor(s) will be obligated to develop detailed mitigation measures for route sections where sensitive off-route receptors are located.

4.6. Air Quality

All necessary measures will be taken in order to control dust (PM_{10} and $PM_{2.5}$) and other air emissions including mainly nitrogen oxides (NO_x), carbon monoxide (CO), unburnt hydrocarbons (HC), sulphur oxides (SO_x), Lead (Pb). Those measures will include but not limited to the following:

- Dust-emitting material stocks and the trucks transporting such materials will be covered with tarpaulin to prevent dispersion by the wind.
- Construction sites, open storage piles, and transportation routes will be adequately moisturized whenever possible. Regular maintenance of roads will be conducted to prevent dust generation.
- Exhaust emissions from construction and transportation vehicles will be periodically monitored.
- Low-emission vehicles will be utilized whenever feasible.
- Access by third-party vehicles to Project-related activities will be restricted.
- Regular maintenance programs for Project vehicles and equipment will be implemented.
- All of the Project vehicles will respect road speed limits reduced by 10 km/h to the extent practicable.
- Relevant Turkish legislation concerning speed limits based on vehicle type and road category will be observed.
- Excessive idling of Project-related equipment and vehicles will be restricted. Project-related equipment and tools will be operated at idle as infrequently as possible.
- Blasting operations will require approval from AYGM. Appropriate blasting methods will be selected for these operations. When using explosives, the regulations outlined in the "Production, Import, Transport, Storage, Storage, Sale, Use, Destruction, Inspection Procedures and Principles" for Explosive Materials Excluded from Monopoly, dated 29.09.1987 and numbered 12028, will be followed. The Contractor will be responsible for obtaining the necessary "Explosive License" required for blasting in designated areas. Qualified personnel will conduct blasting operations, following all necessary safety precautions.
- The creation, filling, and detonation of holes, along with subsequent related activities, will adhere to Mining Law No. 3213, as modified by the Labor Health and Occupational Safety Regulation issued by the Ministry of Labor and Social Security.
- The Project Grievance Mechanism will be implemented. If any comment/grievance/complaint related to dust and air quality is received through the Grievance Mechanism, the complaints will be evaluated and necessary corrective preventive actions will be taken.

5. TRAINING, REPORTING AND MONITORING

5.1. Training

All employees of the contractor(s) will receive basic training on environmental, social, occupational health and safety, labour and security issues. Additionally, specialized training will be provided for key personnel based on their project-specific responsibilities.

These training programs will offer all personnel the opportunity to comprehend the following subjects:

- The requirements of PPWMP and how to implement them on the site, and
- Procedures to be followed for effective waste management and mitigation measures to be implemented for pollution prevention.

Beyond the general training topics mentioned above, the Contractor(s) and AYGM will also deliver specific training to personnel based on their tasks within the Project. This training will encompass various subjects, including but not limited to:

- Environmental investigation,
- Hazardous materials management (covering collection, reuse, recovery, storage, and disposal of hazardous materials),
- Waste management (encompassing collection, reuse, recovery, storage, and disposal of hazardous and non-hazardous wastes),
- Pollution prevention management,
- Spill response (with a particular focus on managing spills in soil and water),
- Usage of spill response equipment,
- Identification of prohibited materials,
- Vehicle maintenance requirements,
- Dust control measures,
- Noise control strategies.

5.2. Reporting and Monitoring

Daily inspections will be conducted under the coordination of the environmental and social team established by the Contractor(s).

Any incidents discovered during these inspections will be recorded and reported on a monthly basis. The WB, AIIB, IsDB and AYGM will be promptly informed of any incidents or accidents related to the Project that have had, or are likely to have, a significant adverse impact on the environment, affected communities, the public, or workers. These incidents or accidents include, but are not limited to, occurrences during construction/rehabilitation works, environmental spills, and so on.

Sufficient detail will be provided regarding the incident or accident, findings of the Root Cause Analysis (RCA), indicating immediate measures or corrective/preventive action actions taken or that are planned to be taken to address it, compensation paid, and any information provided by any contractor and supervision consultant, as appropriate. It will be ensured that the incident report is in line with the World Bank's Environment and Social Incidence Response Toolkit (ESIRT). Subsequently, as per the Banks' request, a report on the incident or accident and proposal regarding any measures to prevent its recurrence will be prepared.

All events and nonconformities will be reported in accordance with project standards as described in Section 3.

The main monitoring activities will focus on ensuring compliance with the mitigation measures and management controls described and key performance indicators identified within the scope of this PPWMP.

Site-specific PPWMP monitoring requirements will be elaborated in management/implementation plans and procedures to be prepared by the Contractor(s) prior to the onset of the land preparation and construction phase of the Project. Monitoring activities will be designed to target specific topics to meet site-specific requirements in line with the Monitoring Plan framework provided in the Environmental and Social Management Plan (ESMP) and considering the key performance indicators.

In addition, the reporting requirements within the scope of this Plan can be described as follows:

Waste Records: Waste records according to the waste generation rates, types of waste generated, and disposal methods will be recorded.

Incident Reports: the spills of pollutants that occur during project activities. During these incidents immediate reporting, along with documentation of response actions taken to contain, clean up, and mitigate the impacts of the spill will be carried out.

Water Records: Use of water for each activity (dust suppression, potable water etc.) will be recorded.

Regular Monitoring Reports: Regular (monthly, quarterly) reporting will be prepared to assess the implementation of this Plan.

Table 5 details the monitoring activities identified for waste management issues of the Project. The Project Owner's Environmental Engineer/Specialist is responsible for the implementation of this plan.

Table 5. Pollution Prevention and Waste Management and Monitoring Plan

ID	Topic	Measure/ Monitoring Parameter/ Target	Performance Indicator / Target	Monitoring Location	Monitoring Method	Monitoring Frequency	Monitoring Responsibility
PPWMP-1	Waste Management Hierarchy	Prevention of landfilling and/or incineration (i.e., without energy recovery) of wastes (except medical wastes)	All types of waste send to licensed recycling/recovery/disposal facilities	All waste sources	Records of waste disposal	Weekly	Environmental Engineer/Specialist
PPWMP -2	Pollution Prevention and Waste Minimization	Prevention and/or minimization of hazardous and non-hazardous wastes sourced directly from project area	All types of waste send to licensed recycling/recovery/disposal facilities	All waste sources	Waste generation records	Weekly	Environmental Engineer/Specialist
PPWMP -3	Pollution Prevention and Waste Minimization	Obtaining Qualified Zero Waste Certification -which is not obligatory as per the national legislation- and enhancing its level through meeting requirements of Zero Waste Regulation as a supporting measure for waste prevention and minimization	Obtaining Silver Zero Waste Certification	Project Site	Certification records	Annually	Environmental Engineer/Specialist
PPWMP -4	Trainings	Provision of PPWMP related trainings	100 % completion of each training annually	Project Site	Records of trainings	Annually	Environmental Engineer/Specialist
PPWMP -5	Inspection	Performing on-site audits to inspect their compliance with the PPWMP related Project Standards.	Zero non-compliances	Project Site	Audit Minutes and Reports	Annually	Environmental Engineer/Specialist
PPWMP -6	Corrective and Preventive Actions	Implementation of corrective and preventative actions against identified non-compliances through site inspections at project site	Closing all non-compliances within a quarterly period	Project Site	Corrective& Preventive Action records	Quarterly	Environmental Engineer/Specialist
PPWMP -7	Environmental Measurements and Grievance Records	Performing respective environmental measurements (including air, noise, water, soil) Taking necessary corrective and preventive actions to close complaints	All measurement results comply with project standards Closing all grievances within a quarterly period	Project's AoI	Measurement Results Grievance Records	Quarterly	Environmental and Social Specialists

6. REFERENCES

- Environmental and Social Impact Assessment Report (CNR-ETMIC-ESIA-001)
- Environmental and Social Management Plan (CNR-ETMIC-ESMP-001)
- Community Health and Safety Management Plan (CNR-ETMIC-CHSMP-001)
- Emergency Preparedness and Response Plan (CNR-ETMIC-EPRP-001)
- Biodiversity Management Plan (CNR-ETMIC-BMP-001)
- Occupational, Health and Safety Management Plan (CNR-ETMIC-OHSMP-001)