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MINISTRY OF TRANSPORT
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AYEM
Altyapı Yatırımları Genel Müdürlüğü



ÇINAR
ENGINEERING
CONSULTANCY INC.



**ÇUKUROVA REGION AND İSKENDERUN BAY RAILWAY
CONNECTION PROJECT
WASTE MANAGEMENT PLAN
CNR-ADN-WMP-002
Rev.02**

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ABBREVIATIONS & DEFINITIONS

Contractor	Expert Firms responsible for the construction of the Project on behalf of DGII
DGII	General Directorate of Infrastructure Investments
EHS	Environmental, Health, and Safety
ESIA	Environmental and Social Impact Assessment
ESIRT	Environment and Social Incidence Response Toolkit
ESMP	Environmental and Social Management Plan
ESS	Environmental and Social Standards
GIIP	Good International Industry Practices
kg	Kilogram
KPI	Key Performance Indicators
m³	Meter cube
MoEUCC	Ministry of Environment, Urbanization, and Climate Change
No	Number
PPE	Personal Protective Equipment
RCA	Root Cause Analysis
RCA	Root Cause Analysis
WB	World Bank
WBG	World Bank Group
WBG	World Bank Group
WMP	Waste Management Plan



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1 INTRODUCTION

Waste Management Plan (WMP) includes the identification of waste streams and management actions including minimization, recycling, collection, storage, treatment and disposal of wastes which will be generated during site preparation, construction and operation phases of the Project.

WMP has been prepared in line with DGII and regarding World Bank (WB) Environmental and Social Standards (ESSs), Turkish regulatory framework, WBG General and relevant Sector-specific Environmental, Health and Safety (EHS) Guidelines, and other applicable Good International Industry Practices (GIIP).

1.1 Scope

The main objective of the WMP is the identification of hazardous and non-hazardous wastes generated through the activities of the planned Project. The aim is to determine measures and practices for managing risks and impacts related with generation of these wastes.

Specifically, the purposes of this WMP are to;

- Define the waste management hierarchy,
- Define principles and guidelines to be followed during the collection, segregation, temporary storage, transfer, and recycle / reuse / disposal of wastes,
- Define monitoring and reporting procedures,
- Define training requirements,
- Define applicable legislative requirements and standards (Project Standards) relevant to the plan, and
- Define roles and responsibilities relevant to the plan.

The measures, practices, managerial actions, and implementations provided in this plan are applicable to all Project personnel, subcontractors and service providers' personnel, and visitors for both of the two phases-land preparation and construction and operation phase-of the Project accordingly.

The contractor will meet the requirements outlined in this WMP by adapting them to fit their operations. Prior to commencing construction work, the contractor is expected to create their own site-specific WMP and procedures, which should encompass the identification of waste streams, selection of disposal methods, recognition of permit requirements, and establishment of management actions.

Contractor will ensure that the waste disposal strategy developed for the Project through its plan and procedures will follow the following handling hierarchy:

1. Prevent the generation of waste.
2. Minimize waste generation.
3. Reuse, recover, and recycle waste in ways that ensure safety for both human health and the environment.
4. Dispose of waste through environmentally sound and safe methods, which may include treatment or destruction.

Contractors are expected to adhere to the following Fundamental Principles for Waste Management:

- **Cradle-to-Grave Oversight:** Wastes should be tracked comprehensively from their origin to their final disposal.



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- **Source Segregation and Categorization:** Wastes must be separated at their source and categorized appropriately.
- **Priority on Reuse, Recovery, and Recycling:** Emphasis should be placed on reusing, recovering, and recycling waste.
- **Appropriate Management for All Wastes:** Regardless of their type, all wastes must be managed correctly throughout their journey and not left on-site.
- **Strict Prohibition of Dumping and Open Burning:** On-site dumping and open burning of waste are strictly prohibited.
- **Licensed Facilities for Transportation and Disposal:** Waste transportation and disposal must only occur through facilities that hold the necessary licenses.
- **No Mixing of Different Waste Types:** Mixing different types of waste is strictly forbidden.
- **Prioritizing Transport to Nearest Licensed Facility:** Whenever possible, waste should be transported to the closest licensed facility.

The requirements outlined in this plan pertain to the Construction Phase of the Project; however, they can also serve as guidelines for the formulation and implementation of Plans and Procedures during the other phases of the Project.

1.2 Objectives

The WMP has been developed to establish strategies for mitigating the impacts of waste generated by project activities. These Key Performance Indicators (KPIs) play a crucial role in evaluating the WMP's effectiveness and providing guidance for enhancing waste reduction and management strategies. The selection of specific KPIs will depend on the project's objectives, scope, and priorities.

The KPIs used to monitor the implementation of the Waste Management Plan are outlined as follows. Additionally, reference will be made to the Project's Occupational Safety and Health Procedures and plans within these performance indicators.

Table 1. Key Performance Indicators for WMP

Key Performance Indicators	Timeframe	Records	Responsibility
Waste Records	Weekly Control	Waste disposal records (amount, date, disposal authority, disposing party)	Contractor
Waste disposal records (amount, date, disposal authority, disposal facility)	Weekly Control	Waste receipts	Contractor
Recycled waste records (type, amount)	Weekly Control	Waste Records	Contractor
Site Inspection / Audit Records	Weekly Control	Audit records	Contractor
Licenses of Disposal Facilities	Present for all agreed facilities / Monthly control	Waste Records	Contractor
Protocols with Disposal Facilities	Present for all types of wastes / Monthly control	Waste Protocols	Contractor

The effectiveness of these KPIs relies on thorough documentation, consistent monitoring, and prompt implementation of corrective actions whenever they are deemed necessary.

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2 ROLES AND RESPONSIBILITIES

The Contractor will fulfil the specified requirements in this WMP by customizing them to align with their operational activities. In this regard, the Contractor must develop a site-specific WMP and Procedures in accordance with the DGII Policy, which outlines the approach for implementing the provisions of this plan. The Contractor's WMP requires approval from DGII before construction work commences. Additionally, the Contractor is responsible for ensuring that subcontractors also adhere to the requirements outlined in the site-specific WMP.

Furthermore, the Contractor will consistently update its site-specific WMP to accommodate changes in the Project's needs or newly identified requirements. Throughout the contractual period, the Contractor will ensure the active involvement of all personnel in training programs. This includes regular site-specific training sessions that encompass Environmental and Social considerations, as well as Waste Management.

The roles and responsibilities within the WMP are outlined as follows:

- DGII will establish and maintain the health and safety requirements for the Project, effectively communicating these requirements to the Contractor.
- DGII will oversee the implementation of the WMP and health and safety procedures by Contractors, including conducting audits.
- The Contractor is accountable for creating, executing, and maintaining a comprehensive, Project-specific WMP that adheres to the minimum criteria and precautions set forth in this WMP.
- The Contractor is responsible for educating its employees about the WMP requirements and health and safety procedures through training.
- The Contractor will supervise the adherence of all subcontractors to the Project-specific WMP and related procedures.
- The Contractor will prepare reports containing performance indicators to showcase the successful implementation of the site-specific WMP, and these reports will be communicated to DGII.

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3 LEGAL FRAMEWORK

Regarding waste management, the project will undergo evaluation in accordance with the following international standards and national regulations.

3.1 National Legislation

The National Legislation in relation with environmental, social, health and safety management constructing the legal basis for the Project are identified in the following sections.

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.

The environmental regulations that are valid within the above-mentioned laws are listed below.

Table 2. Environmental Regulations in Türkiye

Regulation Name	Official Gazette Date	Issue
Environmental Permits and Licenses (General)		
Regulation on Environmental Impact Assessment	29.07.2022	31907
Regulation on Environmental Permits and Licenses	10.09.2014	29115
Regulation on Environmental Audit	12.06.2021	31509
Regulation Concerning Environmental Management Services	01.11.2022	32000
Waste Management		
Regulation on Control of Packaging Wastes	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 Landfill of Wastes	26.03.2010	27533
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	12.07.2019	30829
Notice on Fuel, Auxiliary Fuel and Alternative Raw Material Derived from Waste	20.06.2014	29036
Regulation on the Control of Collecting Wastes from the Vessels	26.12.2004	25682
Regulation on Recovery of Some Non-Hazardous Wastes	17.11.2011	27967



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3.2 International Standards

As the WB is the lending institution for the project, it should be in line with national legislation as well as international standards and GIIP.

WB has established ESSs to define its clients' responsibilities for managing their environmental and social risks. During the investment period, the borrower is required to comply with these standards. The international standards and guidelines applicable to this WMP are listed below:

World Bank Environmental and Social Standards

- ESS1: Assessment and Management of Environmental and Social Risks and Impacts
- ESS3: Resource Efficiency and Pollution Prevention and Management

WBG EHS Guidelines on Environmental Waste Management

WBG EHS Guidelines for Construction and Decommissioning

WBG EHS Guidelines for Construction Materials Extraction

WBG EHS Guidelines for Railways

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4 WASTE MANAGEMENT

4.1 Waste Management Hierarchy

Activities of the facilities result in generation of a wide range of that require an adequate planning to be in compliance with Project 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 the Figure 1.

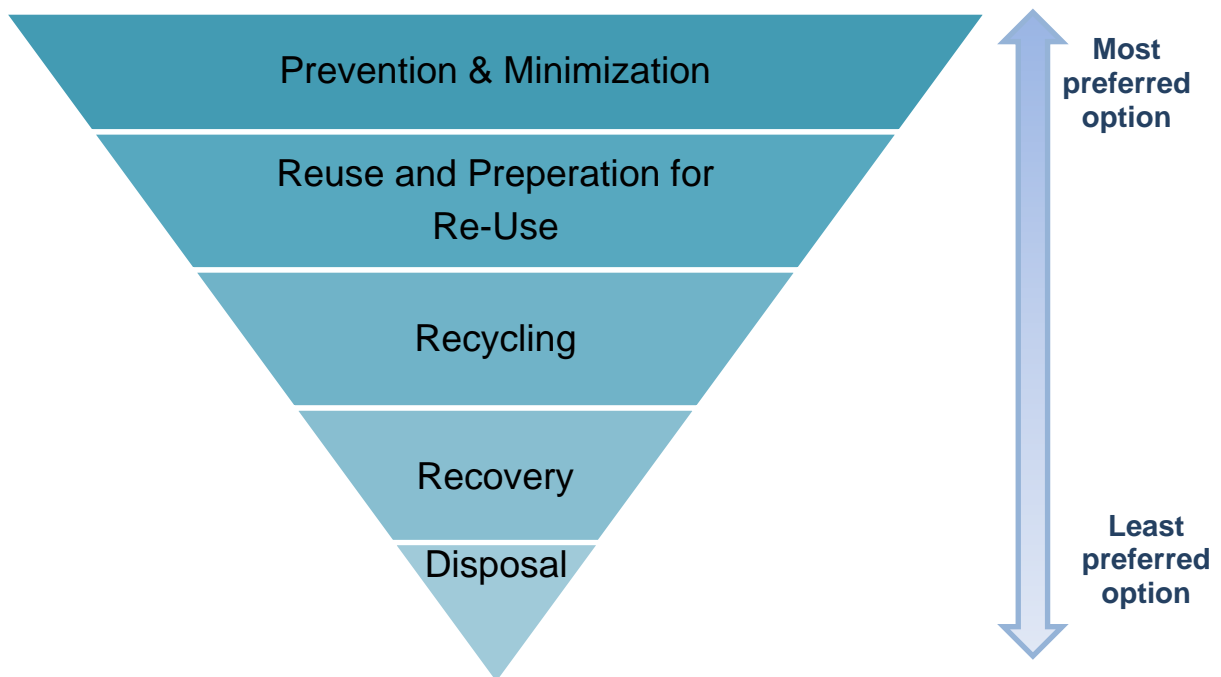


Figure 1. Waste Management Hierarchy

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 without energy recovery etc.

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4.2 Waste Generation and Classification

The waste generated within the Project can be categorized based on its source (phase, activity, or location) and its hazardous nature—classified as hazardous or non-hazardous. This section provides an overview of the characteristics and sources of waste generated within the Project area, which serves as a foundation for identifying measures and managerial actions related to waste management.

4.2.1 Land Preparation and Construction Phase

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.

The subsequent sections outline the types of waste anticipated during both the land preparation and construction phases, as well as during the operational phase. Estimated quantities of these wastes are also provided for reference.

Municipal Solid Waste (Non-hazardous)

During the construction phase, which commences with the land preparation works, one of the initial tasks will involve setting up camps to house the Project workers. These camps will serve as accommodation and provide essential facilities for the workers during the entire construction period. They will be strategically situated along the route, considering logistical efficiency and local conditions.

Adana Metropolitan Municipality and Hatay Municipality and Türkiye's average daily waste removal values are given in Table 3. Türkiye's average daily waste generation rate is 1.16 kg per person in 2020, the average municipal waste generation value for Adana Metropolitan Municipality is 0.98 kg/day and 1.21 kg/day for Hatay Municipality.

Table 3. Municipal Waste Generation Statistics

Municipality	Waste Generation (kg/day/person)		
	Domestic (Non-Recyclable)*	Recyclable*	Domestic (Non-Recyclable)*
Adana	0.64	0.34	0.98
Hatay	0.84	0.45	1.29
Türkiye Average	0.73	0.40	1.13

* Recyclable and non-recyclable wastes have been calculated based on the Environmental Indicators published by the Ministry of Environment and Urbanization, according to the national action plan for waste management, 35% of waste generated should be recycled and 65% landfilled by 2023 (Ministry of Environment, Urbanization and Climate Change, 2021).

During the land preparation and construction phases of the project, it is envisaged that 180 individuals will be employed. In consideration of these peak personnel numbers and assuming that the daily municipal waste generation rate will be 1.13 kg per person, amount of waste estimated to be generated at the Project sites has been calculated. The approximate amount of total municipal waste to be generated daily has been calculated as

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0.20 tons. The domestic waste will be handled as per the provisions of national Waste Management Regulation.

Domestic solid waste from the personnel would be collected in closed containers located at various points of the camp areas. These solid wastes would be collected in containers and at certain intervals would be transported to the solid waste collection system belonging to the nearest municipality and be disposed of. To effectively handle these waste quantities, agreements for waste reuse, recycling, and disposal will be established with the relevant Municipality.

The amount of approximately 0.20 tons of solid waste to be generated by the Project activities per day corresponds to approximately 0.0081% of the daily total solid waste reception capacities (about 2,564 tons) of solid waste disposal facilities located in Adana and Hatay Metropolitan Municipalities. In addition, employment from the local population will be prioritized within the scope of the Project and therefore the majority of the staff will be composed of residents of the towns and neighborhoods on the Project route. The actual increase that will occur due to the Project will be even lower since the personnel employed from the local settlements contribute to the waste generation in the provinces where they already live. In addition, waste management trainings will be given to reduce the total amount of domestic waste production to be sent to the landfill site, and separate collection of packaging waste at the construction site will be encouraged. Therefore, the load that could be added to the existing waste disposal infrastructure capacity by the Project would be negligible. The impact will be temporary and will significantly decrease upon completion of the construction phase.

The collection, storage, recovery and disposal of solid waste will be complied with in accordance with the issues specified in the "Waste Management Regulation".

Excavation and Construction Waste

During the construction phase of the Project, amount of material to be excavated from the main route and access road construction site is estimated to be 1,515,190.75 m³. 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 the Regulation on Control of Excavated Soil, Construction and Demolition Wastes. According to the current design and results of the preliminary geotechnical studies, a major part (more than 88%) of the excavated materials is foreseen to be reused in fill operations, where the remaining will need to be disposed of at the storage sites as excavated material.

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 in coordination with the appropriate municipalities, for potential future use. Throughout excavation activities, a sample 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 cleaning and rehabilitation 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.

- 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%.

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- 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 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 and construction phase of the Project.

Packaging waste, including packing paper, plastic, and glass bottles, will be systematically gathered apart from other waste streams, irrespective of the materials utilized and their origins. 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.

According to the Environmental Indicators published by the Ministry of Environment, Urbanization and Climate Change (MoEUCC), 35% of the generated municipal waste (by weight) would consist of recyclable materials. Therefore, the projected daily packaging waste generation would approximate around 71.19 kg (MoEUCC, 2021).

Medical Wastes

In accordance with paragraph 2 of Article 11 of the Regulation on Occupational Health and Safety Services, workplaces with 50 or more employees are required to have an infirmary. Additionally, suitable vehicles will be provided to ensure the transportation of employees to the nearest health unit in case of emergencies.

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

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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 according to the points indicated in the regulations, would be disposed of by delivering to the nearest health institution or municipal medical waste collection system. Medical waste that are produced under the Project will be regularly recorded according to the Regulation on Control of Medical Waste, will be sent to the Relevant Provincial Directorate of MoEUCC (Hatay, Osmaniye or Adana), this information will be kept for at least three years and be kept open to examination of the Ministry upon request.

Considering this requirement, an on-site infirmary area will be established, as the construction phase is projected to involve a workforce of 180 individuals.

The total quantity of medical waste that will be generated is calculated according to the worst-case scenario, considering that 0,69 kg¹ of medical waste is generated per year per capita and that all personnel will receive medical intervention at least once a year. The amount of medical waste for land preparation and construction phase is 124.2 kg/year. The medical waste will be handled as per the provisions of national Regulation on Control of Medical Wastes.

End-of-Life Tires

It is anticipated that end-of-life tires will not pose a concern within the project area, as tyre 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 gathered in impermeable tanks, kept distinct from other waste streams, and subsequently managed in alignment with the directives laid out in the Waste Oil Management Regulation.

¹ www.tuik.gov.tr Türkiye Annual Medical Waste Quantity Per Capita, 2018

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After the delivering of the waste oils to the licensed companies, Waste Oil Declaration Form in Appendix-2 of the Regulation should be filled and sent to the Provincial Directorate of Environment and Urbanization (Hatay, Osmaniye or Adana) until the end of February of the following year.

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. Considering that the quantity of vegetable waste oil is accepted as 12 kg²/year per capita, the amount to be generated during the land preparation and construction phase is 2160 kg/year. The waste vegetable oil will be handled as per the provisions of national Regulation on the Control of Waste Vegetable Oil.

Vegetable waste oils that will be generated from the kitchens of camp sites to be constructed within the scope of the project 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.

Hazardous and Special 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:

- Waste and materials (personal protective equipment (PPE), 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 intended for use in construction 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.

The quantity of the hazardous wastes would be dependent of the activities in the camp sites, and it is not possible to give exact information on the amount of the waste at this stage.

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

4.2.2 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,

² Kolza Biodizel A.Ş., General Principles of Vegetable Waste Oils

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- 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).

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 solid waste storage facilities.

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 separation of 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 this 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,
- Illegally dumped hazardous waste (hazardousness to be identified by analysis),
- Landscape and vegetation related waste (herbicide and pesticide containers).

Maintenance related waste

In the operation phase, there will be waste generated from the maintenance and repair of the trains. Maintenance-repair wastes can be generally listed as follows:

Ballast Screening: In this activity, which is repeated every 5 years on average, waste generation (substance without ballast properties) is estimated.

Superstructure Renewal: Wastes that will arise from concrete sleepers (concrete blocks on which rails sit) as a result of superstructure renewal activities performed every 30 years on average.

Infrastructure Renewal: It is the work to be carried out in extraordinary situations during the operation of the railway lines, 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...



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The maintenance / repair work on the railway lines will be carried out at large intervals or in one-off situations.

All types of waste to be generated during the project implementation and their characteristics are given in following section. Waste codes listed in the table are determined according to Annex-4 in National Waste Management Regulation.

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

13 WASTE OIL AND FUEL OIL (EDIBLE OILS, EXCLUDING 05 AND 12)

13 01 Waste Hydraulic Fluid



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

15 WASTE PACKAGES; UNSPECIFIED ABSORBERS, MOPS, FILTER MATERIALS 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)
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- 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)
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- 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



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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)
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- 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)
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17 02 Wood, Glass and Plastics

17 02 04	Wood, glass or plastic including or contaminated with hazardous materials	(M)
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17 03 Bituminous Mixtures, Coal Tar and Tarred Products

17 03 01	Bituminous mixtures including coal tar	(M)
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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)
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17 09 Other Construction and Demolition Wastes

17 09 03	Other construction and demolition wastes containing hazardous wastes (including mixed waste)	(M)
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- All wastes in this section cover all excavation soil, ruins, and construction wastes

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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 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.



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4.3 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 EHS Guidelines to prevent or minimize the quantities of waste generated and the hazards associated with the waste generated.

Contractor will carry out the following activities:

- Ensuring that all waste is separated on-site and implementing recycling procedures.
- Establishing a domestic solid waste disposal plan by coordinating with local official institutions (Relevant Municipalities).
- Identifying licensed hazardous waste disposal facilities.
- Ensuring the identification of temporary waste storage areas in compliance with legislation and making necessary arrangements.
- Establishing temporary storage areas at the construction sites for recyclable waste.
- Defining waste production flows specific to its activities and determining disposal methods for these wastes in line with project requirements.
- Establishing a recording and reporting process for waste generated at the sites.
- Creating a strategy to minimize waste generation.
- Defining training requirements in the Waste Management Plan related to waste generation minimization, waste recycling, and disposal, and incorporating them into the Training Program.
- Implementing good maintenance and housekeeping procedures to minimize waste generation.
- Compiling a list of licensed waste disposal facilities near the construction site. Conducting specialized assessments to ensure that the waste disposal facilities and waste storage areas listed and utilized during construction activities can withstand additional pressure from the Project without disrupting current waste management services.

Requirements for hazardous wastes are listed below:

- Hazardous wastes and non-hazardous wastes should be stored separately from each other.
- A record will be kept on the amount of the waste and packaging and labeling of the waste will be according to the internationally accepted standards required by the environmentally licensed recycling or disposal facility which will receive the waste.
- The Waste Declaration Form indicated in the regulation will be filled and approved every year by the end of March with the previous year's information using the web-based program prepared by the Ministry of Environment and Urbanization and a copy will be stored for five years.
- The waste would be temporarily stored in durable, leak-proof, safe containers at international standards placed on a concrete area away from the buildings of the camp. There will be hazardous waste labels on the containers, the quantity and the stored date would be indicated on the container, if the containers are damaged, the waste would be transferred to other containers having the same specifications, containers would always be kept closed, and they would be stored so that the waste does not chemically react.
- Hazardous wastes should be stored in closed containers where they will not be directly exposed to sunlight, rain and wind.
- Adequate ventilation should be provided in areas where volatile wastes are found.

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- All the measures will be taken for the health and safety of the employees responsible for the collection, transportation and temporary storage of the waste within the facility.
- In order to prevent pollution that happens as a result of accidental spill or by deliberate actions, depending on the type of the waste, location of the incident would be brought to its original condition by latest within a month from the time of the incident and all the expenses for this will be borne.
- Also, when waste is spilled by accident or deliberately and in other similar cases, office of the governor will be informed and a report detailing the accident date, accident location, type and quantity of the waste, cause of the accident, the waste disposal action and rehabilitation of the accident location will be submitted to the office of the governor.
- In order to continue the conformity of the requirements listed above, and the inappropriate ones to continue the control after the relevant actions are taken; Periodic checks will be carried out in the area; Corrective actions will be taken when any non-compliance is detected.

Mitigation measures and precautions for operation phase of the project are listed in the below:

- 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.
- An Industrial Waste Management Plan will be prepared as per the format defined by the MoEUCC.
- Regular on-site inspections of solid waste management will be performed.
- Hazardous Materials and Hazardous Waste Compulsory Liability Insurance will be executed for the hazardous waste temporary storage area.
- There will not be any waste burning, disposing or burying activities under any circumstances.
- The transportation of wastes will be ensured in appropriate frequencies so that the storage capacities are not exceeded.
- It will be ensured by trainings that wastes are not dumped at locations other than areas specifically designated for this purpose.
- Waste recycling/recovery/disposal agreements with the authorized municipality or licensed firm will be executed for the management of hazardous and non-hazardous wastes.
- Official waste declarations for all waste generated will be submitted to the online system of MoEUCC.
- Grievance Mechanism of the project will be in place. In case of any grievance, urgent corrective and preventive action(s) will be taken.

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4.4 Waste Streams and Disposal Requirements

In the following sections, waste streams and disposal conditions are given for land preparation and construction phases, and these conditions will also provide guidance for operation and commissioning phases.

DGII will ensure that its contractor (including all subcontractors) is managed without damaging the environment and human health, from the formation of the wastes to their disposal, creating necessary standards in management and determining the programs for this. The contractor will define and implement waste streams and disposal processes for waste generated on site.

Ensuring that temporary waste storage areas meet the standards set by the relevant legislation and the below mentioned issues are considered for these areas:

- The top and four sides of the storage area will be covered to prevent the entrance of external factors into the area,
- 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,
- Absorbents, fire extinguishing equipment, etc. will be placed near the waste storage areas in order to be prepared for emergencies such as spillage, fire. be ready,

Determining any possible spillages / leaks quickly by performing visual checks periodically in hazardous waste storage areas, ensuring that wastes are not spilled out areas other than reserved for this purpose and providing all necessary waste management trainings and repeating these trainings periodically.

5 TRAINING, REPORTING AND MONITORING

5.1 Training

All employees and contractors' personnel will receive foundational training covering environmental, social, occupational health and safety, labour, and security matters. Moreover, specialized training will be imparted to key personnel engaged in tasks encompassing waste separation, storage, transportation, and treatment. Details of the trainings within the scope of requirements of the waste management are presented in Table 4.

Table 4. Trainings Related to Waste Management

Training	Trainer	Participants	Period	Content
Introduction Training	Environmental Specialist/ Responsible	Newly-recruited Personnel Personnel of newly-contracted subcontractor-service provider.	Whenever needed	Provision of basic awareness, such as type of containers to be used, labeling, difference between hazardous / non-hazardous wastes etc.
Environmental Management System Awareness Training	Environmental Specialist/ Responsible	All personnel	Once in a year	Waste management measures and monitoring activities indicated in this plan, waste management hierarchy, waste segregation, environmental impacts of the project within including the ones related with waste generation, national waste legislation, Environment and Social Management System.
Internal Inspectors/ Group Leader Training	Environmental Specialist/ Responsible	Internal Inspectors/ Group Leaders	Once in a year and/or when a new participant hired	Provision of details of responsibilities of internal inspectors / group leaders who shall continuously inspect waste management aspects to reach assigned targets during operation phase.
Temporary Waste Storage Area Training	Environmental Specialist/ Responsible	Temporary Waste Storage Area Commissioners	Once in a year and/or when a new participant hired	Details of the tasks assigned to waste storage area commissioners.

5.2 Reporting and Monitoring

Daily inspections will be conducted under the coordination of the Contractor's environmental and social team.

Any incidents detected during these inspections will be recorded and reported monthly. The WB and DGII will be notified of 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 including but not limited to; incidents and accidents encountered during construction works, environmental spills, etc.

Sufficient detail will be provided regarding the incident or accident, findings of the Root Cause Analysis (RCA), indicating immediate measures or corrective 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

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incident report is in line with the WB's Environment and Social Incidence Response Toolkit (ESIRT). Subsequently, as per the Bank's request, a report on the incident or accident and propose any measures to prevent its recurrence will be prepared.

All events and nonconformities will be reported according to project standards as described in the ESMP.

The main monitoring activities, outlined in Chapter 7: Monitoring Plan of the ESMP will focus on ensuring compliance with the mitigation measures and management controls described and key performance indicators identified within the scope of this WMP.

Monitoring activities for each waste stream will be detailed in management/implementation plans and procedures to be prepared by the Contractor 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 ESMP and considering the key performance indicators.

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



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Table 5. Waste Management and Monitoring Plan

ID	Topic	Measure/ Monitoring Parameter/ Target	Performance Indicator / Target	Monitoring Location	Monitoring Method	Monitoring Frequency	Monitoring Responsibility
WMP-1	Waste Hierarchy	Prevention of landfilling and/or incineration (i.e., without energy recovery) of wastes (except medical wastes).	Zero waste (except medical waste) to landfill and/or incineration (i.e., without energy recovery) from all manufacturing and non-manufacturing activities / sites	All waste sources	Records of waste disposal	Annually	Environmental Specialist/Responsible
WMP-2	Waste prevention and minimization	Prevention and/or minimization of hazardous and non-hazardous wastes sourced directly from sections/ departments	Reduce or at least maintain quarterly.	All sections/ departments	Waste generation records of each Internal Inspector/ Group Leader	Quarterly	Environmental Specialist/Responsible
WMP-3	Waste Prevention and 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 and enhancing its level annually.	Project Site	Certification records	Annually	Environmental Specialist/Responsible
WMP-4	Trainings	Provision of WMP related trainings	100 % completion of each WMP training within their respective period	Project Site	Records of trainings	Bi-annually	Environmental Specialist/Responsible
WMP-5	Inspection	Performing on-site audits at Licensed Companies to inspect their compliance with waste management related Project Standards.	Once before contracting and annually afterwards for each Licensed Company	Licensed Company sites	Records of on-site visual/ documentation inspections	Annually	Environmental Specialist/Responsible
WMP-6	Corrective and Preventative Actions	Implementation of corrective and preventative actions identified through site inspections and temporary waste storage area inspections.	Closing 100 % within each quarter	Project Site	Corrective& Preventative Action records	Quarterly	Environmental Specialist/Responsible

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6 REFERENCES

- Pollution Prevention Plan (CNR-ADN-PPP-002)
- Employment and Training Plan (CNR-ADN-ETP-002)
- Institutional and Legal Framework (CNR-ADN-ESIA-002, Chapter 2)
- Mitigation Plan (CNR-ADN-ESIA-002, Chapter 5)
- Environmental and Social Management Plan (CNR-ADN-ESMP-002)

