REPUBLIC OF TURKEY
MINISTRY OF TRANSPORT
AND INFRASTRUCTURE

AYGM
Altyapı Yatırımları Genel Müdürlüğü

ÇINAR®
ENGINEERING
CONSULTANCY INC.

FİLYOS PORT AND INDUSTRIAL ZONE RAILWAY CONNECTION PROJECT

AGGREGATE MANAGEMENT PLAN

CNR-ZNG-AMP-002

Final

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ABBREVIATIONS & DEFINITIONS

AMP	Aggregate Management Plan
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 Standard
HS	Health and Safety
OHS	Occupational Health and Safety
RCA	Root Cause Analysis
WBG	World Bank Group

1 INTRODUCTION

A significant volume of aggregate material will be required along the project route. The material need of the project during the construction phase is planned to be met from existing concrete facilities, borrow areas and quarries. The borrow areas and quarries around the project area have been identified as detailed in the ESIA Report. If construction contractor decides to operate its own quarries and borrow sites, firstly an environmental and social impact assessment will be conducted and the Aggregate Management Plan (AMP) will be updated accordingly.

1.1 Scope

Both the Contractor and subcontractors are obligated to meet the specifications outlined in this AMP by customizing them to align with their respective operations. Upon the commencement of the Construction Phase, the Construction Contractor and subcontractors are required to create their own individualized AMP. Subsequently, Project-specific Plans and Procedures will be developed to elucidate how the stipulations of this plan will be executed.

This AMP will serve as the foundational framework for the Contractor to formulate a comprehensive AMP. Regular updates to the AMP will be conducted in tandem with the development of the construction methodology and detailed plans.

1.2 Performance Indicators

Performance indicators pertaining to the execution of the AMP are outlined as follows:

Table 1. Key Performance Indicators for AMP

Key Performance Indicator	Timeframe	Record	Responsibility
Number of complaints about dust, noise, and traffic arising from quarry activities or aggregate transportation	Zero times in a month	Complaint Records	Contractor
Number of blasting operations resulting in work accidents	Zero times in a year	Health and Safety (HS) Records	Contractor

These performance indicators are designed to monitor the effectiveness and adherence to the AMP. They serve as benchmarks to ensure that the objectives of the plan are met, minimizing negative impacts and ensuring a safe working environment.

2 ROLES AND RESPONSIBILITIES

DGII will execute an environmental inspection, monitoring, and reporting program to ensure the fulfilment of commitments outlined in the ESIA Report and this AMP.

Additionally, DGII will oversee the permitting process for the aggregate supply, which will be undertaken by the Contractor. It is DGII's responsibility to guarantee that the Contractor appropriately identifies and addresses the environmental and social consequences associated with the aggregate supply.

In the event of new quarries being considered for aggregate supply, DGII will collaborate with the Contractor in preparing an environmental and social impact assessment study. This study will assess the potential impacts of these new quarries, emphasizing both environmental and social aspects.

The Contractor will formulate a comprehensive AMP containing estimated aggregate quantities and potential resources, which will be submitted for DGII's approval. The initiation of construction activities will be contingent upon obtaining approval for the AMP.

Within the AMP submitted for approval, the Contractor will delineate all pertinent procedures for the operation of borrow pits and the establishment of new quarries. DGII will compile a preliminary list of available quarries and borrow pits that could potentially be utilized during the Project. The Contractor will review this list meticulously.

In collaboration with public institutions and organizations, the Contractor will assess the suitability of existing aggregate sources (licensed quarries, borrow pits, and debris) within the Project scope. If the existing operational borrow pits do not meet requirements and an additional one is deemed necessary, the Contractor will engage with relevant authorities to discern the requisite procedures for opening a new quarry. All activities will align with pertinent legislation, securing essential permits and licenses as mandated by the Turkish Mining Law, Regulations, and Environmental Law by considering the environmental constraints specified in the ESIA.

The Contractor will appraise the environmental and social consequences associated with operating chosen existing or new borrow pits and quarries. Mitigation measures will be identified and integrated to diminish these impacts. The subsequent section furnishes guidance on conducting such an assessment.

3 LEGAL FRAMEWORK

3.1 National Legislation

Turkish Environmental Law No. 2872, which was issued in the Official Gazette No. 18132 on August 11, 1983, describes the fundamental principles required to protect the environment in accordance with sustainable development and sustainable environmental goals. The Environmental Law provides a legal framework for the development of environmental regulations in accordance with national and international standards. The Mining Law (No. 3213) is also binding in terms of the implementation of the AMP. In addition, the provisions of the Waste Management Regulation will be decisive for AMP within the scope of aggregate management. Fundamental regulations that the Plan will comply with are as the following:

Table 2. Environmental Regulations in Türkiye

Environmental Permits and Licenses	Official Gazette Date	Numbered
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
Land Use and Soils		
Regulation on the Restoration of Lands Disturbed by Mining Activities to Nature	23.01.2012	27471
Mining Waste Regulation	15.07.2015	29417
Waste Management		
Regulation on Waste Management	02.04.2015	29314

3.2 International Standards

As the World Bank is the lending institution for the project, it should be in line with National Legislation as well as international standards and good industrial practices.

The WB has established Environmental and Social Standards to define its borrowers' 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 AMP are listed below:

- World Bank Environmental and Social Standards
    - 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
- WBG General Environment, Health and Safety (EHS) Guidelines (2007)
- WBG EHS Guidelines for Construction Materials Extraction (2007)

4 MITIGATION MEASURES AND MANAGEMENT CONTROLS

If the Contractor intends to utilize borrow pits and quarries, they will be responsible for identifying potential environmental and social impacts, along with the necessary mitigation measures. These findings will be incorporated into the Aggregate Management Plan (AMP). The Contractor will take into account, among other factors, the following considerations:

- Borrow pits and quarries will be one group of associated[1] facilities for the Project and the environmental and social impacts of operating a borrow pit or a quarry (and opening a new quarry) will need to defined and managed in line with all the requirements of the Project defined in the ESIA.
- The transportation to and from the borrow pit/quarry will subject to the requirements of the Project-specific Traffic Management Plan.
- The Contractor will put into practice relevant mitigation measures outlined by the Pollution Prevention Plan, focusing on the management of noise, vehicle exhaust, and dust emissions.
- Erosion and Sediment Control Measures will be implemented and maintained.
- Efforts will be made to minimize disruptions to neighboring habitats.
- Strategies to curtail surface runoff from borrow pits and quarries will be implemented.
- The Contractor will adhere to the directives of the Waste Management Plan to regulate the waste generated from quarry operations.

In case a new quarry is required, the selection of its location will be guided by the following considerations:

- Accessibility;
- Requirements for traffic control and road conditions;
- Potential for storm water run-off and erosion at the site;
- Floristic and faunistic characteristics of the site;
- Preservation of cultural heritage;
- Adherence to provincial environmental planning policies;
- Presence of potential contaminated land;
- Proximity to residential areas;
- Mitigation of visual impacts;
- Ensuring accessibility;
- Security; and
- Sustainability of the source.

The Contractor will prepare a Landscaping Plan to mitigate the visual impacts associated with quarry operations.

To minimize dust emissions, controlled blasting techniques will be employed. Dust collection systems will be installed on drill rigs and other equipment, and efforts will be made to minimize the drop heights of dusty materials. Dust suppression methods such as water or environmentally friendly chemicals will also be utilized.

Night-time activities will be limited, contingent upon approval from DGII. Design and engineering measures will be implemented where appropriate, particularly in sensitive locations where noise barriers may be required. Specific procedures for blasting will be meticulously formulated and submitted for DGII's approval.

[1] ESS-1: Associated facilities, which are facilities that are not funded as part of the project and that would not have been constructed or expanded if the project did not exist and without which the project would not be viable. The area of influence encompasses the associated facilities.

Considering the amplified traffic impact associated with quarry operations, the Contractor will address this aspect. Open communication with the local community will take place to manage the increased traffic load and provide information to relevant parties. This proactive approach aims to prevent safety risks and safeguard the established livelihood practices of the local community, such as beekeeping and animal grazing.

Contractor will consider the ecological aspects during the selection of the new quarry location and make sure the impacts on the ecology and biological environment are at minimum for the selected site.

Contractor will develop the Project specific AMP and procedures which explain the way to implement the requirements of this AMP. Requirements defined in this report will guide Contractor to develop these plan and procedures.

Contractor will identify the roads to be used to transport the aggregate and identify the estimated transport time considering the traffic load and vehicle speed.

Contractor will comply with the Pollution Prevention Plan (PPP) to minimize the impacts on soil and water resources (dust emission, noise, spills etc.).

Community notification will be undertaken when works are likely to cause dust or noise to impact on the public and nearby residents.

Community notification will be undertaken before works are scheduled to commence outside normal working hours.

If construction contractor decides to operate its own quarries and borrow sites, firstly it will be necessary to conduct an environmental assessment that covers;

- Air Emissions
- Noise and Vibrations
- Water Use
- Waste Generation
- Land Conversion (Reinstatement)

During shovelling, ripping, drilling, blasting, transport, crushing, grinding, screening, and stockpiling) activities dust emissions are expected. To control these dust emissions;

- Land clearing, removal of topsoil and excess materials, location of haul roads, tips and stockpiles, and blasting should be planned with due consideration to meteorological factors (e.g. precipitation, temperature, wind direction, and speed) and location of sensitive receptors;
- A simple, linear layout for materials-handling operations to reduce the need for multiple transfer points should be designed and installed (e.g. processing plants should be preferably located within the quarry area);
- Dust emissions from drilling activities should be controlled at the source by dust extractors, collectors, and filters, and wet drilling and processing should be adopted, whenever possible;
- Dust emissions from processing equipment (e.g. crushers, grinders, screens) should be adequately controlled through dust collectors, wet processing, or water spraying. Dust control applications should consider the final use of extracted material (e.g. wet-processing stages are preferred when wet materials or high water contents would not negatively affect their final use);
- Procedures to limit the drop height of falling materials should be adopted;
- Use of mobile and fixed-belt transport and conveyors should be preferred to hauling the material by trucks through internal roads (enclosed rubber-belt conveyors for dusty materials are recommended in conjunction with cleaning devices);
- Internal roads should be adequately compacted and periodically graded and maintained;

- A speed limit for trucks should be considered;
- Water spraying and surface treatment (e.g. hygroscopic media, such as calcium chloride, and soil natural–chemical binding agents) of roadways and exposed stockpiles using a sprinkler system or a ”water-mist cannon” should be implemented;
- Exposed surfaces of stockpiled materials should be vegetated.

Furthermore, to control, NO_2, CO and NO emissions, the following measures should be considered:

- Explore alternatives to blasting, such as hydraulic hammers or other mechanical techniques, as these methods can help mitigate emissions,
- In cases where blasting is necessary, meticulous planning should be undertaken. This planning includes arranging blast holes, determining their diameter, depth, and direction, to minimize emissions,
- Ensure the correct combustion of explosives, typically comprising a blend of ammonium nitrate and fuel oil. This involves minimizing excess water content and preventing improper or incomplete mixing of explosive components.

Implementing these measures will aid in controlling emissions of NO_2, CO, and NO, contributing to improved environmental performance during quarry operations.

Significant noise levels are anticipated during activities like blasting and extraction. To address noise emissions, the following measures should be taken into account:

- Explore options for reducing noise from drilling rigs by adopting techniques like down hole drilling or hydraulic drilling;
- Implement enclosure and cladding measures for processing plants to contain noise emissions;
- Install appropriate sound barriers and noise containment structures, including enclosures and curtains, in proximity to the source equipment (e.g., crushers, grinders, and screens) when necessary;
- Utilize rubber-lined or soundproof surfaces on processing equipment such as screens, chutes, transfer points, and buckets;
- Use of rubber-belt transport and conveyors to reduce noise associated with material movement;
- Installation of natural barriers at facility boundaries (e.g. vegetation curtains or soil berms) when necessary;
- Optimization of internal-traffic routing, particularly to minimize vehicle-reversing needs (reducing noise from reversing alarms) and to maximize distances to the closest sensitive receptors;
- The use of electrically driven machinery to mitigate noise emissions;
- A speed limit for trucks should be considered;
- Avoidance of flame-jet cutting;
- Construct berms to serve both as visual and noise screens, further contributing to noise reduction.

Furthermore, to control vibration, the following measures should be considered:

- Use of specific blasting plans; correct charging procedures and blasting ratios; delayed, micro delayed, or electronic detonators; and specific in situ blasting tests (the use of down hole initiation with short-delay detonators improves fragmentation and reduces ground vibrations);
- Development of blast design, including a blasting-surfaces survey, to avoid over confined charges and a drill-hole survey to check for deviation and consequent blasting recalculations;
- Implementation of ground vibration and overpressure control should incorporate appropriate drilling grids (e.g., grid layout relative to whole length and diameter,

orientation of blasting faces) and employ a suitable charging and stemming process for boreholes. This strategy aims to mitigate potential issues related to fly rock and air blasts.

- To minimize risks associated with fly rock, it is advisable to prioritize the use of hydraulic hammers or other mechanical methods for enhancing rock fragmentation, rather than resorting to secondary blasting methods (such as plaster blasting).
- When possible, prioritize for mechanical ripping as a primary approach to reduce or eliminate the reliance on explosives, thereby lowering associated risks.
- Vibrations stemming from sources like primary crushers and plant screening equipment should also be considered. Designing adequately robust foundations for these facilities will serve to effectively curtail excessive vibrations.

Water will play a crucial role in the operation of quarries and borrow sites. However, it's essential to restrict water consumption by employing recirculation and reuse strategies, including the establishment of closed-circuit systems that facilitate the movement of water from sedimentation ponds back into the quarrying process. In regions with pronounced water scarcity, especially arid or semi-arid areas, it becomes imperative to conduct a comprehensive assessment of water-resource availability and potential impacts. Additionally, any modifications to the natural water balance through alterations to surface water and groundwater flows must be rigorously managed.

During activities such as dewatering of quarry pits, diamond-wire cutting, and the occurrence of surface water runoff, there's a likelihood of generating wastewater with elevated suspended solid content. To mitigate or prevent the discharge of water with suspended sediments, the following recommendations are put forth:

- Incorporate settlement ponds, sumps, and lagoons into the design to ensure sufficient retention time. Proper sealing of lagoons with impermeable materials, as required, is advised. Regular maintenance programs for settlement lagoons should be put in place, covering aspects such as side-slope stability, pipe cleaning and maintenance, and removal of settled materials.
- Recycling of processing / wire cutting waters;
- Construction of a dedicated drainage network to handle water flow effectively;
- Settlement enhancement by using flocculants or mechanical means, particularly where limited space prevents or limits the use of lagoons;
- Install sediment traps along water drainage pathways, including structures such as fascines, silt fences, and vegetation traps.

Rock waste and removed topsoil-overburden constitute the primary inert wastes resulting from quarrying activities. The generation of hazardous waste may arise from impurities and trace components present in exploited (waste) rocks, such as asbestos, heavy metals, or minerals that might lead to acidic runoff. The recommended prevention and control methods to reduce wastes include the following:

- Operational design and planning should incorporate procedures for reducing waste production (for instance, by blending high-quality rock with lower-grade rock);
- Topsoil, overburden, and low-quality materials should be properly removed, stockpiled near the site, and preserved for rehabilitation;
- Hazardous and non- hazardous waste management plans should be developed and adopted during the design and planning phase. Impacts associated with specific chemical and / or physical properties of extracted materials should be considered during the design phase, and impacts from waste rock impurities should be adequately controlled and mitigated by covering waste disposals with no contaminated soil.

Excavation activities at construction materials extraction sites often necessitate significant changes in topography and land cover to accommodate the extraction processes, which may

involve clearing existing vegetation. Consequently, proper reinstatement activities should be carried out once quarry operations come to an end. Measures to ensure effective reinstatement encompass, but are not limited to:

- Selecting appropriate low-impact extraction methods (such as excavation, quarrying, and dredging) that result in final site contours aligning with habitat restoration principles and intended land use;
- Establishment of buffer zones from the edge of extraction areas;
- To reduce the consumption of land area and, consequently, the loss of soil, preference for extraction should be given to thicker deposits (these should be exploited as far as possible and as reasonable);
- Vegetation translocation and relocation techniques should be used as necessary. Vegetation cover, such as native local plants, topsoil, overburden, or spoils feasible for sustaining growth should be removed in separate operations and segregated for later use during site reinstatement, and materials to be used for site reinstatement should be stockpiled and protected from wind and water erosion, as well as from contamination;
- During extraction, ecological niches should be preserved and protected as far as possible;
- Smaller, short-term extraction sites should be reclaimed immediately, while larger sites with a useful lifespan exceeding 3–5 years should undergo ongoing rehabilitation, such as borrow pits;
- Management of further site development through routine topographical and land surveys;
- During reinstatement, affected land should be graded and appropriately scarified before soil layers are reapplied, sustaining vegetative regrowth where needed (the combined thickness of topsoil and the growth layer should not be less than that prevailing in the undisturbed areas);
- Affected land should be rehabilitated to acceptable uses consistent with local or regional land use plans. Land that is not restored for a specific community use should be seeded and revegetated with native species;
- Test pits, interim roads (internal and access), buildings, installations, and structures of no beneficial use should be removed, and the land should be appropriately rehabilitated. Hydrological systems should be restored to predevelopment runoff rate.

5 TRAINING, REPORTING AND MONITORING

5.1 Training

All employees of the contractor 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.

5.2 Reporting and Monitoring

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

Any incidents discovered during these inspections will be recorded and reported on a monthly basis. The World Bank and DGII 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 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 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 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 in accordance with project standards as described in the ESMP.

When decommissioning a quarry, the Contractor will be responsible for developing Reinstatement Plans. These plans will undergo approval by DGII (relevant authority) and will encompass, among other factors:

- Thorough clearing of the quarry operation equipment from the area;
- Complete removal of all sediment and erosion control structures presented on the site.

The main monitoring activities, outlined in 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 AMP.

Monitoring activities for each E&S issue 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, following the additional surveys to be conducted with respected to the quarry 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.

6 REFERENCES

- Pollution Prevention Plan (CNR-ZNG-PPP-002)
- Waste Management Plan (CNR-ZNG-WMP-002)
- Traffic (Transportation) Management Plan (CNR-ZNG-TTMP-002)
- Institutional and Legal Framework (CNR-ZNG-ESIA-002, Chapter 2)
- Critical Habitat Assessment and Biodiversity Management Plan (CNR-ZNG-CHA-BMP-002)