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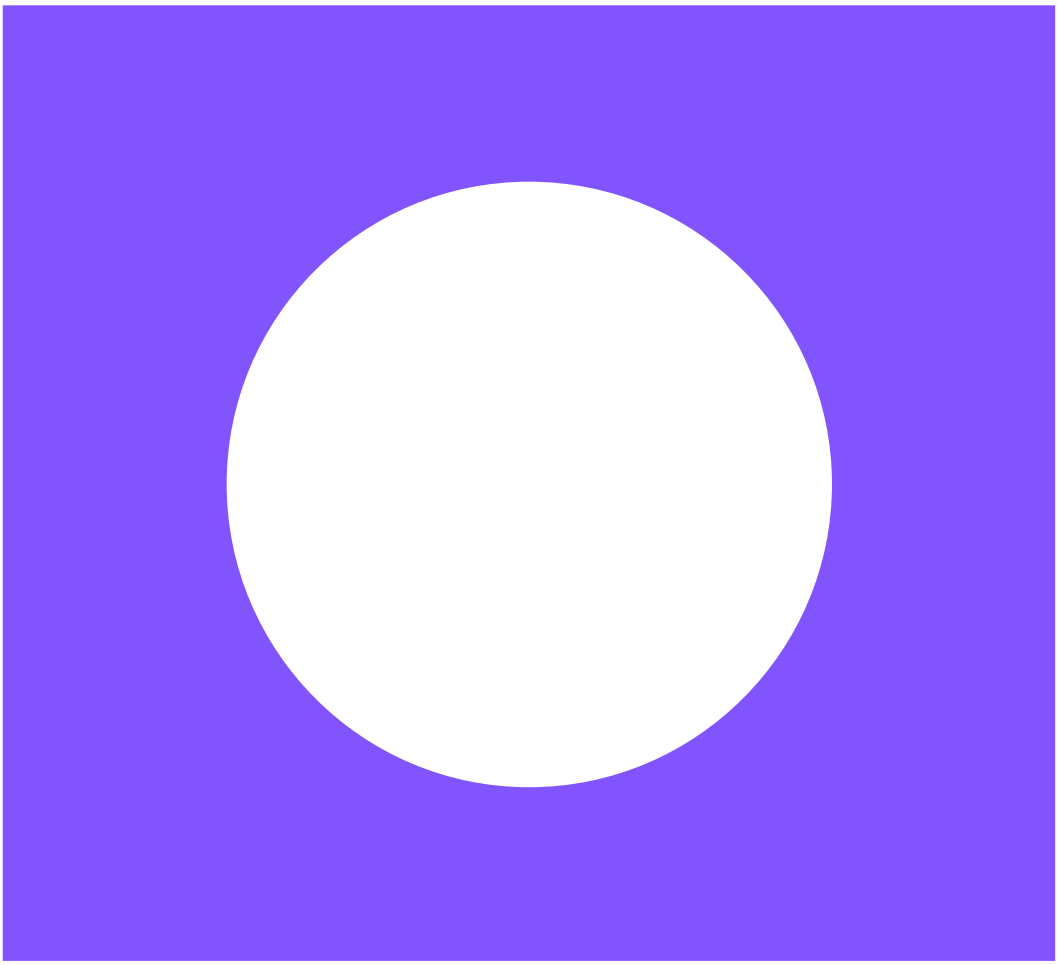

Almaty International Airport

Environmental and Social Impact Assessment Report - Chapter 13

September 2025

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Almaty International Airport

Environmental and Social Impact Assessment Report - Chapter 13

September 2025

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Contents

Tables

Figures

Acronyms and abbreviations

Abbreviation / Acronym	Definition
ALA	Almaty International Airport
AoI	Area of Influence
C-ESMP	Construction Environmental and Social Management Plan
BPEO	Best Practicable Environmental Option
ESMP	Environmental and Social Management Plan
EBRD	European Bank for Reconstruction and Development
EHS	Environmental, Health, and Safety
EPC Contractor	Engineering, Procurement, and Construction Contractor
EPRP	Emergency Preparedness and Response Plan
ESIA	Environmental and Social Impact Assessment
GIIP	Good International Industry Practice
IEMA (ISEP)	Institute of Environmental Management and Assessment (recently renamed as Institute of Sustainability and Environmental Professionals)
IFC	International Finance Corporation
PAA	Project Affected Area
PPE	Personal Protective Equipment
WMP	Waste Management Plan

13 Waste and resources

13.1 Introduction

13.1.1 This chapter of the Environmental and Social Impact Assessment (ESIA) reports the findings of an assessment of the likely significant environmental effects on waste and resources as a result of the Project.

13.1.2 An assessment of likely significant effects has been undertaken for each of the sensitive receptors identified in the study area. Where necessary, commitments to mitigation measures have been made to manage any impacts on receptors.

13.1.3 The (mis)handling of waste and resources through the construction and operational phase of the Project has the potential to have a major adverse effect on environmental and human receptors as well as being likely to reduce the void capacity of landfills in Almaty.

13.1.4 The types and amount of waste expected to be generated in the construction and operational phase are presented in this ESIA. Suggested mitigations based on professional judgement are also put forward. To mitigate the identified impacts, implementation of appropriate management, storage and disposal measures is essential. It is recommended that waste be handled in a manner that complies with Good International Industry Practice (GIIP) and legislative requirements, where practicable. It is also recommended that waste be managed, where practicable, in accordance with the waste hierarchy whereby the following actions will be prioritised in order:

1. Reduce the volume of waste generated
2. Reuse material where possible
3. Recycle unavoidable waste
4. Otherwise recover material/energy from the waste (e.g. anaerobic digestion, incineration with energy recovery)
5. Only dispose of waste (e.g. through landfilling or incineration without energy recovery) as a last resort

13.2 Methodology

Applicable guidelines and standards

13.2.1 In addition to those mentioned in **ESIA Chapter 3: Policy, legal and institutional framework**, the ESIA in relation to waste and resources will follow the following local and international legislation and best practice guidelines.

Kazakhstani legislation

- **The Environmental Code of the Republic of Kazakhstan (Code No. 400-VI ZRK of 2021) –** Establishes a waste management system that classifies waste by hazard, mandates extended producer responsibility, regulates landfill operations, and sets ambitious recycling targets to support the country's green economy transition.

- **New National Waste Management strategy (to be finalised in September 2025[1]) –** Will outline a more holistic approach to waste management.
- **ҚР ДСМ 331/2020 Sanitary Rules for the Collection, Use, Application, Disposal, Transportation, Storage and Burial of Production and Consumption Waste –** Sets sanitary and epidemiological requirements for the handling of domestic and industrial waste.
- **Order № 314 On approval of the Waste Classifier (2021) –** establishes a standardised system for categorising waste types based on their composition and hazard level, in alignment with the Environmental Code to support effective waste management and regulatory oversight.

International guidance

- **International Finance Corporation (IFC) Performance Standard 3 on Resource Efficiency and Pollution Prevention (2012)[2] –** Stipulates that hazardous and non-hazardous waste materials need to be avoided or minimised where possible. If avoidance of waste generation cannot be done but was minimised instead, waste must be recovered and reused. The Project must treat, destroy and dispose of waste including hazardous waste that cannot be recovered or reused in an environmentally sound manner. When waste management is handled by third parties, the Engineering, Procurement, and Construction (EPC) Contractors used will be of good reputation and enterprises that are legitimate and licensed by the relevant regulatory agencies.
- **The Basel Convention[3] –** Lays out limitations to the transboundary movement of hazardous wastes.
- **IFC General Environmental, Health, and Safety (EHS) Guidelines for Waste Management (2007a)[4] –** Provides recommendations on hazardous and non-hazardous waste management and their disposal. These guidelines provide advice on creating and following a Waste Management Plan (WMP) which will include procedures for preventing waste, minimising waste, a plan to separate different types of waste, the proper storage, transportation and disposal of all wastes produced during the construction and operation of the Project.
- **IFC Environmental, Health, and Safety Guidelines for Waste Management Facilities (2007b)[5]**- Provides recommendations on hazardous and non-hazardous waste management, much of which is applicable to any site where waste is stored or handled.
- **IFC performance Standards on Social and Environmental Sustainability (2006)[6] (updated in 2012)[7] –** Sets out how waste and hazardous waste should be managed with respect to human and environmental safety with the goal of sustainability.

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1 The Astana Times (2025) Kazakhstan to Tackle Gaps in Waste Management with Strategy Due by September Available at: Kazakhstan to Tackle Gaps in Waste Management with Strategy Due by September - The Astana Times Last accessed on 18/07/2025

2 IFC (2012) Performance Standard 3 on Resource Efficiency and Pollution Prevention Available at: Performance Standard 3: Resource Efficiency and Pollution Prevention | International Finance Corporation (IFC) Last accessed on 11/8/2025

3 Basel Convention on the Control of Transboundary Movements of Hazardous wastes and their Disposal & Basel Protocol on Liability and Compensation (2023). Available at https://www.basel.int/Portals/4/download.aspx?e=UNEP-CHW-IMPL-CONVTEXT-2023.English.pdf Last accessed on 09/7/2025

4 IFC (2007a). General Environmental, Health, and Safety Guidelines for Waste Management Available at: Final - General EHS Guidelines_APRIL 29.doc Last accessed on 09/7/2025

5 IFC (2007b). Environmental, Health, and Safety Guidelines for Waste Management Facilities

6 IFC (2006). Performance Standards on Social and Environmental Sustainability

7 IFC (2012). Performance Standards on Social and Environmental Sustainability

- **IFC Guidance Note 1 on the Assessment and Management of Environmental and Social Risks and Impacts (2012)[8] –** Outlines how an assessment of environmental and social risks should be conducted.
- **Institute of Environmental Management and Assessment (IEMA) guide to: Materials and Waste in Environmental Impact Assessment (2020)[9].** – Outlines how waste and resources should be considered in an Environmental Impact Assessment and provides guidance on the impact assessment for waste generation on landfill void capacity.
- **European bank for reconstruction and development (EBRD) Environmental and Social Policy (2024)[10]** – Outlines how resources and waste should be efficiently and sustainably used and disposed of in accordance with the waste hierarchy as well as the safe handling and transport of hazardous waste.

Area of Influence for waste and resources

13.2.2 In accordance with IEMA guidance and professional judgement, this assessment uses two geographically different study areas to examine the generation and management of waste, management of material and their storage:

- The Project Affected Area (PAA) defined as the area of land used by the Project permanently or temporarily. This includes the Project footprint (the red line boundary or limits of deviation), and any areas required for temporary access, site compounds, working platforms and other enabling activities.
- The Area of Influence (AoI) is primarily focused within 50km of the Project site as well as any other adjacent areas, where wastes from the Project are to be transported for processing or for final disposal. This area should be sufficient to identify suitable material and waste management infrastructure and disposal sites, within a defined region that could accept arisings of materials or waste generated by the construction and operation of the airport.

Methodological approach

13.2.3 The assessment of impacts from waste and resource (mis)management has been conducted based on available Project information and a desk-based review of provided and publicly accessible information regarding waste management. The ESIA methodology for the management of material and solid waste for the construction and operational phases has been based on two different sets of criteria:

- Mismanagement of material and waste
- The IEMA guidelines on landfill void capacity

13.2.4 The ESIA will be based on relevant legislation and will:

- Review key activities for the construction and operational phases for the generation of waste and material handling.
- Identify key waste streams and material used during the construction and operational phases.
- Identify areas of key concern due to their environmental and social significance.
- Estimate and quantify waste streams where possible.
- Identify suitable waste management procedures including review and implementation of suitable waste management hierarchy.

[8] IFC (2012). Guidance Note 1: Assessment and Management of Environmental and Social Risks and Impacts

[9] IEMA (2020). Guide to: Materials and Waste in Environmental Impact Assessment

[10] EBRD (2024). Environmental and Social Policy

- Identify transportation requirements for waste disposal as a result of construction and operation of the Project.

13.2.5 A range of impacts can occur from the mismanagement of materials and waste arising from construction and operational activities. This impact assessment is primarily focused on identifying materials and waste streams and adopting an appropriate approach in line with GIIP, where practicable, which seeks to avoid the generation of waste in the first instance, rather than mitigating potential impacts to a defined baseline. Nevertheless, mitigation measures have been proposed within the ESIA report to minimise or avoid identified impacts.

13.2.6 Professional judgement will be used to provide an assessment of effects based on several factors, including:

- The type of storage and handling required for the materials and waste.
- The type of waste generated, e.g. inert, non-hazardous, hazardous.
- The availability of suitable facilities within close proximity to the Project to treat the waste generated.
- Compatibility of the best practicable environmental option (BPEO) for the waste within the context of the waste hierarchy, i.e. whether generation of the waste can be minimised, the waste can be recycled, landfilled, etc.

13.2.7 The criteria used to assess the sensitivity of relevant receptors and magnitude of potential impacts for mismanagement of material and waste are outlined in Table 4.2 and Table 4.3 in **ESIA Chapter 4: ESIA scope and methodology**.

13.2.8 Potential impacts for mismanagement of material and waste are attributed significance, taking into account the interaction between the magnitude of an impact and the sensitivity of a receptor, as outlined in Table 4.4 in **ESIA Chapter 4: ESIA scope and methodology**.

13.2.9 The criteria used to assess the sensitivity of relevant receptors and magnitude of potential impacts on landfill void capacity based on IEMA guidelines are outlined in Table 13.1 and Table 13.2. These guidelines are designed to be used in the UK but have been used to support professional judgement for this Project.

Table 13.1: Receptor sensitivity criteria for landfill void capacity (IEMA, 2020)

Sensitivity category	Description
Negligible	Across construction and/or operation phases, the baseline/future baseline of regional (or where justified, national) inert, non-hazardous, and hazardous landfill void capacities are expected to remain unchanged or are expected to increase through a committed change in capacity.
Low	Across construction and/or operation phases, the baseline/future baseline of regional (or where justified, national): • Inert and non-hazardous landfill void capacity is expected to reduce minimally: by less than 1% as a result of wastes forecast. • Hazardous landfill void capacity is expected to reduce minimally: by less than 0.1% as a result of wastes forecast.
Medium	Across construction and/or operation phases, the baseline/future baseline of regional (or where justified, national): • Inert and non-hazardous landfill void capacity is expected to reduce noticeably: by 1% – 5% as a result of wastes forecast. • Hazardous landfill void capacity is expected to reduce noticeably: by 0.1% – 0.5% as a result of wastes forecast.
High	Across construction and/or operation phases, the baseline/future baseline of regional (or where justified, national): • Inert and non-hazardous landfill void capacity is expected to reduce considerably: by 6% – 10% as a result of wastes forecast.

Sensitivity category	Description
	• Hazardous landfill void capacity is expected to reduce considerably by: 0.5% – 1% as a result of wastes forecast.
Very high	Across construction and/or operation phases, the baseline/future baseline of regional (or where justified, national): • Inert and non-hazardous landfill void capacity is expected to reduce very considerably (by greater than 10%); end during construction or operation; is already known to be unavailable; or would require new capacity or infrastructure to be put in place to meet forecast demand. • Hazardous landfill void capacity is expected to reduce very considerably (by greater than 1%); end during construction or operation; is already known to be unavailable; or would require new capacity or infrastructure to be put in place to meet forecast demand.

Source: IEMA guide to: Materials and Waste in Environmental Impact Assessment (2020)

Table 13.2: Magnitude of adverse Impact criteria for landfill void capacity (IEMA, 2020)

Magnitude category	Description
No change	There is zero non-hazardous and hazardous waste generation and disposal from the Project.
Negligible	The Project will reduce: • Regional or, where justified, national landfill void capacity baseline** for inert and non-hazardous by less than 1%. • National landfill void capacity baseline for hazardous waste** by less than 0.1%.
Minor	The Project will reduce: • Regional or, where justified, national landfill void capacity baseline** for inert and non-hazardous by 1% – 5%. • National landfill void capacity baseline** for hazardous waste by 0.1% – 0.5%.
Moderate	The Project will reduce: • Regional or, where justified, national landfill void capacity baseline** for inert and non-hazardous by 6% – 10%. • National landfill void capacity baseline** for hazardous waste by 0.5% – 1%.
Major	The Project will reduce: • Regional or, where justified, national landfill void capacity baseline** for inert and non-hazardous by greater than 10%. • National landfill capacity baseline** for hazardous waste by greater than 1%.

Source: IEMA guide to: Materials and Waste in Environmental Impact Assessment (2020)
** Estimated as the worst-case scenario, during a defined construction and/or operational phase.

13.2.10 Potential impacts on landfill void capacity are attributed significance, taking into account the interaction between the magnitude of an impact and the sensitivity of a receptor, as outlined in Table 13.3.

Table 13.3: Effect threshold

		Magnitude of impact				
Sensitivity (or value) of receptor		No change	Negligible	Minor	Moderate	Major
	Very high	Neutral	Negligible	Moderate	Major	Major
	High	Neutral	Negligible	Minor	Moderate	Major
	Medium	Neutral	Negligible	Negligible	Minor	Moderate
	Low	Neutral	Negligible	Negligible	Negligible	Minor
	Negligible	Neutral	Neutral	Negligible	Negligible	Negligible

Source: IEMA guide to: Materials and Waste in Environmental Impact Assessment (2020)

Limitations and assumptions

13.2.11 This section outlines all assumptions that have been made in this chapter as well as limitations of this study.

Scope

13.2.12 This assessment has not considered the effects of land contamination (such as impact on groundwater) as this has been considered within **ESIA Chapter 9: Geology and soils**. Where potential impacts from contaminated land are identified, this chapter addresses the management of this waste or material only.

13.2.13 The availability of resources and impacts of resource consumption have not been explored here. This ESIA is focused on the generation and management of waste and reusable materials on site as well as resource consumption only in the context of waste reduction.

Baseline

13.2.14 The information provided, at the time of preparing this Chapter, by ALA has been used to establish baseline characterisation. This baseline may evolve as more information and additional assessments become available.

13.2.15 The individual or legal entity responsible for handling the waste is identified in the ALA's Annual waste inventorisation report for 2024 (ALA, received June 2025). However, information regarding the final facility destination and whether this waste is recycled, treated or landfilled is not available in the report and therefore not provided in this ESIA.

13.2.16 It is assumed that available waste generation information from 2024 (ALA, received June 2025 Annual waste inventorisation report for 2024) is representative of operational waste generation in a typical year. These figures are broadly comparable to those presented in the Waste Management Programme (ALA, 2023 WMP 2023-2032). However, any irregularity in waste generation weight or composition that there is may affect estimates, limiting the accuracy of waste generation estimates.

13.2.17 Recycling rates at ALA are assumed to be comparable to those reported for Almaty city for 2019 (Government of the Republic of Kazakhstan, 2023[11]). It is assumed that the waste which is not recycled will be landfilled.

Construction phase effects

13.2.18 The information provided at the time of preparing this chapter has been used to assess the likely effects of the construction phase of the Project. Any assessment of effects may evolve as more information and additional assessments become available.

13.2.19 Whilst materials to be used and wastes to be generated during the construction phase of the Project have been identified at a high level, with best available information, exact quantities of wastes and materials have not been defined and may be subject to change following detailed design.

13.2.20 Estimated construction waste volumes are based on the latest available information at the time of drafting this chapter (YDA SMS, received June 2025 Waste Volumes and Landfill).

13.2.21 An EPC Contractor has been appointed for these elements:

[11] Government of the Republic of Kazakhstan (2023) Information on waste reduction, recycling and reuse Available at: Information on waste reduction, recycling and reuse | Electronic government of the Republic of Kazakhstan Last accessed on 11/07/2025

- Full depth reconstruction of main runway
- Construction of new taxiway
- Construction of a new cargo apron
- Full depth reconstruction of existing VIP apron
- Construction of a new de-icing pad
- Rehabilitation of parking stands

Section 13.5 takes into account these elements in quantitative analyses that were undertaken.

13.2.22 An EPC Contractor has not been appointed for:

- The fuel farm
- Catering facility
- Domestic terminal renovation
- Drainage and wastewater treatment
- New head office and training centre
- Aerodrome and ground handling village
- New landside and airside warehouses
- Other improvements

Section 13.5 does not quantitatively assess construction waste generated from these elements as insufficient information was available at the time of drafting this ESIA. Quantitative estimates of waste generated in the construction phase are likely to be underestimated as all construction elements are not accounted for. A qualitative assessment of the construction phase has also been conducted.

13.2.23 The expected waste composition of the construction waste presented is based on analysis of work for which a contractor has been already appointed and thus may not include other waste streams that may be generated.

13.2.24 It is also assumed that construction workers will generate municipal waste at a rate similar to passengers. Calculated municipal waste generation rates using data from 2024 has been used (ALA, received June 2025 Annual waste inventorisation report for 2024 year). This may be an underestimation as passengers are likely to spend less time at the airport than construction workers. A waste generation rate applicable for residents in Almaty (Vassilis et al., 2017[12]) is not used as construction workers are not housed on site.

13.2.25 Estimated municipal waste generation from construction is based on the latest available information at the time of drafting this chapter and is based on monthly estimates of construction workers (YDA SMS, received June 2025 Detailed Manpower Schedule and Histograms).

13.2.26 Estimates of municipal waste generated by construction workers are also likely to be underestimated as estimates are based only on elements for which EPC Contractors have been appointed.

13.2.27 Since the information regarding the recovery and diversion from landfill volumes or weights is unavailable, the impact assessment will be based on the likely composition of waste streams and reasonable assertions will be made about disposal. The lack of data on landfill void capacity and landfill diversion limits the assessment of environmental impacts for waste

[12] Inglezakis, V.J., Moustakas, K., Khamitovac, G., Tokmurzin, D., Rakhmatulina, R., Serik, B., Abikak, Y. and Poulopoulos, S.G., 2017. Municipal solid waste management in Kazakhstan: Astana and Almaty case studies. Available at: https://core.ac.uk/download/pdf/334954945.pdf Last accessed on 11/07/2025

generation, based on guidance from IEMA for landfill void capacity, thus this assessment is based on professional judgement and based on other projects of similar size and nature.

Operational phase effects

13.2.28 The information provided at the time of preparing this chapter has been used to assess the likely effects of the operational phase of the Project. ALA's operational WMP incorporates an adaptive management approach, allowing it to evolve throughout the Project's lifecycle in response to new information, operational changes, and regulatory requirements. Accordingly, the assessment of effects may be refined as more detailed data and additional assessments become available.

13.2.29 The types and quantities of materials required during the operational phase, as well as the waste expected to be generated, have been identified at a high level. This assessment is based on the current operation of the Project and informed by professional judgement and experience from similar projects, and is anticipated to remain broadly consistent.

13.2.30 Assumptions made about waste generation are based on the best available air traffic forecasting estimates: Mott MacDonald, August 2025 Project Horizon Traffic Forecasts Outputs (DRAFT V6.0). These are likely to differ from real passenger numbers in the future.

13.2.31 It is assumed that waste generation will increase linearly with passenger numbers. Estimated waste generation rates in the operational phase of the Project are based on an extrapolation of the waste generation rate (using the available 2024 data) per passenger. Waste generation shall be estimated for 2030, 2040, and 2050.

13.2.32 It is assumed that the waste generation rate will not change. Waste generation rates and composition may shift greatly in the future (in an unexpected fashion), limiting the accuracy of this estimate further into the future.

13.2.33 It is assumed that the broad composition of waste will not change and is well reflected by the 2024 data.

13.2.34 It is also assumed that treatment and landfilling options will not change over the period studied. The availability of recycling facilities and preferential treatment options is expected to increase, thus estimated recycling rates and landfill diversion rates represent a worst-case scenario.

13.2.35 Since the information regarding the recovery and diversion from landfill volumes or weights is unavailable, the impact assessment will be based on the likely composition of waste streams and reasonable assertions will be made about disposal. The lack of data on landfill void capacity and landfill diversion limits the assessment of environmental impacts for waste generation, based on landfill void capacity, thus this assessment is based on professional judgement and based on other projects of a similar size and nature.

Mitigation

13.2.36 It is assumed that the Project will aim to minimise the generation of waste.

13.2.37 It is assumed that all topsoil will be suitable for reuse on site or on projects locally. Where this is not possible, it is assumed that all vegetation and made ground material will be sent to local waste infrastructure for treatment and reuse and thus will not be required to be landfilled.

13.2.38 It has been assumed that all remaining waste identified for disposal will be recycled where possible. The waste that cannot be recycled or treated will be sent to landfill.

13.2.39 It is assumed that waste will be appropriately managed during construction and operation, meeting any local legal and international requirements (i.e. embedded mitigation).

13.3 Baseline

Current baseline

13.3.1 This section provides an overview of the existing waste management infrastructure and procedures at ALA as well as the expected construction and operational waste types resulting from the Project.

13.3.2 There are six municipal waste recycling enterprises in Almaty City (Government of the Republic of Kazakhstan, 2023). It is also reported that in Almaty City in 2019 the recycling rate was 10.95%. It is assumed that the remaining 89.05% was landfilled.

13.3.3 The exact location of facilities that are used by ALA are not listed here, as this information was not available at the time of preparing this ESIA. Instead, the companies responsible for managing or treating the waste are listed in Table 13.4 and Table 13.5.

13.3.4 Within ALA, oil sludge from the fuel farms (both aviation and gasoline) and waste from the maintenance area is collected on site and stored in an underground storage tank to the northern extent of the airport boundary. Hazardous waste is segregated and stored in a separate facility on site at the northern extent of the airport apron. These wastes are stored appropriately before removal from site via an authorised waste carrier to a municipal waste management facility (Appendix 13.A: Site photos).

13.3.5 Table 13.4 and Table 13.5 outline the types and volume of waste generated at ALA. In total 33,651.45 tonnes of non-hazardous waste was generated in 2024 (4,651.45 tonnes excluding construction waste), which serviced approximately 11.4 million passengers in 2024 (ALA, March 2025 Draft Master Plan). 75.10 tonnes of hazardous waste were generated. Based on this, the calculated waste generation rate (kg/passenger) for each waste stream is listed in Table 13.4 and Table 13.5. The individual or legal entity responsible for taking the waste is listed, however the final waste treatment facility used will be dependent on the appointed EPC Contractors and thus has not been provided.

Table 13.4: Weight of non-hazardous waste reported in 2024 and treatment/disposal destination

Waste description	Waste code	Weight (tonnes)	Waste generation rate (kg/ passenger)	Individual or legal entity responsible for taking the waste*
Mixed construction and demolition wastes	17 09 04	29000.000	2.54386	ИП "КаРиДа" IE "KaRiDa"
Mixed Municipal waste	20 03 01	4560.000	0.40000	ТОО "Эко Сервис Алматы" Eco Service Almaty LLP
Plastics	20 01 39	34.562	0.00303	ИП Рысбек Ж.Р.,ТОВАРИЩЕСТВО С ОГРАНИЧЕННОЙ ОТВЕТСТВЕННОСТЬЮ "ВИТА ПРОМ" Individual Entrepreneur Rysbek ZH.R., LIMITED LIABILITY PARTNERSHIP "VITA PROM"
Discarded electrical and electronic equipment	20 01 36	2.387	0.00021	ТОВАРИЩЕСТВО С ОГРАНИЧЕННОЙ ОТВЕТСТВЕННОСТЬЮ "ВИТА ПРОМ" LIMITED LIABILITY PARTNERSHIP "VITA PROM"
End-of-life tyres	16 01 03	23.940	0.00210	ТОВАРИЩЕСТВО С ОГРАНИЧЕННОЙ

Waste description	Waste code	Weight (tonnes)	Waste generation rate (kg/ passenger)	Individual or legal entity responsible for taking the waste*
				ОТВЕТСТВЕННОСТЬЮ "ВИТА ПРОМ" LIMITED LIABILITY PARTNERSHIP "VITA PROM"
Ferrous metal	16 01 17	24.576	0.00216	ТОО "АКАТ-21" AKAT-21 LLP
Other fractions not otherwise specified (non-hazardous)	20 01 99	0.850	0.00007	ТОВАРИЩЕСТВО С ОГРАНИЧЕННОЙ ОТВЕТСТВЕННОСТЬЮ "ВИТА ПРОМ" LIMITED LIABILITY PARTNERSHIP "VITA PROM"
Paper and cardboard	20 01 01	4.835	0.00042	ТОВАРИЩЕСТВО С ОГРАНИЧЕННОЙ ОТВЕТСТВЕННОСТЬЮ "ВИТА ПРОМ",ТОО "Карина Paper" LIMITED LIABILITY PARTNERSHIP "VITA PROM", LLP "Karina Paper"
Sawdust, shavings, cuttings, wood, particle board and veneer	03 01 05	0.300	0.00003	(not provided)
Total non-hazardous waste (including construction wastes)	**N/A**	**33,651.45**	**2.95**	**N/A**
Total non-hazardous waste (excluding construction wastes)	**N/A**	**4,651.45**	**0.41**	**N/A**

Source: Mott MacDonald based on waste generation data from 2024 (R ALA, received June 2025 Annual waste inventorisation report for 2024 year) and passenger numbers reported in 2024 (ALA, March 2025 Draft Master Plan).
*Annual waste inventorisation report for 2024 year (ALA, received June 2025).

Table 13.5: Weight of hazardous waste reported in 2024 and treatment/disposal destination

Waste description	Waste code	Weight (tonnes)	Waste generation rate (kg/ passenger)	Individual or legal entity responsible for taking the waste*
Infectious waste from humans	18 01 03*	0.0123	0.000001	ТОО "Технопарк-2030" Technopark-2030 LLP
Infectious waste from animals	18 02 02*	0.095	0.000008	ТОО "Ветстанция" Vetstantsiya LLP
Fluorescent tubes and other mercury-containing waste	20 01 21*	0.124	0.000011	ТОВАРИЩЕСТВО С ОГРАНИЧЕННОЙ ОТВЕТСТВЕННОСТЬЮ "ВИТА ПРОМ" LIMITED LIABILITY PARTNERSHIP "VITA PROM"
Desalter sludges or emulsions	13 01 08*	9.000	0.000789	ТОВАРИЩЕСТВО С ОГРАНИЧЕННОЙ ОТВЕТСТВЕННОСТЬЮ "ВИТА ПРОМ" LIMITED LIABILITY PARTNERSHIP "VITA PROM"

Waste description	Waste code	Weight (tonnes)	Waste generation rate (kg/ passenger)	Individual or legal entity responsible for taking the waste*
Oil filters	16 01 07*	4.970	0.000436	ТОВАРИЩЕСТВО С ОГРАНИЧЕННОЙ ОТВЕТСТВЕННОСТЬЮ "ВИТА ПРОМ" LIMITED LIABILITY PARTNERSHIP "VITA PROM"
Absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by hazardous substances	15 02 02*	0.325	0.000029	ТОВАРИЩЕСТВО С ОГРАНИЧЕННОЙ ОТВЕТСТВЕННОСТЬЮ "ВИТА ПРОМ" LIMITED LIABILITY PARTNERSHIP "VITA PROM"
Wastes containing oil	16 07 08*	45.100	0.003956	ТОВАРИЩЕСТВО С ОГРАНИЧЕННОЙ ОТВЕТСТВЕННОСТЬЮ "ВИТА ПРОМ" LIMITED LIABILITY PARTNERSHIP "VITA PROM"
Waste paint and varnish containing organic solvents or other hazardous substances	08 01 11*	0.300	0.000026	ТОВАРИЩЕСТВО С ОГРАНИЧЕННОЙ ОТВЕТСТВЕННОСТЬЮ "ВИТА ПРОМ" LIMITED LIABILITY PARTNERSHIP "VITA PROM"
Lead batteries	16 06 01*	15.178	0.001331	ТОО "АКАТ-21" AKAT-21 LLP
Total hazardous waste	**NA**	**75.104**	**0.0066**	**NA**

Source: Mott MacDonald based on waste generation data from 2024 (ALA, received June 2025 Annual waste inventorisation report for 2024 year) and passenger numbers reported in 2024 (ALA, March 2025 Draft Master Plan)
*Annual waste inventorisation report for 2024 year (ALA, received June 2025).

Future baseline

13.3.6 In order to better understand the impact on waste generation and thus the potential impact on receptors it is necessary to consider waste generation if the Project were to not go ahead.

13.3.7 If the Project were not to go forward no construction waste would be generated. It is not foreseen that operational waste generation will significantly increase.

13.3.8 Without the Project, passenger numbers are not expected to grow significantly, and operations are likely to remain consistent.

13.4 Potential impacts

13.4.1 The following potential impacts that may be caused by the (mis)handling of waste and resources in the construction and operational phase of the Project include:

- Mismanagement of materials or waste, resulting in the temporary or permanent degradation of the natural environment
- Release of greenhouse gas emissions (e.g. through transportation and waste management)
- Visual Impacts, noise, vibration, disruption to traffic and other potential causes of nuisance
- Negative impacts on human health (health and safety hazards)

- Increased pressure on landfill void capacity
- Unsustainable use or loss of resources to landfill resulting in the temporary or permanent degradation of the natural environment
- Ecological impacts

13.5 Assessment of effects

Construction phase effects

13.5.1 Quantitative information presented in this section is based on the elements for which EPC Contractors have been appointed and quantitative information made available. Construction waste is assessed qualitatively for all other elements.

13.5.2 A significant volume of construction waste is expected to be generated by the Project. This will include:

- Construction waste from excavation and demolition activities
- Mishandling/ surplus of construction material
- Packaging material
- Municipal solid waste generated by construction workers

13.5.3 It is likely that a large proportion of this waste will be diverted from landfill.

13.5.4 The Project will generate waste through enabling works and the construction of these elements. The excavation and demolition waste arising and their reuse or disposal is stated in Table 13.6. Table 13.7 lists the potential waste types that may be generated. The likely waste composition, the treatment/ disposal options and location of waste treatment facilities are given in Table 13.8.

Table 13.6: Excavation and demolition waste reuse/ disposal from the Project

Material/waste	Quantity (m^3)	Weight (Tonnes)
Demolition of structures/pavement	65,453	163,633
Asphalt pavement	50,276	125,690
Concrete pavement	150	360
Excavated materials (soils/organics)	1,907,859	3,052,575
Total waste generated	**2,023,738**	**3,342,258**
Reuse of excavated material without any process	1,056,627	1,690,603
Reuse of excavated material after chemical process	12,000	19,200
Total excavated material reused on site	**1,068,627**	**1,709,803**
Total waste removed from the Project site	**955,112**	**1,632,455**

Source: YDA SMS, received June 2025 Waste Volumes and Landfill

Table 13.7: Waste type and potential treatment

Location	Waste description	Potential treatment
Fuel Farm	Excavated soil and rocks	Inert (landfilled)
	Steel rebar scraps	Recyclable
	HDPE membrane cuttings	Recyclable
	Pipe off-cuts	Recyclable
	Empty cable reels	Recyclable
Catering Facility	Concrete and mortar residue	Inert (landfilled)
	Plastic packaging waste	Recyclable (Plastic)

Location	Waste description	Potential treatment
	HVAC duct cut-offs	Recyclable (Metal)
	Wire and conduit waste	Recyclable
Airport Pavement	Existing unsuitable soil to spoil	Recyclable
	Pavement core cuttings	Inert (landfilled)
	Asphalt milling waste	Recyclable
	Old concrete slabs	Recyclable
	Old concrete pavement dowel bars	Recyclable

Source: ALA, Received June 2025 Material Plan

Table 13.8: The treatment/disposal method and facility location where applicable for construction waste streams

Waste Type	Composition	Treatment / Disposal Method	Facility Location
Concrete and asphalt	4.3%	Crushing and reuse as aggregate or base layer	On-site mobile crusher or crushing plant
Steel	2.1%	Collected and sent for recycling	Local scrap metal dealers
Timber	0.8%	Reuse where possible, else landfill	Local municipal landfill or wood recycling
Plastic/packaging	0.4%	Recyclable plastics to recycling centres, others to landfill	City recycling centres
Hazardous waste	0.9%	Specialized hazardous waste disposal contractor	Licensed hazardous waste facility (near industrial zone)
Excavated soil	85.7%	Reuse on-site for backfilling, or disposal in licensed inert waste landfill	Landfill

Source: YDS SMS, received July 2025 Construction Waste Streams and Waste Treatment

13.5.5 Material brought to the site for construction has the potential to become waste (e.g. through mishandling, damage or contamination). It is estimated that 10% of material brought to the site for construction will become waste (RICS, 2023[13]).

13.5.6 Table 13.9 lists the material that is expected to be brought to the site for construction, the expected quantity of that material and likely waste arisings.

Table 13.9: Material used in the construction phase that has the potential to become waste

Description	Unit	Quantity	Potential waste (10% of material) (RICS, 2023)
Pavements			
Fly ash	m^3	900	90
Cement	Tonnes	128,221	12,822
Chemical Admixtures for Concrete	Tonnes	1,180	118
Capping Layer (PGS)	m^3	1,127,166	112,717

[13] RICS (2023) Whole life carbon assessment for the built environment, 2nd edition

Description	Unit	Quantity	Potential waste (10% of material) (RICS, 2023)
Geotextiles	m^2	2,003,400	200,340
Bitumen Emulsion	Tonnes	664	66
Bitumen	Tonnes	7,137	714
Polymer Modified Bitumen	Tonnes	6,290	629
Crushed Aggregate	Tonnes	539,860	53,986
Aggregate	m^3	405,875	40,588
Sealing cord made of foamed polyethylene	m^3	204,955	20,496
Bituminous mastic	l	81,982	8,198
Dowel Bar	Tonnes	8,842	884
Stormwater Drainage			
Reinforced concrete pipe Ø500-1500mm	m	19,077	1,908
PVC Ø300mm pipe	m	2,871	287
Line gutters	m	5,952	595
Drainage Manholes	Unit	334	33
Corrugated drainage pipe	m	28,603	2,860
Oil-water separator	l	1	0
De-icing fluid collection system	Unit*	1	0
Marking			
Reflective paint for marking	l	14,992	1,499
Airfield Ground Lighting (AGL)			
Electrical Ducts	l	259,385	25,939
Airfield Manholes	Unit*	666	67
Bare Coppers for Earthing	Unit*	40,110	4,011
Copper Clads for Earthing	Unit*	660	66
Cables	Unit*	635,835	63,584
Connector kits	Unit*	6,866	687
Approach Lights	Unit*	445	45
Runway Lights	Unit*	682	68
Runway PAPI	Unit*	8	1
Taxiway Lights	Unit*	1,969	197
Illuminated Airfield Signs	Unit*	105	11
Floodlighting	Unit*	127	13
Fence			
Fence	m	2,000	200

*Unit refers to single unit of the construction material
Source: YDA SMs, received July 2025 Materials

13.5.7 During peak construction period, (October 2025-November 2027) there will be approximately 426 workers on site (YDA SMS, received June 2025 Detailed Manpower Schedule and Histograms). In addition to construction waste, municipal solid waste will be generated by these construction workers. It is estimated that approximately 0.41 tonnes of additional non-hazardous solid waste will be generated from July 2025 to December 2027 in the construction phase.

13.5.8 The mismanagement of materials and solid waste may lead to significant effects particularly on health and safety as well as through contamination of the environment. For the construction phase, the sensitivity of effect from the mismanagement of materials and waste is likely to be **medium** (Table 4.2), the magnitude will be **major adverse** (Table 4.3), and effects are likely to be **major adverse (significant)** (Table 4.4).

13.5.9 IEMA (2020) guidance for environmental impact assessment for the disposal of waste, require information on available landfill void capacities within the region. In the absence of information for available regional landfill void capacities and the quantities of waste arisings, it is anticipated that the majority of the waste (considering that 1,632,455 tonnes is estimated only for the project components where quantitative information has been provided) is likely to be sent to a treatment facility and not disposed to regional landfill sites. Therefore, based on IEMA (2020) guidance for environmental impact assessment for the disposal of waste criteria, for the construction phase, the sensitivity of effect from disposal of construction waste is likely to be **medium** (Table 13.1), the magnitude will be **minor** (Table 13.2), effects are likely to be **minor adverse (not significant)** (Table 13.3).

13.5.10 The potential effects of unmitigated mismanagement of waste and resources on the environment and human receptors as well as on landfill void capacity in the construction phase are summarised in Table 13.10.

Table 13.10: Summary of significance assessment of potential unmitigated impacts that may occur in the construction phase

Activity	Potential Impact	Magnitude of impact	Receptor Sensitivity	Impact Evaluation	Significance of Effect
Mismanagement of material and solid waste	Contamination of environments (specifically surface watercourse, groundwater and the ground) due to leakage and spillage of wastes associated with poor handling and storage arrangements.	Adverse, permanent and moderate	Medium	Moderate adverse	Significant
	Fugitive emissions, such as dust, associated with the handling and storage of some waste streams.	Adverse, temporary and minor	Low	Negligible	Not significant
	Visual amenity impacts associated with poor storage of waste at the construction site	Adverse, temporary and minor	Low	Negligible	Not significant
	Health and safety hazards due to inappropriate handling and storage of waste particularly hazardous waste.	Adverse, permanent and major	Medium	Major adverse	Significant
Landfill void capacity*	Pressure on existing landfill capacities.	Adverse, temporary and minor	Medium	Minor adverse	Not significant
	Increased travelling from transporting waste from the Project site.	Adverse, temporary and minor	Low	Negligible	Not significant

* Based on professional judgement

Operational phase effects

13.5.11 In the operational phase, it is likely that waste generated will be increased when compared to a future baseline (should the Project not go ahead). As part of the Project, additional capacity for passengers and cargo will be created. As such, the volume of waste from the catering and hospitality of workers and passengers, packaging waste, and waste generated from maintenance and cleaning will be increased. However, the composition of the waste is unlikely to change significantly.

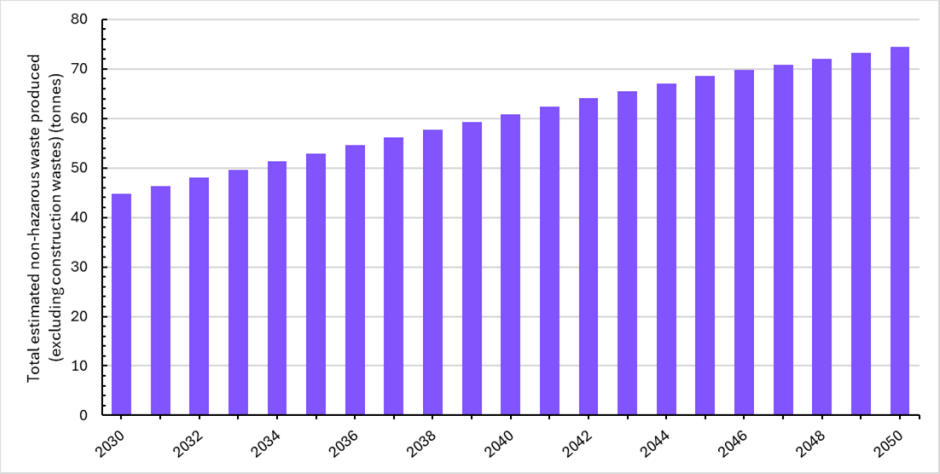
13.5.12 If the Project were to go forward, there would be more passengers transiting ALA compared to a future baseline (if the Project were not to go ahead). More waste would therefore be generated. If recycling/treatment rates remain the same, in the period 2030-2050, more waste would also be landfilled. **Expected passengers, waste generated**, **and landfill diversion rates** in 2030, 2040, 2050 summarises the expected passengers, waste generated and landfill diversion rates through the operational phase.

Table 13.11: Expected passengers, waste generated, and landfill diversion rates through the operational phase

Expected passengers, waste generated, and landfill diversion rates in 2030, 2040, 2050	**Unit**	**Operational phase**
Passengers served 2030	**Passenger number**	**109,710**
Total non-hazardous waste generated in 2030 (excluding construction waste)	Tonnes	44.76
Diverted from landfill in 2030, based on 10.95%	Tonnes	4.90
Landfilled in 2030, based on 89.05%	Tonnes	40
Passengers served 2040	**Passenger number**	**149,023**
Total non-hazardous waste generated in 2040 (excluding construction waste)	Tonnes	60.80
Diverted from landfill in 2040, based on 10.95%	Tonnes	6.66
Landfilled in 2040, based on 89.05%	Tonnes	54
Passengers served 2050	**Passenger number**	**182,330**
Total non-hazardous waste generated in 2050 (excluding construction waste)	Tonnes	74.39
Diverted from landfill in 2050, based on 10.95% (Tonnes)	Tonnes	8.15
Landfilled in 2050, based on 89.05% (Tonnes)	Tonnes	66.25

Source: Mott MacDonald based on waste generation data from 2024 (ALA, received June 2025 Annual waste inventorisation report for year 2024) and passenger numbers reported in 2024 (ALA, March 2025 Draft Master Plan).
Estimation of waste generation in the operational phase of the Project uses projected passenger numbers from air traffic modelling (Mott MacDonald, August 2025 Project Horizon Traffic Forecasts Outputs (DRAFT V6.0)).

Figure 13.1: Calculated total non-hazardous waste generated (excluding construction wastes) per year from 2030 to 2050 after completion of the Project



Source: Mott MacDonald based on waste generation data from 2024 (ALA, received June 2025 Annual waste inventorisation report for year 2024) and passenger numbers reported in 2024 (ALA, March 2025 Draft Master Plan).

Estimation of waste generation in the operational phase of the Project uses projected passenger numbers from air traffic modelling (Mott MacDonald, August 2025 Project Horizon Traffic Forecasts Outputs (DRAFT V6.0)).

13.5.13 The mismanagement of materials and waste may lead to significant effects particularly on health and safety as well as through contamination of the environment. The sensitivity of effect from the mismanagement of materials and waste is likely to be **medium**, the magnitude will be **major adverse**, and effects are likely to be **major adverse (significant)**.

13.5.14 IEMA (2020) guidance for environmental impact assessment for the disposal of waste, requires information on available landfill void capacities within the region. In the absence of information for available regional landfill void capacities and the quantities of waste arisings, it is assumed that as much of the operational waste generated will be recycled/treated where feasible and not disposed to regional landfill sites. This projected waste is likely to be generated over a 25-year period. Therefore, based on IEMA guidance the environmental impact assessment on landfill void capacity, for the operational phase, the sensitivity of effect from disposal of operational waste is likely to be **low**, the magnitude will be **minor**, effects are likely to be **negligible (not significant)**

13.5.15 The potential effects of unmitigated mismanagement of waste and resources on the environment and human receptors as well as on landfill void capacity in the operational phase are summarised in Table 13.12.

Table 13.12: Summary of significance assessment of potential unmitigated impacts that may occur in the operational phase

Activity	Potential Impact	Magnitude of impact	Receptor Sensitivity	Impact Evaluation	Significance of Effect
Mismanagement of material and waste	Contamination of environments (specifically surface watercourse, groundwater and the ground) due to leakage and spillage of wastes associated with poor handling and storage arrangements	Adverse, permanent and moderate	Medium	Moderate adverse	Significant
	Fugitive emissions, such as dust, associated with the handling and storage of some waste streams	Adverse, temporary and minor	Low	Negligible	Not significant
	Visual amenity impacts associated with poor storage of waste	Adverse, temporary and minor	Low	Negligible	Not significant
	Health and safety hazards due to inappropriate handling and storage of waste particularly hazardous waste	Adverse, permanent and major	Medium	Major adverse	Significant
Landfill void capacity*	Pressure on existing landfill capacities	Adverse permanent and minor	Low	Negligible	Not significant
	Increased travelling from transporting waste from the Project site	Adverse, temporary and minor	Low	Negligible	Not significant

* Based on professional judgement

13.6 Mitigation

13.6.1 The following embedded mitigations are already in place at ALA:

- Working with licensed third party waste companies

- Annual waste inventorisation report prepared
- Certain waste types are reused and recycled
- Segregation of hazardous waste
- Operational WMP (ALA, 2023 ALA Waste management program 2023-2032 years)

13.6.2 The following embedded mitigations are planned at ALA:

- Hazardous waste storage locations assessment for international good practice
- In maintenance and repair zone will be new construction, including oil discharge point

13.6.3 This section takes into account the previous Environmental and Social Management Plan (ESMP) (August 2021), the existing WMP and the Consolidated Compliance Summary Report (June 2025).

13.6.4 It is recommended that the mitigation stated here are incorporated into the framework ESMP, where practicable.

Construction phase mitigation

13.6.5 WMPs specific to the construction phase will be created by the EPC Contractors and form a part of their individual Construction Environmental and Social Management Plans (C-ESMPs) based on guidance from IFC Performance Standard 3 (2012) and followed throughout the construction phase. The construction WMP will detail the site procedures to manage construction waste, including hazardous waste. It will identify the quantities and categories of waste for processing, confirm the capacity of the local landfills, and establish a processing plan for the hazardous waste. This will be a live document and additions/updates to this will be made as appropriate. All EPC Contractors and workers on site will be expected to comply with the WMP.

13.6.6 It is recommended that the international guidance listed in Section 13.2 is to be followed throughout, where practicable.

13.6.7 Where practicable, it is recommended that:

- Orientation/induction training is provided to workers regarding proper waste segregation, correct handling and storage of hazardous materials, disposal and emergency procedures.
- Personal protective equipment (PPE) is provided where appropriate.

13.6.8 Mitigation measures will be implemented on all aspects of the Project to reduce the effects of waste generation by the Project during the construction phase. Likely impacts are not expected to be significant provided GIIP for waste management and disposal is adhered to throughout the construction phase of the Project, where practicable. It is recommended that, where practicable, the waste hierarchy is followed, which prioritises the management of waste in the following order:

- The generation of construction waste will be avoided, where possible. Suitable planning and mitigation measures will allow this to be minimised.
- The reuse of materials will be explored, based on the facilities available in the area and applicable waste legislation. A preferred option is to reuse excavated materials in situ, which would significantly reduce the volume of unused materials requiring disposal.
- Additionally, opportunities for recycling metal, timber and clean construction rubble will be considered. Construction waste will be recycled, where possible.
- Construction waste will be disposed of in landfill as a last resort.

13.6.9 Where possible, suppliers that use returnable, reusable, or practicably recyclable packaging are prioritised in the planning stage of construction. It is recommended that unused material is returned and packaging recycled, where possible.

13.6.10 Segregated point of waste generation bins for municipal solid waste are provided throughout the ALA, construction site and any facilities for construction workers.

13.6.11 The appropriate management and storage of materials during the construction phase of the Project is essential to mitigate the effects on the environment. Where practicable, recommendations to be implemented according to GIIP include the following measures:

- Waste is segregated by classification. This will maximise opportunities for materials and waste to be reused, recycled, treated and diverted from landfill.
- Sufficient number of skips or other adequate containers are provided for the collection of the different types of wastes.
- Colour-coded bins and labelled skips are provided according to waste classification.
- Materials are stored in sealed containers at designated areas with clear and precise labelling.
- All recycling containers are clearly labelled. Containers are located in close proximity to the site under construction in which recyclables/salvageable materials will be placed.

13.6.12 Hazardous materials such as paints, solvents and lubricants will be managed and stored appropriately in the existing dedicated area. ALA has provided photographic evidence of the current practices in place to allow storage and management of hazardous material (Appendix 13.A: Site photos). Hazardous materials are stored indoors on a hard surface to allow for collection of accidental spills, which reduces the risk of environmental pollution during both normal operations and emergencies. Storage locations are to be assessed against environmental safety good practice, and corrective actions developed and implemented. The following measures are required based on GIIP, where practicable:

- Access to the hazardous waste storage area is limited to authorised and trained personnel.
- Waste is segregated such that hazardous materials do not mix with incompatible hazardous material or non-hazardous material.
- Waste storage is located away from sensitive receptors (e.g. passengers, housing, natural drainage and water bodies).
- Hazardous waste/material is stored in appropriate enclosed containers, away from direct sunlight wind and rain.
- Where volatile wastes are stored, adequate ventilation is provided.
- An impermeable dike (bund) with a volume of at least 110% of the largest tank or container will be used for storage, or 25% of the total vessel volume to be stored in the bund, whichever volume is greater. This bund will be constructed around the waste oil and chemical storage area to contain leaks and spills arising from the materials stored.
- Hazardous waste storage areas have spill containment systems and be protected to avoid run-off to and from the storage area.
- Perimeter cut off drainage is constructed to contain leaks, spills, and run off.
- Firefighting equipment is provided in close proximity to the storage and collection centres.
- Chemical and hydrocarbon absorbent materials is provided to clean up spills and leaks.
- Hazardous waste containers for storage and transport is appropriately marked and labelled.

13.6.13 To prevent nuisances (e.g. noise, litter, dust and odours) the following measures are recommended, where practicable:

- Good housekeeping and cleaning is maintained throughout storage areas and the ALA site.
- Appropriate pest control measures are implemented.
- Skips are covered where appropriate (e.g. where dusty, odorous wastes are stored).

- Dusty wastes are watered down as required (e.g. during strong windy periods).
- Project-related waste is placed in dedicated areas inside the Project boundary.
- Training is provided on the importance of cleanliness and not dumping waste outside the Project boundary.

13.6.14 Each type of waste or recyclable material will be handled by separate facilities accordingly.

13.6.15 All wastes will be transported offsite by vehicles with the appropriate capacity to safely transport the waste material. EPC Contractors employed are licenced by the relevant regulatory agencies. These vehicles are accompanied by:

- A chain-of-custody documentation to the final destination.
- An up-to-date authorised hazardous waste passport for hazardous waste.

13.6.16 Final waste disposal facilities are:

- Located as close to ALA as possible to minimise the impacts of transportation (e.g. the release of carbon emissions). The appointed EPC Contractors will identify the closest and relevant treatment and disposal sites.
- In close proximity to the Project so that long-haul transportation to separate facilities is minimised when separate treatment or disposal facilities are required.
- Issued with the appropriate permits.

13.6.17 Mitigation measures that are required on site to encourage efficient handling and storage of material and reduction of waste arisings, and to reduce the potential impacts identified are as follows:

- Materials are delivered, as required and where practicable, to avoid damage or contamination.
- Where site-won material is not available or suitable for reuse, secondary or recycled materials are procured, where available and practicable.
- All suitable excavated material is reused in the construction of the Project and in landscaping features to reduce the requirement to import materials for construction and to reduce the need to remove surplus materials from site, where practicable.
- Temporary stockpiling of fill materials prior to incorporation into the Project are avoided where possible, to minimise double handling and damage. However, where required, materials are be stockpiled in accordance with best practice and managed appropriately.
- Locally sourced materials and suppliers will be identified and used, where practicable.
- Pre-cast elements are used where practicable to encourage efficient use of materials and avoid the generation of waste arisings from off-cuts.
- Materials are substituted with less hazardous or toxic materials, wherever technically appropriate and economically feasible to minimise hazardous contamination of the environment.
- There are procedures and training for correct handling and storage of hazardous materials.
- There are procedures and training for spillage reporting and response.
- A Spill Prevention Plan and Emergency Preparedness and Response Plan (EPRP) for hazardous material management, is developed by the ALA or by the contractor, and maintained throughout construction. Where practicable, it is recommended that this document include:
  - Environmental impacts, mitigation, and monitoring as part of contractual arrangements with third parties such as fuel handlers and ground service companies.

- Fire training on impermeable surfaces surrounded by a retaining dyke to prevent foam and powder or other environmentally hazardous fire extinguishing agents or polluted fire water from entering the stormwater system.
- Treatment of water containing fire extinguishing agents and non-combusted flammable materials prior to discharge to surface water.
- Identification of the necessary bunding and spill kit requirements (and reference to the spill prevention and response plan).
- Details of the correct procedure for handling and storage of any hazardous materials.
- A map showing the material storage locations.
- Vehicle and equipment fuelling to be undertaken in designated areas on impermeable surfaces with adequate spill protection in place.
- Training requirements (as necessary) with respect to materials handling procedures, use of PPE, spill procedures and emergency preparedness and response procedures.
- The correct procedure for reporting any environmental incidents related to spills/leakages.

13.6.18 The following monitoring is recommended according to GIIP, where practicable. This includes:

- Local groundwater quality is monitored regularly (see **ESIA Chapter 9: Geology and soils**).
- Periodic inspections of waste storage areas are conducted and findings documented.
- Any spillages or leaks of hazardous materials/waste are recorded and investigated.
- Regular audits of waste segregation and collection practices.
- The types and quantities of waste generated during operations are regularly monitored.
- Investigation of complaints appropriate actions are taken and noted in the grievance log (refer to Stakeholder Engagement Plan for grievance mechanism).
- Relevant documentation for waste carriers and the permits of final waste disposal facilities are regularly checked to make sure these are in date and appropriate.

Operational phase mitigation

13.6.19 Where practicable, it is required that mitigation measures for the operational phase include the following:

- Operational solid waste management will follow existing protocols for the current terminal. The current WMP is followed. This will be a live document and additions/updates to this will be made as appropriate. It is recommended that all contractors and workers on site comply with the WMP.
- The international guidance listed in section 13.2 is followed throughout.
- The BPEO for the waste within the context of the waste hierarchy is implemented.
- The mitigations that are implemented in the construction phase, listed in section 13.6, are largely applicable for the operational phase and implemented. This includes mitigations for segregation, storage, waste transport requirements and material/waste handling measures.
- Training applicable for management of non-hazardous and hazardous waste during the construction phase is also applicable for the operational phase of ALA.
- Segregated point of waste generation bins for municipal solid waste are also provided throughout the airport.
- Food establishments also segregate compostable and other food waste for recycling.
- Monitoring listed for the construction phase in section 13.6 is applicable for the operational phase and is implemented.

13.7 Summary of residual effects

13.7.1 Residual effects after the application of mitigation are presented in Table 13.13.

Table 13.13: Summary of residual effects for waste and resources

Description of effect	Permanent or temporary	Sensitivity of receptor	Magnitude of impact	Significance of effect before additional mitigation	Additional mitigation	Residual effect	Proposed monitoring
Construction phase							
Mismanagement of material and waste leading to contamination of environment (specifically surface watercourse, groundwater, and the ground) due to leakage and spillage of wastes associated with poor handling and storage arrangements.	Permanent	Medium	Moderate	Moderate adverse	Where practicable, it is required that: • Construction WMPs are created and followed. • Material management and storage areas are specially designed with considerations detailed in section 13.6. • Waste storage areas are located away from sensitive receptors. • There are procedures and training for correct handling and storage of hazardous materials. • Materials are substituted with less hazardous or toxic materials, wherever possible. • Transport of such materials are handled by appropriate and correctly authorised vehicles. • Final disposal, where necessary, occurs at facilities that are correctly authorised.	Minor adverse	Where practicable, it is recommended that: • Local groundwater quality is monitored. • Periodic inspections of waste storage areas are conducted and findings documented. • There is regular audits of waste segregation and collection practices. • Any spillages or leaks of hazardous materials/waste are recorded and investigated.
Fugitive emissions, such as dust, associated with the handling and storage of some waste streams.	Temporary	Low	Minor	Negligible	Where practicable, it is recommended that: Construction WMPs are created and followed. • Waste storage areas are located away from sensitive receptors. • PPE is provided to personnel where appropriate. • Good housekeeping and cleaning practices are followed • Dusty wastes are watered down as required. • Training is provided on the importance of cleanliness • Skips are covered where appropriate (e.g. where dusty or odorous wastes are stored).	Negligible	Where practicable, it is recommended that: • Periodic inspections of waste storage areas are conducted and findings documented. • There are regular audits of waste segregation and collection practices. • Any complaints are investigated, appropriate actions taken and noted in the grievance log.

Description of effect	Permanent or temporary	Sensitivity of receptor	Magnitude of impact	Significance of effect before additional mitigation	Additional mitigation	Residual effect	Proposed monitoring
Visual amenity impacts associated with poor storage of waste	Temporary	Low	Minor	Negligible	Where practicable, it is recommended that: • Construction WMPs are created and followed. • Good housekeeping and cleaning practices are followed • Segregated point of generation bins are provided. • Skips are covered where appropriate. • Waste are segregated by classification. • Waste storage areas are located away from sensitive receptors. • Waste is placed in dedicated areas inside the Project boundary. • Training is provided on the importance of cleanliness and not dumping waste outside the Project boundary.	Negligible	Where practicable, it is recommended that: • Periodic inspections of waste storage areas are conducted and findings documented. • There are regular audits of waste segregation and collection practices. • Any complaints are investigated, appropriate actions taken and noted in the grievance log.
Health and safety hazards due to inappropriate handling and storage of waste particularly hazardous waste	Permanent	Medium	Major	Major adverse	Where practicable, it is required that: • Construction WMPs are created and followed. • Material management and storage areas are specially designed with the considerations detailed in section 13.6. • PPE is provided to personnel where appropriate. • There are procedures and training for correct handling and storage of hazardous materials. • Materials are substituted with less hazardous or toxic materials, wherever possible. • Transport of such materials are handled by appropriate and correctly authorised vehicles. • Final disposal, where necessary, occurs at facilities that are correctly authorised. • Spill Prevention Plan and EPRP for hazardous material management is created and followed.	Negligible	Where practicable, it is recommended that: • Periodic inspections of waste storage areas are conducted and findings documented. • There are regular audits of waste segregation and collection practices. • Any spillages/ leaks of hazardous materials/waste or other health and safety incidents are recorded and investigated.

Description of effect	Permanent or temporary	Sensitivity of receptor	Magnitude of impact	Significance of effect before additional mitigation	Additional mitigation	Residual effect	Proposed monitoring
Pressure on existing landfill capacities	Permanent	Medium	Minor	Minor adverse	Where practicable, it is recommended that: • Waste is appropriately segregated. • Segregated point of generation bins are provided. • The BPEO for the waste within the context of the waste hierarchy is implemented. • Final disposal, where necessary, occurs at facilities that are correctly authorised.	Negligible	Where practicable, it is recommended that: • Periodic inspections of waste storage areas are conducted and findings documented. • There are regular audits of waste segregation and collection practices. • The types and quantities of waste generated during operations are regularly monitored.
Increased travelling from transporting waste from the Project site	Temporary	Low	Minor	Negligible	Where practicable, it is recommended that: • Transport of such materials are handled by appropriate and correctly authorised vehicles. • Chosen recycling or disposal facilities are located as close to ALA as possible. • When separate treatment or disposal facilities are required, these are in close proximity to each other.	Negligible	Where practicable, it is recommended that: • Relevant documentation is kept up to date and regularly checked.
Operational phase							
Mismanagement of material and waste leading to contamination of environments (specifically surface watercourse, groundwater, and the ground) due to leakage and spillage of wastes associated with poor handling	Permanent	Medium	Moderate	Moderate adverse	Where practicable, it is required that: • The existing operational WMP is followed. • Material management and storage areas are specially designed with the considerations detailed in section 13.6. • Waste storage areas are located away from sensitive receptors. • There are procedures and training for correct handling and storage of hazardous materials.	Minor adverse	Where practicable, it is recommended that: • Local groundwater quality is monitored. • Periodic inspections of waste storage areas are conducted and findings documented. • There are regular audits of waste segregation and collection practices.

Description of effect	Permanent or temporary	Sensitivity of receptor	Magnitude of impact	Significance of effect before additional mitigation	Additional mitigation	Residual effect	Proposed monitoring
and storage arrangements					• Materials are substituted with less hazardous or toxic materials, wherever possible. • Transport of such materials are handled by appropriate and correctly authorised vehicles. • Final disposal, where necessary, occurs at facilities that are correctly authorised.		• Any spillages or leaks of hazardous materials/waste are recorded and investigated.
Fugitive emissions, such as dust, associated with the handling and storage of some waste streams	Temporary	Low	Minor	Negligible	Where practicable, it is recommended that: • The existing operational WMP is followed. • Waste storage is located away from sensitive receptors. • PPE is provided to personnel where appropriate. • Good housekeeping and cleaning practices are followed. • Dusty wastes are watered down as required. • Training is provided on the importance of cleanliness • Skips are covered where appropriate.	Negligible	Where practicable, it is recommended that: • Periodic inspections of waste storage areas are conducted and findings documented. • There are regular audits of waste segregation and collection practices. • Any complaints are investigated, appropriate actions taken and noted in the grievance log.
Visual amenity impacts associated with poor storage of waste	Temporary	Low	Minor	Negligible	Where practicable, it is recommended that: • The existing operational WMP is followed. • Good housekeeping and cleaning practices are followed. • Segregated point of generation bins are provided. • Waste segregated is by classification. • Waste storage areas are located away from sensitive receptors. • Waste is placed in dedicated areas inside the Project boundary. • Training is provided on the importance of cleanliness and not dumping waste outside the Project boundary	Negligible	Where practicable, it is recommended that: • Periodic inspections of waste storage areas are conducted and findings documented. • There are regular audits of waste segregation and collection practices. • Any complaints are investigated, appropriate actions taken and noted in the grievance log.

Description of effect	Permanent or temporary	Sensitivity of receptor	Magnitude of impact	Significance of effect before additional mitigation	Additional mitigation	Residual effect	Proposed monitoring
					• Skips are covered where appropriate.		
Health and safety hazards due to inappropriate handling and storage of waste particularly hazardous waste	Permanent	Medium	Major	Major adverse	Where practicable, it is required that: • The existing operational WMP will be followed. • Material management and storage are specially designed with the considerations detailed in section 13.6. • PPE is provided to personnel where appropriate. • There are procedures and training for correct handling and storage of hazardous materials. • Materials are substituted with less hazardous or toxic materials, wherever possible. • Transport of such materials are handled by appropriate and correctly authorised vehicles. • Final disposal, where necessary, occurs at facilities that are correctly authorised. • Spill Prevention Plan and EPRP for hazardous material management is created and followed.	Negligible	Where practicable, it is recommended that: • Periodic inspections of waste storage areas are conducted and findings documented. • There are regular audits of waste segregation and collection practices. • Any spillages/ leaks of hazardous materials/waste or other health and safety incidents are recorded and investigated.
Pressure on existing landfill capacities	Permanent	Low	Minor	Negligible	Where practicable, it is recommended that: • Suppliers that use returnable, reusable, or practicably recyclable packaging are prioritised. Unused material is returned and packaging recycled where possible. • Waste is appropriately segregated. • Segregated point of generation bins are provided. • The BPEO for the waste within the context of the waste hierarchy is implemented. • Final disposal, where necessary, occurs at facilities that are correctly authorised.	Negligible	Where practicable, it is recommended that: • Periodic inspections of waste storage areas are conducted and findings documented. • There are regular audits of waste segregation and collection practices.

Description of effect	Permanent or temporary	Sensitivity of receptor	Magnitude of impact	Significance of effect before additional mitigation	Additional mitigation	Residual effect	Proposed monitoring
Increased travelling from transporting waste from the Project site	Temporary	Low	Minor	Negligible	Where practicable, it is recommended that: • Transport of such materials are handled by appropriate and correctly authorised vehicles. • Chosen recycling or disposal facilities are located as close to ALA as possible. • When separate treatment or disposal facilities are required, these are in close proximity to each other.	Negligible	Where practicable, it is recommended that: • Relevant documentation is kept up to date a regularly checked.

Appendix 13.A: Site photos

Storage of hazardous materials