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# DUSHANBE SUSTAINABLE DEVELOPMENT PROJECT

## ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT SCOPING REPORT FOR THE DUSHANBE MUNICIPAL SOLID WASTE LANDFILL EXPANSION PROJECT

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## LIST OF ABBREVIATIONS

BOD	Biological oxygen demand
CEP	Committee for Environmental Protection
COD	Chemical oxygen demand
DEU	Road Maintenance Department
DSUDP	Dushanbe Sustainable Urban Development Project
E&S	Environmental and Social
ECUs	Electronic control units
EHS	Environmental, Health, and Safety
ESF	Environmental and Social Framework (of World Bank)
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
ESSs	Environmental and Social Standards (of World Bank)
FS	Feasibility Study
GIIP	Good International Industry Practices
GIS	Geographic information system
IPF	Investment Project Financing
ISWM	Integrated Solid Waste Management
JEU	Housing Maintenance Department
LMPs	Labor Management Procedures
LRP	Livelihood Restoration Plan
MPC	Maximum Permissible Concentrations
MPD	Maximum Permissible Discharge
MPE	Maximum Permissible Emissions
MRF	Material Recovery Facilities
MSW	Municipal solid waste
OHS	Occupational health and safety
PAPs	Project-affected persons
PAPs	Project-affected households
PIG	Project Implementation Group
PM	Particulate Matter
RFID	Radio frequency identification
RP	Resettlement Plan
RPF / RF	Resettlement Policy Framework / Resettlement framework
SCWC	Smart city waste collection
SEA/SH	Sexual exploitation and abuse and sexual harassment
SEP	Stakeholder Engagement Plan
SPZ	Sanitary protection zone
SUE	State Unitary Enterprise
SWM	Solid waste management
WB	World Bank
WBG	World Bank Group
WTE	Waste-to-Energy

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## 1 INTRODUCTION

### 1.1 Background

The Government of Tajikistan and the State Unitary Enterprise (SUE) “Smart City”<sup>1</sup> (the Client) are preparing the Dushanbe Sustainable Urban Development Project (DSUDP, P179630), in accordance with the policies and requirements of the World Bank (WB). Within the framework of the DSUDP, Smart City intends to establish an integrated solid waste management (ISWM) for the city of Dushanbe (the Project).

The proposed Project is aimed at addressing financial and operational challenges in Dushanbe’s solid waste sector through a series of capital and institutional measures. Through such measures, DSUDP will facilitate ISWM and promote financial and social sustainability of operations to ensure lasting results of facility and operational improvement. The Smart City and WB teams conducted a Rapid Assessment of Existing Solid Waste Management System in Dushanbe<sup>2</sup> in 2022-2023. Based on the findings and issues, they formed a four-component Project described below.

### 1.2 Dushanbe Sustainable Urban Development Project

**Component 1: Solid Waste Collection Efficiency** (tentatively USD17 million). This component will improve the adequacy and efficiency of solid waste collection services operated by the four collection SUEs in Dushanbe. This component will include the following improvements: i) upgrade MSW container sites, vehicles and equipment to meet minimum standards, ii) optimise waste collection system to maximise efficiency through innovative use of technology and equipment, and iii) implement pilot projects for source separation covering households, enterprises and public entities and including the provision of separate containers for different waste types, composting initiatives and public awareness raising actions encouraging behavioural change.

**Component 2: Solid Waste Treatment and Disposal** (tentatively USD17 million). This component will upgrade and remediate the physical and operational aspects of Dushanbe’s landfill, while also improving environmental performance, contributing to climate change mitigation, increasing resource recovery, and meeting the needs of waste pickers.

This component will finance i) structural and engineering improvements at the existing landfill site, construction of new landfill cells and purchase of appropriate landfill equipment, and ii) small-size material recovery facility (MRF) featuring a basic waste sorting line to recover recyclable components from waste.

**Component 3: Institutional Strengthening** (tentatively USD5 million). This component will strengthen the broad institutional aspects of integrated solid waste management in Dushanbe, enhancing the necessary institutional capacity, while also improving performance management within an adequate policy framework. It will involve developing and implementing i) an integrated long-term integrated solid waste management framework and plan in Dushanbe, ii) performance improvement plans for SUEs, iii) public awareness raising/behaviour changing campaigns, iv) adequate tariffs/fees for waste collection and management services and improved billing systems, and v) a roadmap to greener, climate conscious and technologically feasible urban development in Dushanbe.

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<sup>1</sup> State Unitary Enterprise (SUE) “Smart City” <https://dsc.tj/ru/glavnaya/>

<sup>2</sup> City Climate Finance Gap Fund, World Bank Group (WBG). Rapid Assessment of Solid Waste Management Sector in Dushanbe: Current Situation and Challenges – 2023.

**Component 4: Project Management Support** (tentatively USD1 million). This component will support the incremental operating costs for the Project Implementation Group (PIG) within the Smart City SUE, and project management consultants

The preparation of the following two predesign – feasibility study (FS) - documents is now underway:

- A. Improvement of Solid Waste Collection in Dushanbe Including the Tariff and Billing System; and
- B. Feasibility study of the investment to the Dushanbe landfill (hereinafter the Landfill project).

In accordance with the WB requirements, before the decision on financing the investment project is made it is necessary to conduct an Environmental and Social Impact Assessment (ESIA) in accordance with the Principles and Standards of WB. The assessment of the listed above investment projects is assigned to Ecoline International Ltd. (Bulgaria) and NGO "Peshsaf" (Tajikistan) jointly referred to as the Social and Environmental Consultant ("E&S Consultant").

**The E&S Consultant conducts:**

- The framework environmental and social assessment for the Dushanbe MSW Collection System and development of the Environmental and Social Management Framework (ESMF, Workstream A). The results are provided in a separate document<sup>3</sup> and are subject to the public consultations;
- The Environmental and Social Impact Assessment (ESIA) for the Dushanbe MSW Landfill Expansion Project (ESIA of the Landfill project, Workstream B);

**The "Environmental and Social Impact Assessment (ESIA) Scoping for the Dushanbe MSW Landfill Expansion Project" (the current document)** is the first document of the ESIA package and presents the results of the **first stage of ESIA** of this project;

**The second stage of ESIA** will include a full-scale assessment of social and environmental impacts and risks, and an Environmental and Social management plan and other required management plans will be developed;

- The Stakeholder engagement plan<sup>4</sup> for both abovementioned projects (Workstreams A and B).

### 1.3 Objectives and Content of the Document

The objective of this document is to identify the significant environmental and social risks and impacts of the Landfill Project throughout the life cycle and to formulate a plan for a full-scale ESIA (see [Section 6](#)).

The Scoping Report described the baseline and conducted a socio-ecological assessment of the current activities of the Landfill, studied the environmental and social baseline in the project area, including identifying critical gaps in the baseline information, drew up a plan for conducting a full ESIA, and developed environmental and social design criteria.

<sup>3</sup> Environmental and Social Management Framework (ESMF) for the Dushanbe municipal solid waste (MSW) Collection System. Ecoline International Ltd. and NGO "Peshsaf", 2025

<sup>4</sup> Stakeholder Engagement Plan. Ecoline International Ltd. and NGO "Peshsaf", 2025

A serious limitation of the ESIA Scoping is the absence of developed design solutions at the time of its implementation. At present, the designer has been selected and has just started work. In the future, the ESIA will be carried out in parallel with the design process and will be based on emerging design solutions.

#### 1.4 History of the Landfill

The existing city-wide landfill in Dushanbe city began operating in 1978. By the beginning of the second millennium, the landfill was outdated both morally and physically, the infrastructure had become dilapidated and required replacement<sup>5</sup>.

Systemic changes in solid waste management were initiated within the framework of the project "Dushanbe Solid Waste Management", financed by the EBRD in the amount of 11.7 million US dollars (2008-2014)<sup>6</sup>. Within the framework of this Project:

- State Unitary Enterprises (SUE) were established in four districts of the city, as well as four district "Road Operation" State Enterprises for the collection and removal of solid waste to the existing solid waste landfill located at the 9<sup>th</sup> kilometre of the Dushanbe-Vahdat highway;
- in 2011, the city-wide landfill was transferred to the balance sheet of the newly established self-supporting company, the State Unitary Enterprise "City-wide Solid Waste Landfill of Dushanbe City", which assumed responsibility for the reception, recording and placement of waste brought to the landfill site;
- The landfill was reconstructed within the framework of the EBRD project:
  - an administrative building, warehouses and a wheel washing facility were built; vehicle scales were installed;
  - the landfill was fenced with a metal mesh and provided with vehicles and special equipment for waste storage;
  - systems for collecting landfill biogas and collecting and removing landfill leachate have been created;
  - a 4-section cattle burial ground was built (Beccari biothermal pits);
  - a medical waste incineration plant was purchased and launched, with an estimated capacity of more than three tons of waste per month;
  - a plant for demercurization of mercury-containing waste was purchased and put into operation.

Unfortunately, some of the purchased installations are not working any longer, for instance, the demercurization installation stopped working in 2018. The constructed systems for collecting landfill gas and landfill leachate are not working either and are currently buried under accumulated waste and mudflows. The Beccari biothermal pits are not functioning and are half destroyed.

To date, the sanitary protection zone (SPZ) of the waste storage area has not been officially established and approved. At present, the landfill requires reconstruction and expansion, as well as ensuring that its activities comply with the requirements for a sanitary landfill.

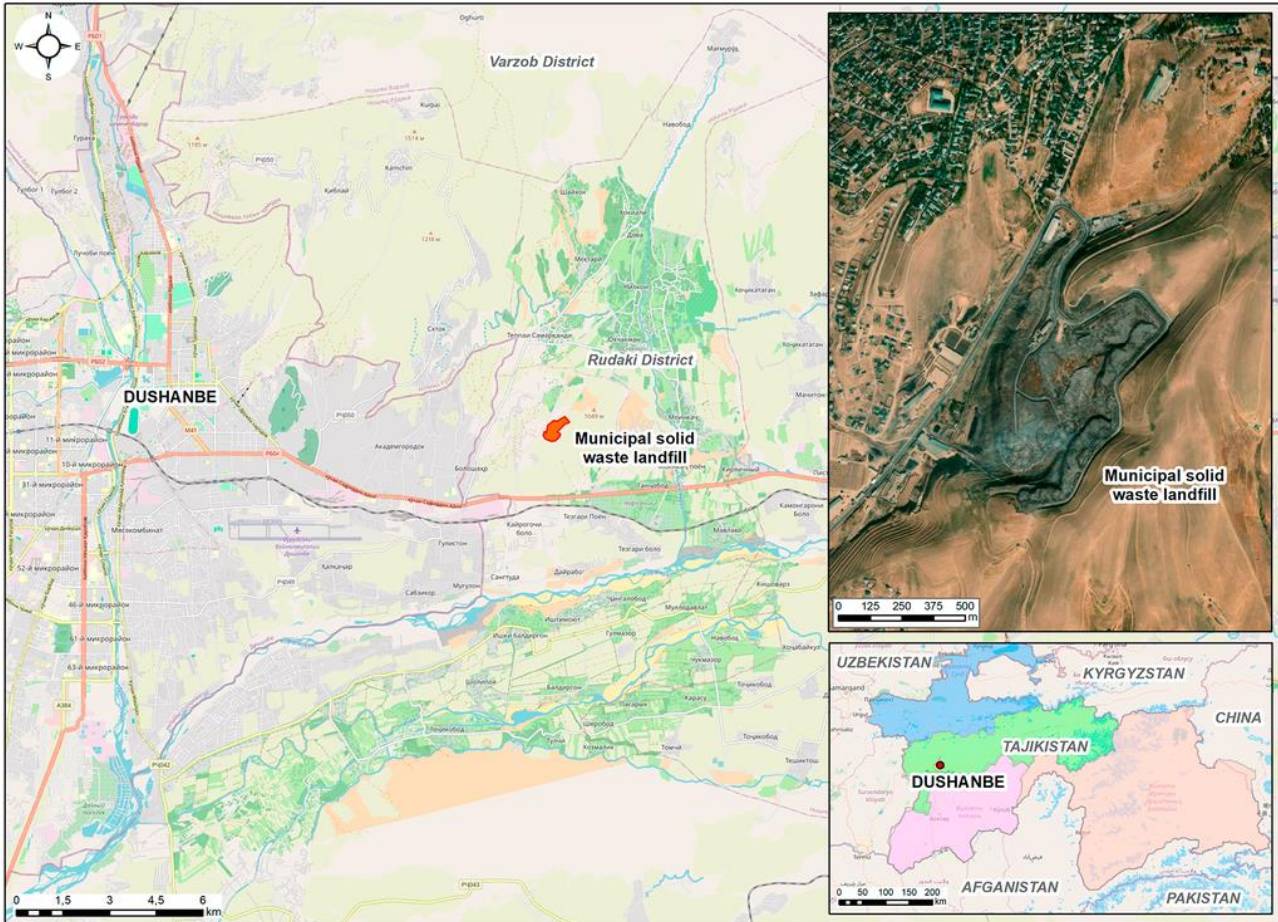
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<sup>5</sup> The following sources were used in preparing this section: Waste management of Dushanbe city. Current state, challenges, and ways of solution. Tajik branch of the Scientific and Research Center of the Interstate Commission for Sustainable Development of the International Fund for Saving the Aral Sea, 2017;

<sup>6</sup> <https://www.ebrd.com/home/work-with-us/projects/psd/38901.html#customtab-e372d41d26-item-3c765d0894-tab>

### 1.5 Brief Description of the Dushanbe Landfill Expansion Project

Solid waste Landfill is located approximately 9 km east of the city centre of Dushanbe (Figure 1). The landfill has been accepting waste since 1978 and currently occupies approximately 25 to 30 hectares. The current waste inflow level is estimated at 1,000 to 1,500 tons per day.



Prepared by E&S Consultant based on open source data, 2025

**Figure 1. Overview map**

The project description for the purposes of the ESIA Scoping is based on the Terms of Reference issued to the designer<sup>7</sup>.

The composition of pre-design works includes:

- Feasibility Study (FS), and
- Preliminary Design (PD) for the reconstruction of the Landfill, including:
  - characteristics of the current state of the Landfill;
  - a detailed assessment of the current legal, financial and institutional mechanisms in Dushanbe related to the management and operation of the Landfill;
  - developing a plan to contain and prevent fires at high-level landfills;

<sup>7</sup> The selection of the designer for the Feasibility Study of investments in the landfill was made in May 2025; in this regard, to date, preliminary (pre)design solutions are either absent or unavailable for assessment.

- a study of the feasibility of landfill expansion and conceptualization of alternative options; development of preliminary design and cost estimates for selected options;
- preparation of tender documentation for further actions.

Within the framework of the FS, conceptual design solutions will be formulated by the FS Consultant, including alternatives for project implementation, and associated facilities will be identified. On this basis, the Project Description will be completed and a full-scale ESIA will be conducted (ESIA Stage 2).

## 2 LEGAL AND REGULATORY FRAMEWORK

### 2.1 National Legislation

The environmental and social legal framework of the Republic Tajikistan (RT) comprises the Constitution and a suite of laws, regulations, and strategic documents.

The fundamentals of the national environmental policy and the system of environmental requirements are set out in a number of key laws and regulations that are discussed below. The National Development Strategy until 2030 and other strategic documents<sup>8</sup> define environmental protection and social wellbeing priorities and provide consistency between them and economic development objectives.

#### 2.1.1 General Information (Key Laws and Strategies)

Constitution of the Republic Tajikistan (1994, with subsequent amendments) is the supreme legal authority setting out the fundamentals of nature resource management and social development. In particular, the Constitution grants the exclusive ownership of natural resources (land, mineral resources, water, air space, flora and fauna) to the state (Article 13). It also guarantees that the citizens are entitled to healthy and favourable environment and imposes on them the obligation to protect the nature and historical and cultural assets (Article 44).

RT Law on Environmental Protection No. 760 of 2 August 2011<sup>9</sup> is a key framework law on environment, setting out the legal basis of the national environmental policy that aims to ensure sustainable socio-economic development and maintain the right to healthy environment. The Law introduces key notions such as 'environment', 'pollution', etc. and principles of environmental protection; it sets requirements relating to the prevention of adverse impacts on the environment and sustainable management of natural resources. Article 35 of the Law requires that adverse environmental impacts be prevented and environmental safety maintained in the course of development projects (including landfill projects). It also binds project sponsors to conduct the environmental impact assessment and environmental review of their projects.

RT Law on Environmental Impact Assessment No. 1448 of 18 July 2017<sup>10</sup> is a key piece of legislation governing the environmental impact assessment (EIA) process. It details the principles and procedure to be followed when conducting an environmental impact assessment of a planned activity in order to avoid any harmful impacts it might cause to the environment and society. The Law prescribes that all projects that might affect the environment are subject to environmental review and classifies them into different impact categories. According to Article 12 of the Law, all projects/facilities affecting the environment are classified into four categories based on their impact, ranging from significant to insignificant, and each category has specific criteria triggering the required level and scope of assessment and mitigation as part of the EIA process. The Category A and B projects require a full-scale EIA with the preparation of the EIA report and environmental management plan, while the simplified EIA procedure is applied to the Category C and D projects.

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<sup>8</sup> The Republic of Tajikistan National Development Strategy until 2030. Approved by the RT *Majlisi* namoyandogon Resolution MO RT No. 636 of 1 December 2016. – <https://faolex.fao.org/docs/pdf/taj195945.pdf>

<sup>9</sup> RT Law on Environmental Protection No. 760 of 2 August 2011, amended by the RT Laws No. 1160 of 7.11.2014, No. 1449 of 18.07.2017, No. 1879 of 08.06.2022, No. 1880 of 08.06.2022, and No. 2099 of 13.11.2024 – <https://istemol.tj/wp-content/uploads/2020/03/Zakon-RT-Ob-ohrane-okruzhajushhej-sredy.pdf>

<sup>10</sup> RT Law on Environmental Impact Assessment No. 1448 of 18 July 2017 (amended by the RT Laws No. 120 of 4.11.1995, No. 351 of 5.01.2008, No. 471 of 31.12.2008, No. 663 of 29.12.2010, and No. 1048 of 28.12.2013). [http://portali-huquqi.tj/publicadliya/view\\_qonunhoview.php?showdetail=&asosi\\_id=20154](http://portali-huquqi.tj/publicadliya/view_qonunhoview.php?showdetail=&asosi_id=20154)

RT Law on the State Environmental Review No. 818 of 16.04.2012<sup>11</sup> prescribes that the State Environmental Review is required for all national and local projects, concepts, programmes and schemes that involve the use of natural resources and/or may cause adverse environmental impact. The Law:

- Sets out general principles of environmental review;
- Defines the type and mandate of environmental experts including those involved in both state and public environmental review and lists activities subject to a mandatory environmental review;
- Details the public environmental review procedure (Chapter 4);
- Specifies the state environmental review timeline where the decision on whether a project may go ahead are to be made within 30 days after the project documentation has been accepted by the relevant governmental authority.

The Law specifies the decision-making deadline as 30 days after the submission of project documentation for review, which could be extended to 60 days for complex projects. While the Law enables the public (i.e. non-governmental) environmental review process that can be initiated by interested parties, but the decisive authority rests with the state environmental review. No public consultation is required for the Category C and D projects, while public participation in the Category A and B projects does not go beyond the EIA approval so the public is not involved in follow-up and monitoring. A public environmental review procedure initiated by non-governmental organisations is a rare practice; its findings are not binding; it has very tight constraints in terms of time and information available; and is subject to the state environmental review.

The Environmental Impact Assessment Procedure and Classification of Projects/Facilities<sup>12</sup> approved by the RT Government Resolution, provides that for major projects the EIA procedure has the following stages: preliminary site assessment; preliminary EIA (the FS stage) with the application for the state environmental review; full-scale EIA including the EIA Report and Environmental Management Plan with the project-specific emission/discharge limit values.

State Environmental Review Procedure was approved by the RT Government Resolution No. 697 of 3 December 2012<sup>13</sup>.

The RT Law on the Environmental Monitoring of 25 March 2011 No. 707<sup>14</sup> introduces a three-tier monitoring system with the national, local and site-specific levels and requires the nature resource users to share their data with the national data bases. It establishes monitoring objectives (observation, assessment and forecast) and principles (continuity, comparable techniques and accessible information).

<sup>11</sup> RT Law on the State Environmental Review No. 818 of 16.04.2012 (amended by the Law No. 2101 of 13.11.2024) [http://portali-huquqi.tj/publicadliya/view\\_qonunhoview.php?showdetail=&asosi\\_id=13758](http://portali-huquqi.tj/publicadliya/view_qonunhoview.php?showdetail=&asosi_id=13758)

<sup>12</sup> On the Environmental Impact Assessment Procedure and Classification of Projects/Facilities Based on Their Environmental Impact and Criteria for Assigning an Environmental Hazard Category to a Planned Activity. Approved by the Resolution No, 532 of 1 November 2018 – [https://base.spinform.ru/show\\_doc.fwx?rgn=111332&ysclid=m9mz8qtd3k260414657](https://base.spinform.ru/show_doc.fwx?rgn=111332&ysclid=m9mz8qtd3k260414657)

<sup>13</sup> State Environmental Review Procedure (RT Government Resolution No. 697 of 3 December 2012), [http://portali-huquqi.tj/publicadliya/view\\_qonunhoview.php?showdetail=&asosi\\_id=14571](http://portali-huquqi.tj/publicadliya/view_qonunhoview.php?showdetail=&asosi_id=14571)

<sup>14</sup> RT Law on the Environmental Monitoring of 25 March 2011 No. 707 (amended by the RT Law of 26.07.2014 No. 1120) - [https://www.adlia.tj/show\\_doc.fwx?rgn=16386](https://www.adlia.tj/show_doc.fwx?rgn=16386)

## 2.1.2 Land Use, Land Acquisition, Physical Resettlement and Economic Displacement

RT Land Code of 13 December 1996<sup>15</sup> is a key legal document regulating land relations including land acquisition for public needs. The Land Code prescribes that all land is exclusively owned by the state while individuals and legal entities possess the right to use land (based on long-term, short-term or lifelong inheritable tenure). The Code specifies grounds for terminating land tenure rights including land acquisition (alienation) for public needs with compensation. Article 24 of the Land Code states that non-agricultural land should be used as much as possible for projects not related to agriculture (including sanitary landfills), and Article 29 emphasises the need to minimise acquisition of valuable agricultural land for non-agricultural uses.

*Land Acquisition and Compensation Procedure.* The RT Land Code (Articles 41–43) and regulations issued by the Government detail the land acquisition and compensation procedure for national needs. Pursuant to Article 43 of the Land Code, the land compensation procedure is established by the RT Government which, in turn, issued the Regulation of 30 December 2011 No. 641<sup>16</sup> prescribing that those whose land tenure rights are terminated are entitled to compensation for the affected land and associated losses (cost of improvements, harvest and structures on this land) and provision of alternative land of equal value (where possible) before the termination of land tenure.

RT Civil Code of 24 December 2022 No. 1918<sup>17</sup> complements the land legislation with provisions on protecting property rights in situations involving property alienation. In particular, Article 310 requires that an affected property owner (or other title holder) be compensated at market value for this property and associated losses. The Code also requires that a fair acquisition procedure be followed with the right to claim an adequate compensation in court. In combination with the land law provisions, this serves as the national legal framework for protecting the rights of the project affected persons (PAPs) in situations involving land acquisition for community needs.

RT Law on Land Valuation of 12 May 2001<sup>18</sup> (as amended by the RT Law of 12.05.2007) introduces the state cadastral valuation system and land pricing policy. It describes the procedures for defining cadastral zones, estimating land value and updating information required for taxation, lease and land management purposes.

RT Law on Valuation Services of 7 August 2020 No. 1720<sup>19</sup> outlines the legal and organisational framework for professional land valuation: who can be a valuator, how are valuation services licensed, what standards and methods are used, how the report is prepared and what are the responsibilities of the parties. The law mandates an independent and transparent market valuation for all transactions involving both state and private property.

## 2.1.3 Environmental Quality Standards

Environmental quality in Tajikistan is regulated by a number of laws and standards setting permissible pollution levels for air, water and soil and outlining requirements on biodiversity

<sup>15</sup> RT Land Code of 13 December 1996 (as amended by the RT Laws No. 199 of 28.07.2006, No. 357 of 05.01.2008, No. 405 of 18.06.2008, No. 704 of 25.03.2011, No. 819 of 16.04.2012, No. 891 of 01.08.2012, No. 1363 of 14.11.2016, No. 1823 of 23.12.2021, No. 1824 of 23.12.2021, No. 1825 of 23.12.2021, No. 1902 of 19.07.2022, and No. 1974 of 22.06.2023) [https://www.adlia.tj/show\\_doc.fwx?rgn=132093&contype=2](https://www.adlia.tj/show_doc.fwx?rgn=132093&contype=2)

<sup>16</sup> RT Government Resolution of 30 December 2011 No. 641 "On the Approval of Land Compensation Procedure for Land Users and Other Title Holders Affected by Land Acquisition".. [http://portali-huquqi.tj/publicadliya/view\\_qonunhoview.php?showdetail=&asosi\\_id=13474](http://portali-huquqi.tj/publicadliya/view_qonunhoview.php?showdetail=&asosi_id=13474)

<sup>17</sup> RT Civil Code. Approved by the MN MORT Resolution of 23 November 2022 No. 915 - [https://adlia.tj/show\\_doc.fwx?rgn=143977](https://adlia.tj/show_doc.fwx?rgn=143977)

<sup>18</sup> RT Law on Land Valuation of 12 May 2001 No. 18 [https://www.adlia.tj/show\\_doc.fwx?Rgn=2048](https://www.adlia.tj/show_doc.fwx?Rgn=2048)

<sup>19</sup> RT Law on Valuation Services of 7 August 2020 No. 1720 [https://www.adlia.tj/show\\_doc.fwx?rgn=137072](https://www.adlia.tj/show_doc.fwx?rgn=137072)

protection. There is a system of maximum permissible concentrations (MPC) for various pollutants, maximum permissible discharges (MPD) and other guideline values approved by relevant authorities (Environmental Protection Committee, Ministry of Health etc) in line with their mandate. The existing system of environmental standards have been inherited from the Soviet era. Basic environmental quality guidelines and regulations that are of relevance to the solid waste landfill project and pertaining to air, water, flora and fauna are described below.

### 2.1.3.1 Ambient Air Quality

RT Law on Ambient Air Protection of 28 December 2012 No. 915 provides the legal framework for air protection and introduces mandatory air quality standards. It defines key notions such as 'ambient air' and 'ambient air pollution' and introduces the principle of avoiding and preventing non-compliance with ambient air quality standards set as maximum permissible concentrations (MPC) of pollutants in the ground-level air that do not cause harmful impact on health and environment. The Law also defines the term 'maximum permissible emission' (MPE) as a limit value regulating emission of a pollutant from a specific source with the aim of maintaining compliance with the prescribed MPC of this pollutant in the ambient air. To ensure that this works in practice, the Law requires facility operators to obtain emission permits and install emission treatment systems at source.

### 2.1.3.2 Surface Water and Groundwater Quality

RT Water Code of 2 April 2020 No. 1688 regulates the use and protection of water resources (both surface and underground) and aims to prevent pollution, depletion and adverse impact on water resources. The Code declares that the protection of national water resources is imperative to better standard of living and healthier environment. It defines key terms such as 'surface water' and 'groundwater'. It details the pollution prevention obligations of water users including the ban on untreated wastewater and waste discharges in water bodies with rare specified exceptions. It also establishes maximum permissible discharge (MPD) guidelines for pollutants and binds water users to obtain a water use permit (including water abstraction and wastewater discharge).

### 2.1.3.3 Wildlife

RT Law on Animal Life of 5 January 2008 No. 354<sup>20</sup> provides a legal framework governing the protection, reproduction and sustainable management of wildlife in the country. According to the Law, the state has exclusive ownership of all wildlife inhabiting the territory of Tajikistan and responsible for its protection and reproduction. The Law introduces different categories of animals (rare, endangered, commercial etc.) and provides conservation measures for rare and endangered species (including the RT Red Data Book). It requires the state to maintain wildlife record-keeping and monitoring and regulate the use of wildlife resources.

RT Law on Protection and Management of Plant Life of 17 May 2004 No. 31<sup>21</sup> regulates the protection of wild plant life by establishing the principles of sustainable plant life management and penalties for destroying rare plant species. The Red Data Book lists rare and protected plant species that are not allowed to be damaged or destroyed without a special permit.

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<sup>20</sup> RT Law on Animal Life of 5 January 2008 No. 354, as amended by the RT Law of 24.12.2022 No. 1937 [https://www.adlia.tj/show\\_doc.fwx?rgn=12096](https://www.adlia.tj/show_doc.fwx?rgn=12096)

<sup>21</sup> RT Law on Protection and Management of Plant Life of 17 May 2004 No. 31 [http://portali-huquqi.tj/publicadliya/view\\_qonunhoview.php?showdetail=&asosi\\_id=2521](http://portali-huquqi.tj/publicadliya/view_qonunhoview.php?showdetail=&asosi_id=2521)

## 2.1.4 Waste Management

### 2.1.4.1 General Requirements to Waste Management

RT Law on Industrial and Domestic Waste of 10 May 2002 No. 44<sup>22</sup> is a special piece of legislation regulating all waste management activities, from waste generation, collection and storage to transportation, treatment and disposal, and establishing the state system for waste management, supervision and monitoring. The Law emphasises that protecting environment and human health is of utmost priority in waste management and encourages waste reuse and recycling.

Waste Management Procedure and Mechanisms<sup>23</sup> were introduced by the RT Government Resolution of 2 June 2011 No. 279 as a key regulation detailing the mechanisms for managing waste in a legally compliant manner. The document specifies technical, sanitary and organisational requirements to all stages in waste management process and describes appropriate waste management practices, landfill operation conditions, and requirements to waste collection routes and temporary storage arrangements. This document also sets out standard container site maintenance requirements.

Specific requirements to the organisation and maintenance of container sites in Dushanbe are detailed in the Dushanbe City Public Space Maintenance, Improvement and Hygiene Rules<sup>24</sup>.

### 2.1.4.2 Hazardous Waste

**Mercury-Containing Waste.** Mercury lamps are considered to pose a serious risk and should be managed in line with the RT Government Resolution of 3 March 2011 No. 97<sup>25</sup>. The document requires providing safe arrangements for the collection, temporary storage, transportation and management of spent mercury lamps from individuals and legal entities.

**Medical Waste.** Medical waste hazard classification system includes 5 classes, and the following regulations establish requirements to how these materials should be managed:

- Sapin 2.1.7.033–21 Rules Governing the Collection, Storage and Disposal of Waste from Healthcare Facilities, Sanitary Rules and Norms (SanPiN);
- National Guidelines on Infection Prevention and Control in RT. Approved by the Ministry of Health and Social Protection of the Republic of Tajikistan, 2023;
- Sanitary Rules (P 3.3.2342-08) "Ensuring Safe Vaccination". Guidance Note 3.1.2313-08 "Requirements to Disinfection, Destruction and Disposal of Disposable Syringes and Needles";
- SanPiN 2.1.7.2790-10 "Sanitary and Epidemiological Requirements to Medical Waste Management";

<sup>22</sup> RT Law on Industrial and Domestic Waste of 10 May 2002 No. 44 as amended by the RT Laws No. 109 of 25.07.2005 and No. 736 of 28.06.2011 [https://www.adlia.tj/show\\_doc.fwx?rgn=3243](https://www.adlia.tj/show_doc.fwx?rgn=3243)

<sup>23</sup> On the Procedure, Conditions and Methods for Industrial and Domestic Waste Collection, Use, Disinfection, Transportation, Storage and Disposal. Approved by the RT Government Resolution of 2 June 2011 No. 279 [https://www.adlia.tj/show\\_doc.fwx?rgn=16571](https://www.adlia.tj/show_doc.fwx?rgn=16571)

<sup>24</sup> Dushanbe City Public Space Maintenance, Improvement and Hygiene Rules [http://portali-huquqi.tj/publicadliya/view\\_qonunhoview.php?showdetail=&asosi\\_id=10964](http://portali-huquqi.tj/publicadliya/view_qonunhoview.php?showdetail=&asosi_id=10964)

<sup>25</sup> On the Procedure for Collection, Storage, Transportation and Management of Spent Mercury Lamps. Approved by the RT Government Resolution of 3 March 2011 No. 97 [http://portali-huquqi.tj/publicadliya/view\\_qonunhoview.php?showdetail=&asosi\\_id=12669](http://portali-huquqi.tj/publicadliya/view_qonunhoview.php?showdetail=&asosi_id=12669)

- SanPiN 190.010.090 "Rules Governing the Collection, Disinfection, Storage, Transportation and Disposal of Waste from Healthcare Facilities" (approved by the MoPHSP No. 410 of 14 May 2021).

Currently, the following procedure for medical waste management is applied: each medical and preventive care facility appoints a trained employee responsible for sorting, temporary storage and accounting of all classes of waste generated in medical facilities; waste is collected in special containers; once the containers are filled, they are transferred to a licensed company, based on a contract. The transportation is carried out on specially equipped isotherm vehicles designated for hazardous cargo. The fact of transfer is recorded in the institution's logbook, indicating the name of the transport company, the date and weight of the cargo.

The State Sanitary and Epidemiological Surveillance Service controls compliance with sanitary rules; it also supplies institutions with safe containers.

Biological Waste (including dead animal carcasses, veterinary laboratory residues etc.). The term "biological waste" is not defined in the RT waste management legislation. Veterinary practitioners continue using sanitary guidelines inherited from the Soviet era, including those that regulate the use of Bekkari pits and burial of dead animals<sup>26</sup>.

#### *Asbestos Waste*

There are no dedicated national regulations on safe management of asbestos waste in Tajikistan. Good international industry practice documents and relevant international regulations from EU and neighbour countries (e.g. RF and Kazakhstan) should be used to develop appropriate asbestos management instructions for landfill staff.

#### *Radioactive Waste*

The management of radioactive waste is regulated by the RT Law on Radioactive Waste Management of 30.05.17 No. 1430 which bans the disposal of radioactive waste on the MSW landfills.

### 2.1.4.3 Infrastructure Requirements

Procedure for Maintaining Populated Areas in Proper Sanitary Condition, established by the RT Government Regulation of 2 June 2011 No. 280<sup>27</sup>, specify waste collection frequencies, container site maintenance standards and duties of relevant services on maintaining proper sanitary condition in populated areas.

RT Government Resolution of 2 November 2012 No. 626 "On Ownerless Waste Identification and Recording Procedure"<sup>28</sup> aims at promoting a systematic approach to inventorying illegal waste dumps, especially those of uncertain origin.

RT Government Resolution of 30 December 1998 No. 513 "On Technical Inventory of Civic Amenity Sites, Structures, Facilities, and Utility Networks"<sup>29</sup> provides a regulatory framework for inventorying and recording all infrastructural assets including waste management system components. This important document governs the design and siting of waste collection sites,

<sup>26</sup> Veterinary and Sanitary Rules on Biological Waste Collection, Management and Destruction (approved by RF Ministry of Agriculture and Food on 04.12.1995 No. 13-7-2/469) (amended on 16.08.2007) <https://fsvps.gov.ru/files/veterinarno-sanitarnye-pravila-sbor/>

<sup>27</sup> "On the Procedure for Maintaining Populated Areas in Proper Sanitary Condition". Approved by the RT Government Resolution of 2 June 2011 No. 280 [https://www.adlia.tj/show\\_doc.fwx?Rgn=16573](https://www.adlia.tj/show_doc.fwx?Rgn=16573)

<sup>28</sup> "On Ownerless Waste Identification and Recording Procedure". Approved by the RT Government Resolution of 2 June 2012 No. 626 [http://www.portali-huquqi.tj/publicadliya/view\\_qonunhovview.php?showdetail=&asosi\\_id=14485](http://www.portali-huquqi.tj/publicadliya/view_qonunhovview.php?showdetail=&asosi_id=14485)

<sup>29</sup> "On Technical Inventory of Civic Amenity Sites, Structures, Facilities, and Utility Networks". Approved by the RT Government Resolution of 30 December 1998 No. 513 [https://www.adlia.tj/show\\_doc.fwx?rgn=5188](https://www.adlia.tj/show_doc.fwx?rgn=5188)

sorting stations and other technical facilities and thus ensures that they are formally recognised in the urban planning and land management regulations.

RT Government Resolution of 6 June 2005 No. 209 “On Rules Governing the Provision of Domestic Solid and Liquid Waste Collection Services”<sup>30</sup> regulates relations between service suppliers and customers, service contracting procedure, service quality standards, service operator obligations on regular collection of waste, and sanctions for poor quality and disruption of services.

RT Government Resolution of 3 June 2014 No. 354 “Rules Governing Connections to Utility Networks”<sup>31</sup> details the procedure for connecting various facilities including waste transfer stations and landfills to utility networks.

Dushanbe City Public Space Maintenance, Improvement and Hygiene Rules<sup>32</sup> set out specific local sanitary standards and requirements applied in Dushanbe.

Regulation titled “Maximum Quantity of Toxic Industrial Waste Allowed for Disposal at the Solid Waste Landfills”, developed in addition to the Soviet-era guidelines specifies how much industrial waste is allowed to be accepted at the MSW landfills<sup>33</sup>. It refers to the MSW Landfill Design and Operation Manual (RSFSR Ministry of Housing and Municipal Utilities, 1981) and Sanitary Rules No. 2811–83. The document specifies conditions allowing landfill operators to accept both industrial and domestic waste and sets quantitative and qualitative limits and pollution prevention measures.

#### 2.1.4.4 Competent Authorities and Responsibility

The Law on Waste prescribes that a specially designated competent authority should oversee waste management sector on behalf of the state (now this role could be performed by the Environmental Protection Committee under the RT Government in cooperation of local housing and municipal service departments), while environmental and sanitary inspectorates are in charge of monitoring compliance with current legal requirements.

The Law establishes sanctions for violating waste management rules (illegal dumps, littering, violating landfill operation standards etc.) including administrative penalty system and criminal penalties applied in the event if a non-compliance causes major damage.

#### 2.1.5 Labour Relations and Occupational Health and Safety

The Constitution of Tajikistan guarantees equal rights and freedoms to all citizens, regardless of nationality, race, gender, language, religion, political beliefs, education, social and property status (art. 17). This creates the basis for prohibiting discrimination in employment relations.

The Labor Code No. 1329 of July 23, 2016<sup>34</sup> prohibits discrimination at work. In particular:

*Article 7 prohibits discrimination in employment on any grounds, including race, gender, age, language, religion, political beliefs, and other circumstances.*

<sup>30</sup> “On Rules Governing the Provision of Domestic Solid and Liquid Waste Collection Services”. Approved by the RT Government Resolution of 6 June 2005 No. 209 [https://www.adlia.tj/show\\_doc.fwx?Rgn=11778](https://www.adlia.tj/show_doc.fwx?Rgn=11778)

<sup>31</sup> “Rules Governing Connections to Utility Networks and Services”. Approved by the RT Government Resolution of 3 June 2014 No 354 [http://www.portali-huquqi.tj/publicadliya/view\\_qonunhovie.php?showdetail=&asosi\\_id=16275](http://www.portali-huquqi.tj/publicadliya/view_qonunhovie.php?showdetail=&asosi_id=16275)

<sup>32</sup> Dushanbe City Public Space Maintenance, Improvement and Hygiene Rules. Approved by the Resolution of the Dushanbe City Majlisi on 16 October 2008 No. 150-15. [http://portali-huquqi.tj/publicadliya/view\\_qonunhovie.php?showdetail=&asosi\\_id=10964](http://portali-huquqi.tj/publicadliya/view_qonunhovie.php?showdetail=&asosi_id=10964)

<sup>33</sup> “Maximum Quantity of Toxic Industrial Waste Allowed for Disposal at the Solid Waste Landfills”. Approved by the RSFSR Ministry of Housing and Municipal Utilities and USSR Ministry of Health, Moscow 1985 <https://filial-nic-mkur.tj/knigi/25.pdf>

<sup>34</sup> RT Labour Code of 23 July 2016 No. 1329 (amended by the Laws No. 1897 of 19.07.2022 and No. 2054 of 20.06.2024) [https://andoz.tj/docs/drugie-kodeksi/Code\\_%E2%84%968\\_Labor\\_code\\_RT\\_ru.pdf](https://andoz.tj/docs/drugie-kodeksi/Code_%E2%84%968_Labor_code_RT_ru.pdf)

*Article 23 provides guarantees for employment, ensuring equal opportunities for all candidates.*

The Law "On Equality and Elimination of All Forms of Discrimination" dated July 19, 2022 is aimed at preventing and eliminating discrimination. The law prohibits any form of discrimination, including direct and indirect discrimination, including in the labour sphere; obliges employers to ensure equal rights and opportunities for all employees; appoints a Human Rights Commissioner responsible for ensuring compliance with the law.

The legal basis for the establishment and operation of trade unions, the scope and their participation in monitoring compliance with labour laws; trade union bodies have the right to demand termination of the employment contract with the head in case of violations of labour laws and collective agreements are determined in the RT Law No. 757 "On Trade Unions" dated August 2, 2011<sup>35</sup>. It declares that trade unions play an important role in protecting workers' rights, including the right to participate in monitoring compliance with labour laws and demand termination of an employment contract with a supervisor in case of violations, participate in the formation and implementation of collective agreements. Collective agreements and agreements often include provisions on non-discrimination and equal opportunities.

RT Labour Code is the main body of legislation regulating labour relations and occupational safety issues. It prohibits forced labour, binds the employer to provide safe working conditions, prevent occupational hazards and their harmful effects on employees. The Code states that specific occupational safety measures are to be detailed in relevant laws and employment contracts and special state inspectorates shall monitor working conditions.

Occupational safety issues are regulated in accordance with the Labor Code and special laws on health protection.

The Law No. 363 on Fire Safety (March 20, 2008)<sup>36</sup> establishes the basic concepts, legal, economic and organizational foundations of fire safety, responsibility for violations of safety standards, dispute resolution procedures, etc.

The RT Law On Industrial Safety of Hazardous Production Facilities (February 28, 2004, No. 14)<sup>37</sup> introduces the concept of a "hazardous industrial facility", defines the requirements for safe operation, accident prevention and preparedness for their elimination. The law defines the powers of the authorized body, permits, the need for an industrial safety examination of project documentation, and regulates the professional training of workers at hazardous industrial facilities.

### 2.1.6 Community Health and Safety

The RT Healthcare Code of 30 May 2017 No. 1413<sup>38</sup> is the main legal act aiming to ensure favourable sanitary and epidemiological conditions for the public. The Code binds all industries and organisations regardless of their ownership comply with sanitary rules and standards developed and approved by relevant authorities.

The RT Law on Protecting the Public and Territories against Natural and Technogenic Emergencies of 15 July 2004 No. 53 by providing the institutional and legal framework for safeguarding people from accidents, disasters and natural hazards.

<sup>35</sup> [http://portali-huquqi.tj/publicadliya/view\\_qonunhoview.php?showdetail=&asosi\\_id=13001](http://portali-huquqi.tj/publicadliya/view_qonunhoview.php?showdetail=&asosi_id=13001)

<sup>36</sup> [http://portali-huquqi.tj/publicadliya/view\\_qonunhoview.php?showdetail=&asosi\\_id=9193](http://portali-huquqi.tj/publicadliya/view_qonunhoview.php?showdetail=&asosi_id=9193)

<sup>37</sup> [http://www.portali-huquqi.tj/publicadliya/view\\_qonunhoview.php?showdetail=&asosi\\_id=2318](http://www.portali-huquqi.tj/publicadliya/view_qonunhoview.php?showdetail=&asosi_id=2318)

<sup>38</sup> RT Healthcare Code of 30 May 2017 No. 1413, as amended by the RT Laws No. 1762 of 29.01.2021 and No. 2032 of 03.01.2024 [https://www.adlia.tj/show\\_doc.fwx?rgn=129506&conttype=2](https://www.adlia.tj/show_doc.fwx?rgn=129506&conttype=2)

### 2.1.6.1 Sanitary Protection Zones

A Sanitary Protection Zone (SPZ) refers to a special buffer zone separating an industrial site from residential area and designed to reduce harmful impact on human health. The notion of the SPZ is enshrined in the RT Law on Environmental Protection and sanitary regulations. The Law on Environmental Protection specifies requirements for sanitary, protective and sanitary protection zones established to protect water sources, recreational areas, populated areas and other recipients from pollution and other adverse impacts.

The need for zoning in urban planning (including SPZ) is emphasized in the RT Urban Planning Code of 28 December 2012 No. 933. The SPZ regulations are detailed in the RT Construction Rules and Regulations “Functional Zoning and Spatial Management Procedure”<sup>39</sup> (SNiP RT 30–11- 2019).

The SPZ size depends on the capacity and nature of a facility concerned. For MSW landfills, a minimum SPZ is typically set at 500 m from the landfill site boundaries to the nearest residential housing, though it can be adjusted taking account landfill capacity, local topography, and wind rose. No residential housing, childcare facilities, hospitals etc. are allowed within the SPZ. Where an actual SPZ size is less than that prescribed by law, the design developer should justify this by providing emission dispersion estimates and obtaining consent from the sanitary and epidemiological authority.

The requirement to establish an SPZ should be considered for local authorities in site allocations for planned landfills so that to ensure that the urban zoning plan does not allow residential construction within the landfill’s area of influence.

### 2.1.7 Transportation Requirements and Traffic Safety

Road Traffic Safety Legislation. MSW transportation from collection routes to the landfill site should comply with the road traffic safety rules. Tajikistan has the Law on Road Traffic of 17 May 2018 No. 1533 (as amended by the Law No. 2042 of 03.01.2024) outlining requirements to traffic participants, vehicles and freight transportation operations. It binds the drivers to comply with the Road Traffic Rules (RTR), establishes non-compliance penalties, and specifies how freights should be transported, including a requirement to use a load cover to secure and protect freight during transportation and ban on vehicle overloading.

### 2.1.8 Cultural and Historical Heritage

RT Law on Protection and Management of Historical and Cultural Heritage of 3 March 2006 No. 178<sup>40</sup> sets out the legal framework for ensuring the protection and conservation of historical and cultural assets in Tajikistan. It regulates relations pertaining to the cultural heritage conservation, management and promotion and specifies how the state shall oversee them. According to the Law, historical and cultural assets (architectural, archaeological and historical monuments) are protected by the state and any construction or business activity that might affect them requires consent from the heritage conservation authorities.

### 2.1.9 Gender Equality

RT Law on the State Guarantees for Male and Female Equality and Equal Opportunities in Realising Them of 1 March 2005 No. 89 is a key law mainstreaming gender in all aspects of social life and aiming to provide constitutional guarantees for gender equality in political,

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<sup>39</sup> Functional Zoning and Spatial Management Procedure” 120.030.030. Registered with RT Ministry of Justice on 12 February 2020, Reg. No. 1016. Resolution of the Architecture and Construction Committee within the RT Government “On Approval of RT Construction Rules and Regulations (SNIP RT). [https://www.adlia.tj/show\\_doc.fwx?rgn=137382](https://www.adlia.tj/show_doc.fwx?rgn=137382)

<sup>40</sup> RT Law on Protection and Management of Historical and Cultural Heritage of 3 March 2006 No. 178, as amended by RT Law No. 921 of 28.12.2012 and No. 1429 of 30.05.2017 [https://www.adlia.tj/show\\_doc.fwx?rgn=7138](https://www.adlia.tj/show_doc.fwx?rgn=7138)

economic, social and cultural life. The Law bans gender-based discrimination and binds public authorities to support and encourage equal participation of men and women in work, governance and education. Article 5 of the Law binds the state to provide equal rights and opportunities with respect to employment and remuneration.

*Gender-Related Provisions in the Labour and Social Legislation.* Apart from the special law described above, the RT Labour Code also condemns gender discrimination and grants benefits to pregnant women and family carers. However indirectly, the RT Law on Prevention of Family Violence of 19 March 2013 No. 954 and other social legislation also deal with gender issues.

### 2.1.10 Other Relevant Legislation

RT Law on Environmental Information of 25 March 2011 No. 705<sup>41</sup> stems from Article 25 of the RT Constitution declaring that state authorities, non-governmental associations and public officials are required to give everyone an opportunity to access and review documents affecting their rights and interests unless otherwise provided by the law. The Law establishes the legal, institutional, economic and social arrangements for disclosure of environmental information and the right of individuals and legal entities to receive complete, reliable and current information on environmental matters. Article 4 grants the right of access to environmental information and Article 8 establishes restrictions on access to such information.

RT Law on the Right of Access to Information No. 411 of 18 June 2008 binds the state authorities to provide environmental and social information pertaining to the project and requires ensuring the transparency of this information including details of project risks and proposed mitigation measures. The Law promotes the consideration of public interests, protection of public rights and sustainable regional development.

RT Law on Petitions from Individuals and Legal Entities No. 1339 of 23 July 2016<sup>42</sup> regulates the right of individuals and legal entities to petition government authorities for redress of their grievances and complaints. It sets out grievance procedure with processing and response deadlines and guarantees confidentiality and non-discrimination. It also provides for the right to appeal government decisions or public officer actions in court.

RT Law on Public Associations of 12 May 2007 No. 258<sup>43</sup> states that a public association can be established in one of the following forms: public (non-governmental) organisation, public movement or public initiative. Article 4 of the Law declares that citizens have the right to establish associations for a common purpose and in the common interests on a voluntary basis and that they are free to join or leave such associations. According to the Law, NGOs are required to inform the Ministry of Justice about all funds received from the international sources in advance of spending them and disclose financial statements on their websites.

RT Law on Rural Community Self-Governance Bodies of 5 August 2009 No. 549<sup>44</sup> grants a broad range of powers to jamoats and mandates them to support community efforts on serving their socio-economic needs.

<sup>41</sup> RT Law on Environmental Information of 25 March 2011 No. 705, as amended by RT Law No. 2096 of 13.11.2024 [https://www.adlia.tj/show\\_doc.fwx?Rgn=16383](https://www.adlia.tj/show_doc.fwx?Rgn=16383)

<sup>42</sup> RT Law on Petitions from Individuals and Legal Entities No. 1 339 of 23 July 2016, as amended by RT Law No. 2025 of 03.01.2024 [https://www.adlia.tj/show\\_doc.fwx?rgn=127589](https://www.adlia.tj/show_doc.fwx?rgn=127589)

<sup>43</sup> RT Law on Public Associations of 12 May 2007 No. 258 (as amended by RT Laws No. 384 of 20.03.2008, No. 621 of 21.07.2010, No. 962 of 19.03.2013, No. 1210 of 08.08.2015, No. 1242 of 23.11.2015, No. 1575 of 02.01.2019, and No. 1801 of 25.06.2021) [https://www.adlia.tj/show\\_doc.fwx?Rgn=11267](https://www.adlia.tj/show_doc.fwx?Rgn=11267)

<sup>44</sup> RT Law on Rural Community Self-Governance Bodies of 5 August 2009 No. 549 as amended by RT Laws No. 827 of 16.04.2012, No. 899 of 01.08.2012, No. 1243 of 23.11.2015, No. 1431 of 30.05.2017, and No. 1598 of 04.04.2019 [https://www.adlia.tj/show\\_doc.fwx?rgn=14801](https://www.adlia.tj/show_doc.fwx?rgn=14801)

RT Law on Social Protection for Persons with Disabilities of 29 December 2010 No. 675<sup>45</sup> declares that persons with disabilities are entitled to barrier-free environment, education, employment and rehabilitation. It defines the authority of relevant government bodies to set employment quotas, manage the medical and social expert commission and individual rehabilitation programmes for people with disabilities.

RT Law on Combating Human Trafficking and Assisting Victims of Human Trafficking of 26 July 2014 No. 1096<sup>46</sup> outlines the national system for preventing, investigating and prosecuting human trafficking crime; defines what is slavery, bonded labour and exploitation; and guarantees identification, protection and social rehabilitation to victims.

RT Law on Trade Unions of 2 August 2011 No. 757<sup>47</sup> guarantees that all citizens are free to establish, join and leave trade unions, bargain collectively and protect their labour rights. It declares that trade unions are independent from the government and employers and any attempts to impede their activities shall be prosecuted.

RT Law on Equality and Elimination of All Forms of Discrimination of 19 July 2022 No. 1890<sup>48</sup> provides a common antidiscrimination framework by defining what is direct and indirect discrimination, explaining the notion of reasonable accommodation, guaranteeing the right to judicial remedy and outlining incentive measures for vulnerable groups.

## 2.2 WB Requirements

The present Project is aligned with the World Bank (WB) requirements.

The WB Environmental and Social Framework (ESF)<sup>49</sup> applies to all projects initiated within the framework of the Investment Project Financing (IPF) Policy on or after 1 October 2018. ESF consists of the following components:

- Vision for Sustainable Development,
- Environmental and Social Policy for Investment Project Financing (IPF), which sets out the requirements that apply to the projects supported by the Bank through IPF;
- Environmental and Social Standards (ESS) which set out requirements that apply to Borrowers and their projects (10 ESSs) (see below); and
- Directive on Addressing Risks and Impacts on Disadvantaged and Vulnerable Individuals or Groups.

Considered below are the WB ESSs applied to the present Project and binding on the Borrower, along with the Guidelines and Reference Documents offering guidance and advise on how to achieve compliance with these standards.

### 2.2.1 WB ESS

The following WB ESS apply to the Project<sup>50</sup>:

<sup>45</sup> RT Law on Social Protection for Persons with Disabilities of 29 December 2010 No. 675 [https://www.adlia.tj/show\\_doc.fwx?rgn=16069](https://www.adlia.tj/show_doc.fwx?rgn=16069)

<sup>46</sup> RT Law on Combating Human Trafficking and Assisting Victims of Human Trafficking of 26 July 2014 No. 1096 [https://www.adlia.tj/show\\_doc.fwx?rgn=122167](https://www.adlia.tj/show_doc.fwx?rgn=122167)

<sup>47</sup> RT Law on Trade Unions of 2 August 2011 No. 757 [https://www.adlia.tj/show\\_doc.fwx?rgn=114926](https://www.adlia.tj/show_doc.fwx?rgn=114926)

<sup>48</sup> RT Law on Equality and Elimination of All Forms of Discrimination of 19 July 2022 No. 1890 [https://adlia.tj/show\\_doc.fwx?rgn=142623](https://adlia.tj/show_doc.fwx?rgn=142623)

<sup>49</sup> WB Environmental and Social Framework. 2017. – <https://projects.worldbank.org/en/projects-operations/environmental-and-social-framework>

<sup>50</sup> ESS7 and ESS9 are not applicable to the Project as there are no indigenous communities in the Project area and financial intermediaries are not used in the Project.

### 2.2.1.1 ESS1. Assessment and Management of Environmental and Social Risks and Impacts

ESS1 requires conducting the project appraisal to assess environmental and social risks and impacts associated with each stage of a project using available information and including an accurate project description and identification of any its aspects, along with baseline environmental and social data with a sufficient level of detail for characterising and identifying risks and impacts and mitigation measures. Scoping study is considered as an important part of an E&S assessment and a basis for a subsequent detailed E&S impact assessment. Information disclosure and public consultations are key components of the assessment process.

### 2.2.1.2 ESS2. Labour and Working Conditions

ESS2 requires assessing whether the project meets the WB standards governing labour and working conditions as part of the E&S assessment. It also requires the borrower to establish and maintain healthy employee-employer relations (including permanent staff, temporary/short-term employees, contractors and subcontractors that will be involved in implementing waste management infrastructure improvements at the landfill site and across the city), promote occupational safety and healthy workplace environment, provide a grievance mechanism that employees can use to raise their concerns, not allow any forms of forced and child labour, which is particularly important in the situation with informal waste pickers often present at the landfill site.

### 2.2.1.3 ESS3. Resource Efficiency and Pollution Prevention and Management

ESS3 sets out the requirements to address resource efficiency and pollution prevention and management throughout the project lifecycle in line with Good International Industry Practices (GIIP). Assessing whether the Project meets these requirements in ESIA would include, inter alia, reviewing MSW collection routes (to minimise fuel consumption and prevent excessive air pollution) and other measures designed to minimise adverse Project's impact on human health and contribute to a more sustainable resource uses including energy, water and raw materials.

### 2.2.1.4 ESS4. Community Health and Safety

Considering the ESS4 requirements in ESIA refers to assessing how potential community health and safety risks and impacts are dealt with in the Project and measures are planned to be taken to prevent and minimise those risks and impacts, with special focus on vulnerable individuals and groups. In particular, this would include the consideration of impacts caused by the Project traffic, odour and toxic fumes from new sections of the MSW landfill, potential groundwater pollution etc.

### 2.2.1.5 ESS5. Land Acquisition, Restrictions on Land Use and Involuntary Resettlement

The Project involves land acquisition to extend the existing landfill site and build new waste management facilities. ESS5 requires addressing physical resettlement and economic displacement of Project-affected persons and associated impacts and risks such as impoverishment, loss of social connections, loss of cultural identity etc. Appropriate mitigation measures designed to prevent/minimise involuntary resettlement and/or mitigate its consequences will be developed as required. Special focus will be placed on ensuring information disclosure, meaningful consultations and informed participation of interested parties, as well as livelihood restoration support for persons displaced as a result of the Project.

### 2.2.1.6 ESS6. Biodiversity Conservation and Sustainable Management of Living Natural Resources

ESS6 aims to ensure the protection and conservation of biodiversity and sustainable management of living natural resources throughout the Project lifecycle. As the Project involves land acquisition for landfill extension and new MSW management facilities, new sites

will have to be surveyed for potential presence of rare and valuable species to ensure compliance with ESS6. Furthermore, synanthrope species are likely to be present at and near the existing landfill site so this should be verified through a baseline survey of the landfill site and its surroundings, especially the landfill extension area. The Project team includes a national biodiversity expert who will plan and conduct the flora and fauna survey as part of ESIA.

### 2.2.1.7 ESS8. Cultural Heritage

ESS8 sets out measures designed to protect cultural heritage throughout the project lifecycle. As the Project involves land acquisition for landfill extension and new MSW management facilities, ESS8 requires conducting an archaeological screening or survey of new sites to ascertain the absence of tangible cultural heritage there or otherwise protect the identified assets it against adverse Project impact and support their conservation.

### 2.2.1.8 ESS10: Stakeholder Engagement and Information Disclosure

Addressing the ESS10 requirements in ESIA involves maintaining stakeholder engagement throughout the project lifecycle and promoting constructive and responsive relations to ensure effective management of the Project's environmental and social risks. This includes establishing constructive relations with the Project affected parties, considering stakeholder views in the project design and its E&S parameters, timely provision of information on E&S risks and impacts of the Project to stakeholders, and providing an effective grievance mechanism for managing complaints from the Project affected parties.

ESMF and ESIA will be aligned with all applicable ESSs, General Environmental, Health and Safety Guidelines<sup>51</sup> and good international practice.

## 2.2.2 WB Guidelines

In addition to ESSs, WBG has developed and maintains sectoral and thematic guidelines containing relevant reference information and explaining various details required to achieve compliance with ESSs and establish and maintain the environmental and social management system and its components. The following guideline documents are now in place:

- International Finance Corporation (IFC) Environmental, Health and Safety Guidelines for Waste Management Facilities (2007)<sup>52</sup>;
- IFC Good Practice Handbook: Land Acquisition and Involuntary Resettlement (2023)<sup>53</sup>;
- IFC Good Practice Handbook for Companies Doing Business in Emerging Markets: Stakeholder Engagement (2007)<sup>54</sup>;
- WB Good Practice Note: Addressing Sexual Exploitation and Abuse and Sexual Harassment (SEA/SH) in Human Development Operations (2022)<sup>55</sup>;
- WB Good Practice Note: Environmental and Social Framework for IPF Operations – Gender (2019)<sup>56</sup>;

<sup>51</sup> <https://documents1.worldbank.org/curated/pt/157871484635724258/pdf/112110-WP-Final-General-EHS-Guidelines.pdf>

<sup>52</sup> <https://www.ifc.org/content/dam/ifc/doc/2000/2007-waste-management-facilities-ehs-guidelines-en.pdf>

<sup>53</sup> <https://www.ifc.org/content/dam/ifc/doc/2023/ifc-handbook-for-land-acquisition-and-involuntary-resettlement.pdf>

<sup>54</sup>

<https://documents1.worldbank.org/curated/en/579261468162552212/pdf/399160IFC1StakeholderEngagement01PUBLIC1.pdf>

<sup>55</sup> <https://thedocs.worldbank.org/en/doc/0e0825d39c28f61080380c6be9c40811-0290032022/original/SEA-SH-hGPN-for-HD-Operations-CESSO-Issue-Version-September-26-2022.pdf>

<sup>56</sup> <https://thedocs.worldbank.org/en/doc/158041571230608289-0290022019/original/GoodPracticeNoteGender.pdf>

- WB Good Practice Note: Environmental and Social Framework for IPF Operations – Gender (2019)<sup>57</sup>;
- IFC Introduction to Health Impact Assessment (2009)<sup>58</sup>;
- IFC Good Practice: Addressing the Social Dimensions of Private Sector Projects (2003)<sup>59</sup>;
- IFC Good Practice: Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Markets (2013)<sup>60</sup>.

Any other applicable corporate environmental and social policies of the Client will also be addressed as appropriate.

### 2.3 Good International Industry Practice Requirements

GIIP in waste management cover all stages of waste lifecycle:

- Waste collection and transportation
  - Regular collection: Establish organised and regular waste collection arrangements to prevent illegal dumping.
  - Separation at source: Promote domestic waste separation/segregation at source to separate biodegradable waste (compostable materials such as vegetable and fruit waste, used coffee grounds, egg shells, sunflower seed shells; thermally processed meat and fish, cheese and curd cheese, loose food waste, old plants, dry flowers etc.), recyclable materials and hazardous waste.
  - Stakeholder engagement: Raise public awareness on the importance of proper waste sorting and management.
- Waste transportation
  - Effective management of vehicle fleet: Use covered and well-maintained vehicles for transporting waste to avoid spillage and environmental pollution.
  - Optimised waste collection routes: Plan efficient waste collection routes to reduce fuel consumption and greenhouse gas emissions.
- Waste disposal/recycling
  - Sanitary landfills: Provide engineered landfills with proper lining, leachate collection and landfill gas recovery systems to phase out non-engineered dumpsites.
  - Waste-to-energy (WTE): Use WTE technologies such as waste-to-energy incineration with proper emission treatment to meet air quality standards.
  - Waste dump closure: Phase out and close non-engineered dumpsites and upgrade existing landfills to minimise environmental risks.
- Waste recycling and resource recovery

<sup>57</sup> <https://documents1.worldbank.org/curated/en/415141468176677099/pdf/626310PUB0Proj00Box0361488B0PUBLIC0.pdf>

<sup>58</sup> <https://www.ifc.org/en/insights-reports/2000/publications-handbook-healthimpactassessment--wci--1319578475704>

<sup>59</sup> <https://www.ifc.org/en/insights-reports/2000/publications-gpn-socialdimensions--wci--1319578072859>

<sup>60</sup> [https://www.ifc.org/wps/wcm/connect/topics\\_ext\\_content/ifc\\_external\\_corporate\\_site/sustainability-at-ifc/publications/publications\\_handbook\\_cumulativeimpactassessment](https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/publications/publications_handbook_cumulativeimpactassessment)

- Materials recovery facilities (MRF): Establish MRF to process waste and recover plastic, glass, metals and paper.
- Composting and biogas: Promote organic composting or biogas production as economically viable and sustainable options.
- Environmental controls
  - Leachate management: Install and operate landfill leachate treatment systems.
  - Air emissions: Provide pollution control systems (e.g. scrubbers and filters) at the incineration plants to achieve compliance with emission limits.
  - Monitoring systems: Regularly monitor groundwater, soil and air quality near waste management facilities.
- Climate change mitigation
- Methane capture: Install landfill gas capture systems to reduce greenhouse gas emissions
  - Climate resilient practices: Introduce low-carbon technologies and practices to improve climate resilience.
  - Adopt and implement these GIIP recommendations as an important step to improving MSW management in Tajikistan.

## 2.4 Comparative Review of the RT Legislation and WB Requirements

This section considers:

- RT legislation;
- WB ESS standards;
- WB Guidance Note to ESS 5 (2018<sup>61</sup>) and other WB guidelines.

It also addresses the requirements of the WB guidelines listed in **Section 2.2** and documents detailing the provisions of good international industry practice.

A summary of the comparative analysis is presented in **Table 1** and the detailed review is provided in **ANNEX 1**. The analysis focuses on the ESS requirements applicable to the Dushanbe City Solid Waste Collection Improvements Project and whether they are reflected in the RT legislation<sup>62</sup>.

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<sup>61</sup> <https://documents1.worldbank.org/curated/en/811931548277200104/Guidance-Note-for-Borrowers-ESS5-Land-Acquisition-Restrictions-on-Land-Use-and-Involuntary-Resettlement.pdf>

<sup>62</sup> This comparative review will be updated for the purposes of the ESIA of the Dushanbe City Solid Waste Landfill Project.

**Table 1. A Summary Comparative Review of RT Legislation and WB Requirements**

Topic/Issue	Summary
<b>Environmental and Social Framework</b>	
Classification of projects	The World Bank (WB) classifies each project into one of four categories: High Risk, Substantial Risk, Moderate Risk or Low Risk. In determining the appropriate risk classification, the Bank will take into account relevant issues, such as the type, location, sensitivity, and scale of the project; the nature and magnitude of the potential environmental and social risks and impacts; and the capacity of the Borrower. The RT legislation also has four categories of impacts. In practice, the national EIA can be conducted at a lower level, especially in assessing social aspects.
Use and strengthening of borrower's environmental and social framework	The Bank supports the use of the Borrower's ES Framework provided this is materially consistent with the ESSs. While RT has a multi-level system of standards, the national-level decision-making on a project requires compliance with the national standards. The Client (Borrower) generally lacks an ESF of their own so supporting the development of this capacity is one of the key tasks of the consultant.
Environmental and social due diligence	The Bank will conduct environmental and social due diligence of all projects proposed for support through Investment Project Financing. The Client should consider the results of the WB due diligence in their E&S assessment.
Special project types: projects involving multiple small subprojects	For projects involving multiple small subprojects, WB requires conducting an E&S assessment of each subproject, especially for High Risk or Substantial Risk subprojects. If the Bank is not satisfied that adequate capacity exists on the part of the Borrower, all such subprojects will be subject to prior review and approval by the Bank. The RT legislation requires an EIA and environmental review for each project. A phased assessment of a project and its components (subprojects) is conducted as the project develops.
Environmental and Social Commitment Plan (ESCP)	The Bank requires the Borrower to adopt an ESCP setting out environmental and social commitments, deadlines and responsibilities. This plan will form part of a legal agreement. The RT legislation does not have a similar requirement and no ESCP is expected to be developed for the Dushanbe City Solid Waste Collection Improvement Project.
Information disclosure, consultation and participation	WB requires disclosure of materials relating to the assessment of E&S risks and impacts of High Risk and Substantial Risk projects prior to project appraisal. Information disclosure requirements are detailed in the ESS10. RT as a party to the Aarhus Convention also requires disclosure of environmental information. However, the national requirements significantly differ from those of the WB in the level of detail and, importantly, enforcement practice. In this Project, the gaps between the WB requirements and national legislation will be addressed in the Stakeholder Engagement Plan (SEP) that has been developed and will be consistently implemented and updated in line with the WB requirements.
Associated facilities	WB defines the term "associated facilities" as facilities or activities that are not funded as part of the project and are directly and significantly related to the project. This term is not defined in the RT legislation. The associated facilities for the present Project will be identified as the Project develops.
<b>ESS1. Assessment and Management of Environmental and Social Risks and Impacts</b>	
Environmental and Social Assessment	WB requires the Borrower to conduct an environmental and social assessment of each project and ensure that it is proportionate to project risks and includes the identification of project impacts and mitigation measures. While the RT legislation provides a similar procedure in the form of EIA, the details of how the latter is conducted in practice differs significantly. It is therefore suggested that the bankable Environmental and Social Impact Assessment be conducted as required at

Topic/Issue	Summary
	the FS stage and then amended/adapted as the national EIA Report required by the RT law for submission to the SER authority.
Management of environmental and social risks and impacts	The Bank requires managing risks at all stages of the project, including systematic monitoring and corrective measures. In RT, risks are assessed in EIA and risk assessment is rarely updated in the course of the project implementation. The law requires that monitoring/inspections be conducted during construction and operation stage, but this not always occurs in practice. The Project will establish and maintain a continuous risk management system aligned with ESS1 and good international practice.
Environmental and Social Assessment	The WB E&S assessment methodology employs a consistent approach to managing impacts through prevention, minimisation, mitigation and compensation. As regards national EIAs, the quality of assessment remains poor, especially for social aspects.
Supplier risks and impacts	The Bank requires the Borrower to identify and consider supplier-related environmental and social risks to the extent possible. This issue is not addressed in the RT legislation, and this gap will be dealt with in the special Supplier Management Plan to be developed to identify and monitor these risks.
Environmental and social assessment tools and methods	WB provides a broad range of tools for project assessment, from ESIA and due diligence to strategic assessment (SE) and assessment of cumulative impacts. Key tools applied in RT are EIA (OVOS) and State Environmental Review (SER) without strategic assessment and analysis of social factors and conflict. A broader set of assessment tools will be used in the project, including the analysis of social factors, cumulative and sectoral impacts, in order to address the complex nature of risks, especially those existing in the urban environment, at the landfill site and in informal waste picking activities.
<b>ESS2. Labour and Working Conditions</b>	
Project workers	The Bank requires considering all categories of workers involved in the project, including direct workers, workers employed through third parties, primary supply workers, and community workers. While these terms are not defined in the RT legislation, they do not contradict the law. The term "project workers" is workable and used to correctly identify and manage parties to labour relations.
Employment and working conditions	The Bank requires that employees be provided with information and documentation that is clear and understandable regarding their terms and conditions of employment and paid officially as required by national law. While similar provisions are present in the RT labour legislation, informal employment practice is widespread, as is the case with informal waste pickers working at the landfill site. The project will provide formal employment and labour rights to these people as provided in the ESMP.
Non-discrimination and equal opportunity	The Bank promotes equal opportunity and non-discrimination in all aspects of labour relations. While this principle is explicitly declared in the RT law, gender inequality and limited access to equal opportunity still remain. The project will address this issue by providing specific measures in the ESMP, including those promoting female involvement.
Child labour and minimum age	The Bank does not allow underage labour to be used in hazardous work activities and requires prior risk assessment and continuous monitoring. While similar provisions are in place in RT, weak law enforcement sometimes tolerates child labour in vulnerable sectors. The Project's ESMP will include measures designed to monitor and prevent child labour, including informal waste picker community.
Forced labour	The Bank does not tolerate any forced labour. Similar principle is maintained in RT with legal sanctions for those who violate it. No additional measures are required within the Project.
Grievance mechanism	The Bank requires the Borrower to provide an effective grievance mechanism for all project workers. The RT legislation provides general channels of communication for public grievances but there is no special mechanism for investment projects. The Project will provide a special grievance mechanism adapted to local specific conditions and risks and designed to ensure prompt grievance

Topic/Issue	Summary
Occupational health and safety (OHS)	<p>processing, confidentiality and protection for workers.</p> <p>The Bank requires the Borrower to adopt and maintain a systemic approach to managing occupational health and safety at all stages of the Project, including risk identification and regular inspections. Similar legal requirements apply to employers in RT and relevant authorities should monitor compliance with OHS regulations. However, weak enforcement practice impedes compliance. The Project will have an OHS management system with clear assessment, monitoring and response arrangements that will ensure compliance with the current standards.</p>
<b>ESS3. Resource Efficiency and Pollution Prevention and Management</b>	
Resource efficiency	<p>WB requires the Borrower to implement technically and financially feasible measures for improving efficient consumption of energy, water and raw materials, as well as other resources including cleaner production. Similar provisions are included in the RT environmental laws, but they lack specific implementation mechanisms. The Project implementation including the ESMP is expected to ensure waste reduction and increased waste recycling.</p>
Pollution prevention and management	<p>WB requires the Borrower to avoid the release of pollutants or, when avoidance is not feasible, minimize and control the concentration and mass flow of their release using the performance levels and efficient pollution reduction technologies. The RT legislation includes similar requirements but does not provide effective practical mechanisms for assessing and reducing pollution. Stronger regulation is required within the framework of the Project including effective waste management mechanisms and performance standards based on the best available technologies.</p>
Management of hazardous and non-hazardous waste	<p>WB requires the Borrower to minimise waste generation and reuse, recycle and recover waste in a manner that is safe for human health and the environment. While similar legislation is in place in RT, it should provide detailed management procedures for certain types of waste such as construction, biological and asbestos waste. Other required regulatory improvements include the establishment of waste management monitoring and development of process specifications for all waste management processes, from waste collection to safe disposal. The Project's ESMP includes appropriate measures for various waste streams.</p>
<b>ESS4. Community Health and Safety</b>	
Infrastructure and equipment design and safety	<p>WB requires all project facilities to meet safety standards and not pose threat to affected communities at all stages in the project lifecycle (construction, operation, and decommissioning). RT has a quite extensive regulatory framework on facilities safety, in particular in waste sector (see Section 3.1), however practical enforcement is often weak. Achieving compliance with the national standards and phased introduction of the WB standards and good international practice will be a priority for the Project.</p>
Traffic and road safety	<p>WB requires the Borrower to identify, evaluate and monitor the potential traffic and road safety risks to workers and affected communities. The RT Law on Road Traffic requires preventing environmental and social consequences. As the Project will be implemented in an urban environment with intensive traffic, a Project Transport and Traffic Management Plan addressing transport routes, travel times and pedestrian safety arrangements will be developed for the Project.</p>
Community exposure to health issues	<p>WB requires the Borrower to avoid or minimize the potential for community exposure to water-borne, waterbased, water-related, and vector-borne diseases, and communicable and noncommunicable diseases that could result from project activities. The RT legislation has similar provisions in the Healthcare Code and sanitary standards. However, waste management infrastructure, especially waste</p>

Topic/Issue	Summary
	collection sites, often fall short of these standards. These facilities are planned to be upgraded as part of the Project thus reducing community exposure to health risks.
<b>ESS5. Land acquisition, restrictions on land use and forced resettlement</b>	
Preventing and minimizing displacement. Preventing forced evictions	The World Bank requires that projects seek to avoid physical and economic displacement and avoid forced evictions. ESS5 provides detailed requirements for forced displacement/economic displacement. Tajikistan's legislation formally supports this principle, enshrining the prevention of forced eviction in codes and regulations. However, there are no specific requirements in the case of forced resettlement. The lack of a consistent procedure enshrined in law leads to significant differences in law enforcement practices. To address this gap, the Resettlement Framework under consideration provides for the assessment of alternatives as part of the preparation of the RP and the LRP.
Framework documents/Resettlement plans	According to WB policy, framework documents and Resettlement Plans must be prepared before any resettlement takes place. The legislation of Tajikistan does not contain an explicit requirement to prepare such documents, although compensation commissions are being established. The Resettlement Framework is being developed specifically to address this gap and includes the development of the RP and LRP for all sub-projects where resettlement is unavoidable. This ensures compliance with the Bank's requirements.
Providing assistance to PAPs, especially vulnerable persons	The World Bank requires additional support measures for vulnerable groups affected by resettlement to ensure restoration or improvement of their living standards. National legislation does not contain provisions aimed at such protection and does not differentiate between groups of PAPs. The Resettlement Framework introduces obligations to identify vulnerable groups and provide them with targeted assistance. This helps to compensate for gaps in legal regulation at the local level.
Census of the affected population, inventory of affected property, socio-economic research of the affected PAPs/PAHs	WB standards require a census of PAPs, an inventory of property, and socio-economic research before resettlement begins. The legislation of the RT is limited to an inventory of the affected property and does not require taking into account social vulnerability or restoration of the economic structure. The resettlement Framework provides for the implementation of all necessary measures, including consultations with the PAPs. This ensures compliance with international requirements and an accurate determination of the needs of the population.
Cut-off date (expiry dates of the right to compensation)	WB requires a clear cut-off date after which new persons lose their right to compensation. There are no specific provisions in the national legislation of Tajikistan on establishing the cut-off date. However, the decision of the local hukumat or the Government on the "land acquisition for state or public needs" is issued after the approval of the project documentation and is the legal basis for all subsequent actions. The legislation of Tajikistan indirectly regulates this procedure, so, according to Article 40 of the Land Code of the RT, the land user must be informed in writing no later than one year before the actual acquisition. This date records who is recognized as a legitimate user at the time of notification. Further, according to Article 43 of the Land Code, compensation (the market value of the lost rights plus all losses and lost profits) must be paid before the transfer of the land to the state or the investor. Detailed disclosure of compensation is based on the Procedure for Compensation of losses to land users or users of other registered rights related to land and losses related to the land acquisition, dated December 30, 2011, No. 641. The project proposes to use the start or end date of the census/inventory and make it public. This will eliminate speculation and ensure fairness.
Right to receive	In accordance with the requirements of the World Bank, compensation is provided to all those affected, including persons who do not

Topic/Issue	Summary
compensation	have unregistered rights to land. Tajikistan's legislation limits compensation to registered owners, users and tenants with legal rights (excluding informal users). The Resettlement Framework expands the scope of compensation recipients and introduces assistance to restore the lifestyle even for unregistered PAPs.
Physical displacement	The World Bank requires that displaced persons receive decent housing with secured tenure right and, if necessary, land of equivalent quality or monetary compensation at replacement cost. The Land Code (art. 41) contains similar requirements, in particular, it requires, prior to land acquisition, either the allocation of an equivalent land plot at the request of land owners or users, as well as the construction of residential, industrial and other buildings in a new location by those individuals and legal entities for whom the land plot is allocated (these buildings should be similar in purpose and equivalent to the seized ones), or monetary compensation. The World Bank also requires provide relocation assistance suited to the needs of each group of displaced persons. The Resettlement Framework provides for compensation and supplementary mechanisms reflected in a special matrix. This ensures compliance with international standards and protection of affected persons.
Livelihood restoration	The Bank emphasizes the need to restore incomes and living standards to pre-project levels, taking into account the time needed for adaptation. The legislation of Tajikistan does not provide for such assistance and does not mention the economic consequences of resettlement. The Resettlement Framework compensates for this gap by including additional support measures. Thus, the proposed measures comply with the SES5 standard.
Relocation timeline / transfer of rights	The WB requires that resettlement should take place only after compensation has been paid and necessary support has been provided. The legislation of the RT similarly provides for compensation to be paid before land is taken, which eliminates obvious contradictions. However, restoring livelihoods may take longer. The Framework takes this into account and includes long-term support measures.
Consultations, disclosure of information	International standards require early and active participation of PAPs in the planning and resettlement process, with access to full information. The legislation of Tajikistan requires notification of planned acquisition but does not provide for full consultation. The Project will be implemented in accordance with the Stakeholder Engagement Plan, including disclosure of all documents. This will close the gap and ensure transparency.
Grievance mechanism	The World Bank requires a transparent and independent grievance mechanism available at all stages of resettlement. Tajikistan's legislation does not provide for a specific mechanism for PAPs, but there is a general procedure for filing complaints, including judicial protection. The Project has already proposed a separate mechanism integrated with the ESMF and the Stakeholder Engagement Plan. This will allow for prompt response to complaints and conflict prevention.
Monitoring and evaluation of the resettlement process and audit of the resettlement plan implementation	The WB standards require both internal monitoring and external independent audit of the RP implementation. The national legislation provides only partial regulation-monitoring of compensation for agricultural production losses, but not comprehensive compensation for resettlement. The Resettlement Framework fills this gap by introducing procedures for tracking and, where necessary, external evaluation. This will increase accountability and allow for course correction in the event of deviations.
<b>ESS6. Biodiversity Conservation and Sustainable Management of Living Natural Resources</b>	
Assessment of risks and impacts	WB requires the Borrower to make an assessment of project impacts on biodiversity, including various types of habitats, potential threats and significant natural areas even those that have no official protection status. The RT legislation requires applying similar procedures as part of EIA and environmental review in order to address potential harm to the nature. As this project is not expected

Topic/Issue	Summary
	to cause significant damage or adverse impact on biodiversity, the extent of assessment required will be adjusted appropriately.
Conservation of biodiversity and habitats	WB categorises habitats as modified, natural and critical, along with legally protected areas, and requires ensuring no net loss or preferably a net gain of biodiversity. Whilst the RT legislation requires protecting ecosystems and species and providing compensation (e.g. for tree removal and land acquisition), it does not provide a differentiated approach and 'zero damage' principle. The WB ESS6 requirements will be followed on the Project where applicable.
Legally protected and internationally recognized areas of high biodiversity value	WB requires the Borrower to ensure consistency with the protection status of all legally protected and internationally recognised areas and protect their integrity as a matter of priority. The RT legislation has similar strict requirements to managing protected areas and internationally recognised sites. This requirement does not apply to the Project because there are no protected areas in the project area and its surroundings.
Invasive alien species	The WB ESS6 states that the Borrower will not intentionally introduce any new alien species and will implement measures to avoid the potential for accidental or unintended introductions. The RT legislation has similar requirements on plant protection and quarantine, designed to prevent the introduction of alien (exotic) species. No specific measures are required for this Project as no introduction of invasive alien species is expected.
Sustainable management of living natural resources	WB requires the Borrower to manage natural resources in a sustainable manner through the application of good international practices. In RT similar provisions are included in the relevant legislation (e.g. Forest Code and Law on Wildlife). No specific measures are required for this Project as it does not affect or involve the use of these resources.
Suppliers and contractors	WB requires the Borrower to assess whether the suppliers affect biodiversity and where possible change those suppliers whose activities cause adverse impact to critical habitats. This practice is not codified in the RT legislation, and this issue is rather addressed on a case-by-case basis.
<b>ESS8. Cultural Heritage</b>	
Stakeholder consultation and identification of cultural heritage	WB requires the Borrower to conduct consultations with local communities, regulators, NGO, experts and other stakeholders to identify cultural heritage including intangible assets. The RT legislation requires maintaining the state inventory of cultural heritage, but there is no requirement to hold special consultations on cultural heritage. As part of the Project EIA, relevant authorities will be approached to obtain information on whether any registered cultural heritage is present in the Project area and on past cultural heritage surveys. If there were none, an archaeological screening will be conducted.
Stakeholders access	WB requires allowing access to cultural heritage or providing an alternative access route. While this requirement is not explicitly declared in the RT legislation, it is implied to be part of the general heritage conservation principles. As of now, there appears to be no need for such measures.
Legally protected cultural heritage areas	WB requires the Borrower to comply with cultural heritage regulations and the protected area management plans if the proposed project will be located within a legally protected area or a legally defined buffer zone. The RT legislation requires obtaining a special permit and complying with the approved terms of use. The Project developers will be required to ascertain whether any cultural heritage is present in the vicinity of the project site and act in accordance with the WB and RT requirements if it is.
Archaeological sites and material	For chance finds, WB requires the Borrower to suspend onsite works, conduct an assessment of items found and notify relevant authorities. Similar approach is outlined in the RT legislation; all chance finds are protected and owned by the state. The Project involves a limited amount of earthworks, but a chance finds management procedure will be provided and maintained.

Topic/Issue	Summary
Built heritage	WB requires the Borrower to identify appropriate measures to mitigate impacts on built heritage, including documentation, restoration and relocation. While the RT legislation regulates any impact on architectural heritage but does not directly address visual impact. The Project will address potential impact of waste management infrastructure on built heritage, especially in an urban setting.
Natural features with cultural significance	WB recognises sacred natural features as cultural heritage and requires that such features be identified and preserved in a culturally appropriate manner. The RT legislation recognises the cultural value of natural features but does not provide specific conservation procedures. No such features are present in the Project area.
Commercial use of cultural heritage	WB requires the Borrower not to proceed with the commercial use of cultural heritage unless it carries out consultation with stakeholders and provides for equitable sharing of benefits. The RT legislation does not have a similar requirement. As regards the Project, any commercial use of cultural heritage is not planned.
<b>ESS10. Stakeholder Engagement and Information Disclosure</b>	
General requirements	WB requires the Borrower to engage with stakeholders in a regular and meaningful manner that is proportionate to the nature and scale of the project at all stages of the project lifecycle, from preparation to implementation. The RT legislation provides for public participation in EIA. The Project involves the preparation and implementation of SEP.
Stakeholder identification and analysis	WB requires the Borrower to identify all stakeholders including vulnerable groups, analyse and consider their interests in decision-making. In the RT legislation, similar requirements are incorporated in relevant laws (the Laws on EIA and Environmental Protection, Resolution No. 532). The Project team has already conducted a detailed stakeholder analysis and established a data base that will be updated and used to support targeted engagement.
Stakeholder Engagement Plan	WB requires that the SEP be developed at an early stage, be proportionate to project risks and regularly updated. There is no similar requirement in the RT legislation. The Project-specific SEP has been developed for 2025-2026 and will be regularly reviewed and updated (at least annually).
Information disclosure and consultation	WB requires the Borrower to disclose project information in a timely, understandable and accessible manner and conduct meaningful consultations that are free of coercion and manipulation. In the RT legislation similar practice is outlined in the relevant laws (Laws on EIA and Environmental Protection, and Resolution No. 532). The information disclosure and consultation process on the Project will be conducted in line with the Project SEP.
Grievance mechanism	WB requires the Borrower to establish and maintain a dedicated and effective grievance mechanism. Similar mechanism is outlined in the RT Law on Petitions from Individuals and Legal Entities No. 1339 (2016). A grievance mechanism for the Project has already been established on the basis of the existing grievance procedure maintained by SUE Smart City and integrated in the Project SEP.
External reporting	WB emphasises the importance of regular stakeholder communication and feedback on project implementation, risks and management measures. The RT Laws on the Environmental Monitoring (2011), on Petitions from Individuals and Legal Entities (2016) and on EIA (2017) also require external reporting. The Client will publish the Annual Environmental and Social Performance Report for the Project.

### 3 METHODOLOGY FOR ASSESSING SOCIAL AND ENVIRONMENTAL IMPACTS AND RISKS

#### 3.1 General Information

An Environmental and Social Impact Assessment (ESIA) of a project is the process of identifying potential environmental and social impacts of a proposed activity, assessing the magnitude and significance of those impacts, and developing measures to avoid and/or mitigate negative impacts and enhance positive effects. A key element of the ESIA is consultation with stakeholders.

The main approach of this ESIA is based on the relationship “activities - aspects - impacts”.

The approach is described in the ISO 14001 standard “Environmental management systems” and is a powerful conceptual tool for assessing and managing the Project’s impacts at all stages of its implementation. Following the definitions given in ISO 14001, environmental and social aspects are defined as “elements of activities that can interact with the receiving environment”. Accordingly, impacts are defined as “changes in the receiving environment”.

#### 3.2 ESIA Process

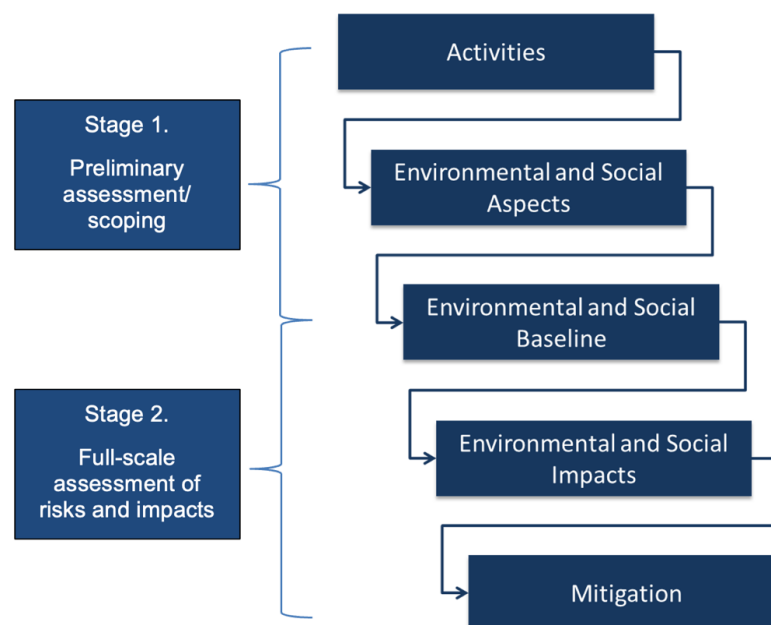
The key elements of the ESIA are:

- Preliminary assessment and identification of key issues for consideration in the ESIA – Environmental and Social Scoping: Stage 1;
- A full-scale assessment, including collection and analysis of information on environmental and social baseline conditions; analysis of alternatives; and detailed assessment of impacts and risks;
- Planning measures to mitigate negative impacts and enhance positive effects, as well as management and monitoring measures;
- Consultations with stakeholders.

For organizational purposes, the ESIA is divided into two stages:

- **Stage 1.** Preliminary assessment (culminating in this Scoping report);
- **Stage 2.** Full-scale assessment of risks and impacts and preparation of Management Plans.

The scheme for conducting the ESIA is presented below (**Figure 2**).



*Figure 2. ESIA concept based on the activity-aspect-impact relationship*

### 3.2.1 Preliminary assessment (scoping) and identification of key issues for consideration in the ESIA

Scoping (which is the focus of this document) is the foundation of the ESIA process.

The environmental and social aspects of the project and associated potential impacts are identified. As a function of the environmental and social aspects, components of the natural and social environment that may be changed by the aspects are identified as environmental and social receptors<sup>63</sup>. Potentially significant impacts are identified in this manner and the scope of the required assessment determined. The assessment itself is carried forward into the next phase of the ESIA.

The following types of Project impacts are considered:

- **Direct impacts:** Project impacts arising directly from Project activities and associated environmental and social aspects. These impacts are typically realized at the same place and time as where and when the Project is implemented. They are also referred to as primary impacts because they have direct consequences for the natural or social environment, for example, discharge of untreated industrial wastewater into a nearby river.
- **Indirect impacts:** may be caused by activities not included in the Project but related to it and/or caused by its implementation. Such impacts often occur over time, affect a wider area, but are reasonably predictable; For example, off-site power generation, that provides electricity to the project.
- **Cumulative impacts:** may result from the combination of the various impacts of the project itself and/or several projects/activities in the same area. Cumulative impacts may

<sup>63</sup> An example of environmental receptors are habitats disturbed as a result of excavation/construction works; an example of social receptors are residents of the district centre who may be employed as construction workers or workers at the planned mining and processing plant.

also result from the gradual build-up of the impacts of one activity when they add up to the impacts of other past, present and reasonably foreseeable future activities.

Both negative and positive impacts from the planned activity are considered.

The identified impacts are preliminarily ranked by significance (high, moderate or medium) by the subject matter specialists.

Within the preliminary assessment is the identification of such negative impacts that cannot be prevented, mitigated or compensated for (fatal flaws) and which, therefore, will be the basis for disqualifying the Project.

During the project development process, designs will be updated and the baseline environmental and social conditions investigated and analysed. All this information will be analysed by specialists and included in the assessment.

### 3.2.2 Full-scale impact and risk assessment

As part of a full-scale assessment, it is necessary to assess the significance of impacts, which is a function of receptor sensitivity and exposure intensity. This section outlines an approach to determining the significance of impacts, consisting of the following steps:

- Assessment of receptor sensitivity (its ecological or social value);
- Assessment of impact intensity;
- Assessment of impact significance;
- Assessment of residual impacts;
- Assessment of cumulative impacts.

#### 3.2.2.1 Assessment of receptor sensitivity

The proposed descriptors and criteria for the sensitivity of a receptor are given in **Table 2**.

**Table 2. Criteria for assessing receptor sensitivity**

Sensitivity	Main Criteria Descriptors
High	High or very high importance and rarity, international or national scale and very limited to no potential for substitution
Medium	Medium importance and rarity, regional scale, limited potential for substitution
Low	Low importance and rarity, local scale
Very low	Very low importance and rarity, local scale

#### 3.2.2.2 Assessment of impact magnitude

**Table 3. Criteria for determining the magnitude of impacts**

Magnitude category	Main criteria
High	Loss of the resource and/or its quality and functional condition; severe damage to its key characteristics, permanent / irreversible change of its properties or components (Adverse impact)
	Large-scale or substantial improvement in the quality of the resource; major restoration or improvement, permanent change in the form of significant improvement in quality characteristics (Positive Impact)
Medium	Loss of a resource that does not lead to a deterioration in its functional condition, partial loss or deterioration of key characteristics, properties or constituent elements (Negative impact)
	Improvement or addition of key characteristics, properties or constituent elements; qualitative improvement (Positive impact)
Low	Some measurable change in parameters, quality or vulnerability, minor loss or alteration to one (or more) key characteristics, properties or constituent elements (Adverse Impact)

Magnitude category	Main criteria
	Minor improvement or addition to one (or more) key characteristics, properties or elements, some positive effect on resource parameters, or a reduced risk of a negative impact (Positive Impact)
Negligible	Very minor loss or deterioration of one or more characteristics, properties or constituent elements (Adverse Impact)
	Very minor improvement or addition of one or more characteristics, properties or constituent elements (Beneficial Impact)
No change	No loss or alteration of characteristics, properties or constituent elements, no noticeable impact in either direction.

### 3.2.2.3 Assessment of impact significance

The significance of impacts is based on reasoning and professional judgment and considers the views and recommendations of stakeholders. In some cases, the significance of predicted impacts may be determined using quantitative thresholds and scoring criteria. By assigning impacts to one of the four significance categories, different impacts can be assessed using the same scale, allowing direct comparison of the significance of different impacts. The four impact significance categories are summarized in **Table 4**.

**Table 4. Criteria for determining the significance of impacts**

Significance category	Main Criteria Descriptors
<b>Major</b>	Very large or large magnitude of change in environmental or socio-economic conditions. Impacts, both adverse and beneficial, which are likely to be important considerations at a national and regional level or could result in violation of statutory environmental regulations.
<b>Moderate</b>	Intermediate magnitude of change in environmental or socio-economic conditions. Impacts that are likely to be important considerations at a regional and local level.
<b>Minor</b>	Small magnitude of change in environmental or socio-economic conditions. Impacts may be raised as local issues but are unlikely to be of importance in the project's permitting and approval process.
<b>Negligible</b>	No discernible change in environmental or socio-economic conditions. Impacts that are likely to have a negligible or neutral influence, irrespective of other impacts.

Impact significance is determined for both positive and negative impacts/risks. To determine the significance of the effects, a matrix is used to combine the sensitivity of the receptor and the magnitude of the impact (**Table 5**).

**Table 5. Impact Significance Matrix**

Impact Magnitude	Receptor Sensitivity / Value			
	High	Medium	Low	Very Low
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Minor
Low	Moderate	Moderate	Minor	Negligible
Negligible	Moderate	Minor	Negligible	Negligible

### 3.2.2.4 Assessment of Residual Impacts

Residual impacts are those likely to occur after mitigation and enhancement of positive impacts and other management measures. Stated differently the residual impacts are what must be 'lived with' if the project goes ahead. Residual impacts must be environmentally and socially acceptable.

### 3.2.2.5 Assessment of Cumulative Impacts

Cumulative impacts from the project and in combination with other existing or reasonably anticipated future projects will be assessed recognising:

- Summative impacts are a change in the state of a receptor that can be summed up with a similar change in the state of the same receptor (e.g., a combination of several similar impacts to a single receptor);
- Interacting impacts - impacts where a change in the state of a receptor can be added to some other change in the state of the same receptor (e.g., a combination of several different impacts on the same receptor).

The assessment of cumulative impacts will follow IFC Good Practice Guidance. Additional measures to mitigate and/or manage cumulative impacts will be included in the ESAP.

### 3.2.3 Environmental and Social Management Plan (ESMP)

Based on the assessment, mitigation will be identified to avoid, reduce or manage potential negative impacts and enhance positive impacts. Mitigation measures will be clear, feasible and applicable to local conditions and based on GIIP.

Mitigation, monitoring and management requirements identified through the impact assessment process will be detailed in an Environmental and Social Management Plan (ESMP). The ESMP will be split into the construction and operational stages. The ESMP will also contain a management framework, that will serve to ensure E&S risks are included in decision-making and day-to-day operations.

### 3.2.4 Stakeholder Engagement and Public Consultation

A Stakeholder Engagement Plan (SEP) has been developed for this ESIA, including stakeholder identification and analysis, action plan, and grievance mechanism. The SEP defines a structured and systematic approach to stakeholder engagement during project development and implementation and provides for the resolution of grievances.

## 4 SUMMARY OF CURRENT PRODUCTION ACTIVITIES OF THE MUNICIPAL SOLID WASTE LANDFILL OF DUSHANBE CITY

### 4.1 Key performance indicators

The annual receipt of waste at the landfill is gradually increasing and in 2024 amounted to 400,270 tonnes. The largest share in the composition of solid waste is food and plant waste (up to 53%).

The largest share of waste comes from the enterprises collecting it on the territory of residential development: five district State Unitary Enterprises for Waste and a private enterprise "Zarafshon Kommunale" provide up to 86% and demonstrate relative stability of transported waste at a short period of time.

### 4.2 Existing Infrastructure

The following works are currently being carried out at the Landfill:

- Reception and registration of incoming garbage trucks at the landfill, including their weighing;
- Subsequent unloading of vehicles and storage of solid waste in areas of the Landfill body convenient for unloading solid waste;
- After illegal and legal collectors of recyclable solid waste fractions have carried out the initial sorting of the delivered waste, it is leveled using a wheeled bulldozer and the site is prepared for unloading the next garbage truck;
- In addition to regular solid waste, the landfill accepts hazardous waste, namely: mercury-containing and medical waste, bio-waste.

From 2008 to 2014, the Landfill was reconstructed as part of the EBRD's "Dushanbe Solid Waste Management" project<sup>64</sup>, and necessary environmental protection facilities were installed. Many of the facilities installed as part of the project are no longer operational and cannot be restored:

- The landfill biogas collection and removal system;
- The drainage system for collecting landfill leachate;  
The compactors purchased under the EBRD loan are not working and are currently written off;
- There is no effective fire extinguishing system in the waste storage area;
- The lighting on the access road and in the waste storage area does not work;
- The undercarriage wash system for vehicles leaving the Landfill is not working.

#### 4.2.1 Hazardous waste management

Different types of hazardous waste are accepted at the Landfill: medical waste, mercury-containing waste, bio-waste (veterinary waste, animal carcasses, including pets). At the point of accounting and control of waste received at the Landfill, there are separate registration logs for each type of hazardous waste received. However, the conditions for safe handling of hazardous waste are not met.

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<sup>64</sup> <https://www.ebrd.com/home/work-with-us/projects/psd/38901.htm>

- **Medical waste.** The Landfill must ensure the transportation, reception and disposal of medical waste. There was purchased a special unit for thermal disposal of medical waste, the monthly productivity of which should be more than three tons / day. In practice, medical waste is stored outdoors in crumbling boxes; the necessary documentation for the equipment is not provided, and its operating conditions are not monitored.
- **Mercury-containing waste.** The Landfill has two mercury-containing waste demercurization units (DMU). Both units are not working (permanently or temporarily). The mercury-containing waste acceptance log was not filled in at the time of the inspection. There is no Instruction on handling mercury-containing waste at the Landfill, including acceptance, temporary storage and demercurization of waste. There is no passport for the demercurization unit and instructions on labour protection for handling mercury-containing waste. It was not possible to inspect the demercurization units due to the lack of a key to the premises. There is no information about the transfer of metallic mercury to a specialized enterprise.
- **Biological waste.** Biowaste is to be disposed of in a 4-section cattle burial ground – the Beccari biothermal pits, built under the EBRD loan and located on the waste storage site. However, the pits are currently inoperable. In 2017, they were also partially dismantled and were operated with violations of safe handling rules. Presently, there is a destruction of the facilities with the dismantling of metal structures.

### 4.3 Organizational structure and management

The SUE "MSW Landfill of Dushanbe" (operates as an independent production and business unit responsible for the reception, sorting, recycling and safe disposal of household waste in the city of Dushanbe. The number of personnel as of December 12, 2024, was 61 people.

#### 4.3.1 Environmental protection

According to the legislation of the RT, the responsibility for compliance with environmental protection requirements in the implementation of the enterprise's activities is borne by its director, while the organization of environmental protection and ensuring environmental safety are assigned to the Environmental Protection Engineer or the OHS Engineer, who combines the functions of the person responsible for Occupational Health and Safety, fire safety and the environment.

The Landfill staffing table does not include a person responsible for the environmental protection. The tasks of organizing environmental protection are limited to the preparation and submission to the authorized body of permits and reporting environmental protection documentation.

Lack of control over the environmental protection and ensuring environmental safety of the Landfill's activities has led to significant violations in the sphere of environmental protection, especially in handling hazardous waste. These violations also cause uncontrolled serious risks of impact on the health of personnel due to air pollution in the work area in the premises where the demercurization and incineration units for medical waste are located.

#### 4.3.1.1 Emissions into the atmosphere

There are stationary and mobile emission sources on the territory of the Landfill. According to the classification established in the legislation of the RT<sup>65</sup>, stationary emission sources are divided into organized and unorganized (area) emission sources. The latter are distinguished by the fact that they do not have a device for localizing the flow of pollutants into the atmosphere.

Mobile sources, which include vehicles and special equipment operating at the landfill, are classified according to environmental classes established by the legislation of the RT.

- *The only stationary emission source:* dedicated medical waste incinerator;
- *Mobile emission sources:* motor vehicles (garbage trucks and trucks, including those belonging to the Landfill), excavators, bulldozers, tractors, loaders. The composition of the exhaust gases of the internal combustion engine includes suspended substances (soot), carbon monoxide and carbon dioxide, sulphur dioxide, nitrogen oxides, polycyclic aromatic hydrocarbons (benz(a)pyrene, etc.) and other organic substances. Emissions must be monitored by periodic monitoring of the specified technical means. Reporting is carried out based on calculation methods;
- *Unorganized (area) emission sources* include emissions of landfill biogas from waste storage areas (old sites) and the smell of foul-smelling light organic compounds (VOCs) from new waste storage working areas. These emissions are not taken into account in the permitting documentation (volume of Maximum Permissible Emissions, MPE), which may lead to an underestimation of the degree of environmental hazard of the Landfill approved by the authorized body.

A significant contribution to air pollution is made by (emergency) emissions of pollutants during fires, which occur quite often at the Landfill. Burning landfill gas and waste produces hazardous organic compounds, including dioxins and furans, which are classified as persistent organic compounds (POPs)<sup>66</sup>.

Emergency emissions at production sites are not standardized but must be taken into account in the quarterly and annual environmental reporting of the Landfill.

#### 4.3.1.2 Wastewater generation

Currently, there is no system for collecting surface runoff generated during snowmelt or rainfall flowing down from the surface of solid waste storage areas on the waste storage site. As a result, contaminated wastewater flows freely down the valley in the form of seasonal or permanent small streams. At the same time, wastewater, can pollute groundwater, the underground flow of which is directed towards the Kafirigan River.

#### 4.3.2 Occupational health and safety

In accordance with the legislation of the RT, full responsibility for ensuring healthy and safe working conditions lies with the employer (manager) of the enterprise. A responsible employee is appointed to organize OHS work. Training or advanced training of the Manager and the responsible employee on OHS issues is conducted once every 5 years. The Landfill's staffing table includes an OHS and Environmental Protection Engineer. However, OHS work is not properly organized.

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<sup>65</sup> Law of the Republic of Tajikistan dated December 28, 2012, No. 915 "On the protection of atmospheric air" [http://portali-huquqi.tj/publicadliya/view\\_qonunhoview.php?showdetail=&asosi\\_id=14718](http://portali-huquqi.tj/publicadliya/view_qonunhoview.php?showdetail=&asosi_id=14718)

<sup>66</sup> Stockholm Convention on Persistent Organic Pollutants. <https://www.pops.int/>

### 4.3.3 Informal activity at the MSW Landfill

There are no technical conditions for organized garbage sorting at the Landfill. Therefore, sorting is carried out with the participation of informal collectors.

Officially, the selection of valuable components from the garbage delivered to the Landfill is carried out by an individual entrepreneur under an agreement with the SUE Municipal Landfill of Dushanbe. According to the results of an interview with the management of the Landfill, about 200 people work at the Landfill, about 40 of them are permanent; the rest come periodically, depending on needs and employment, including seasonal. Collectors of recyclables who directly carry out this activity, with very rare exceptions, do not have legally executed contracts and social guarantees, work without compliance with safety standards, without protective clothes, etc. Nevertheless, the work is organized. There are foremen at the Landfill who organize this work. "Permanent" waste pickers deliver valuable components to an individual entrepreneur. It is assumed that most of the non-permanent/ periodic waste pickers also deliver the found recyclables to the same individual entrepreneur. However, there are also a small number of collectors who voluntarily enter the Landfill and work independently.

Some of the informal collectors rent housing in nearby villages, mainly in Boloshakhr. Some rent out entire residential buildings, while others rent rooms in dormitories. For example, there is a women's dormitory in Boloshakhr village<sup>67</sup>, where single women and/or women living in a religious marriage<sup>68</sup>, some of them with their children. Many people who rent premises near the Landfill in this way do not have other housing. More detailed information about informal waste pickers is provided in the **ANNEX 2**.

### 4.3.4 Public health and safety

The operating Landfill is located in close proximity to residential areas and directly affects residents of the villages of Boloshakhr (Guliston jamoat) and Teppai Samarkandi (Rohati jamoat, see **Figure 3**). Emissions from the Landfill can affect health of the residents of these settlements directly (through air pollution) and indirectly (by polluting garden plots where residents grow food and pastures where they graze cattle).

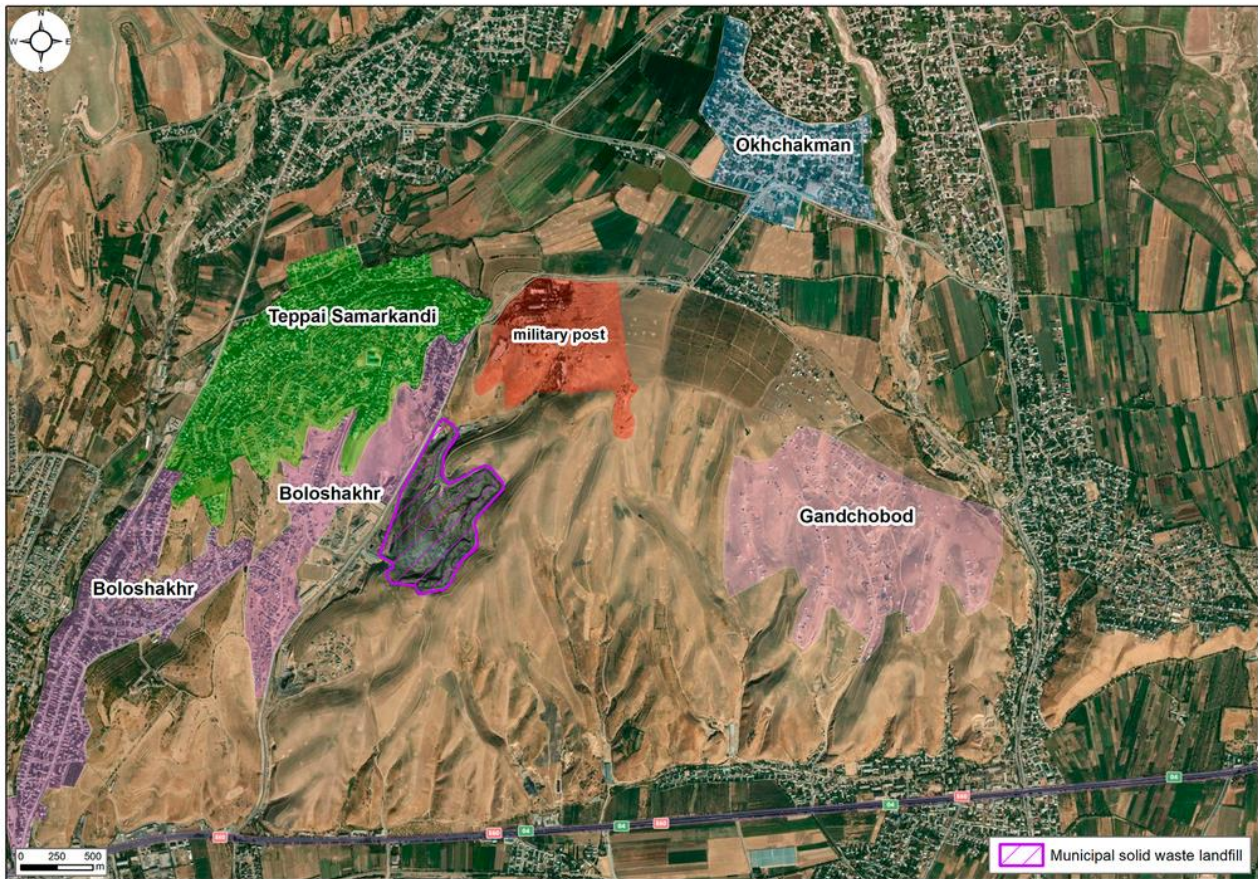
According to the legislation of the RT, it is necessary to establish a sanitary protection zone (SPZ) for the landfill. This Landfill is classified as a Class II facility; for such facilities, a standard SPZ of 500 m has been defined.

The Landfill does not have an officially established SPZ. In his Scoping Report, the Consultant was guided by the normative SPZ of 500 m). From 80 to 100 households in the villages of Boloshakhr and Teppai Samarkandi fall within the normative SPZ of the Landfill. However, taking into account unorganized emissions of pollutants, including those due to spontaneous combustion, the actual emissions of pollutants may be significantly higher and, accordingly, lead to the need to establish a wider SPZ (more than 500 m). In any case, a facility such as Dushanbe solid waste landfill must have an official SPZ established based on the SPZ project (including study of the facility's actual emissions, their dispersion modelling in the environment, and an assessment of the health risk. To control the level of pollution in residential areas located near the Landfill, it is necessary to organize regular monitoring of the state of the atmospheric air, soil, and water in the zone of influence of the MSW Landfill.

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<sup>67</sup> A plot that has been equipped by the owner for a 10-room dormitory.

<sup>68</sup> Polygamous marriages are not recognized by the legislation of the RT and do not provide women with the rights associated with state registration of marriage.



Prepared by the E&S Consultant based on information provided by the Rudaki District Hukumat, Rohati Jamoat and field research data of the Consultant

**Figure 3. Location of the MSW Landfill and neighbouring settlements**

#### **4.4 Preliminary recommendations for the SUE "Dushanbe MSW Landfill" on organizational aspects of current activities**

As priority measures not related to the Project, it is recommended that the company perform the following actions on its own:

- Develop Technological regulations for the Landfill's activities in accordance with the requirements applicable to sanitary landfills;
- Develop a step-by-step Plan/Roadmap to achieve certain requirements, such as:
  - compaction of disposed waste using compactors and crawler bulldozers for uniform shrinkage of stored waste due to sufficient crushing and reduction of the volume of buried waste, thereby prolonging the life of the Landfill;
  - regular layering of solid waste layers with inert materials;
  - maintenance of the vehicle running gear washing system in working order, if possible, its transfer to recycled water supply;
  - allocation of a special site for large-sized construction waste;
  - development of a draft MPE with consideration of mobile sources of internal combustion engine emissions;
  - regular correction of MPE Projects with consideration of the growth in the volume of solid waste disposal services;

- Develop Instructions for the safe handling of medical waste and train personnel on it;
- Develop Instructions for the safe handling of mercury containing wastes and train personnel on it;
- Carry out constant control over the management of medical waste and mercury waste; provide personnel with appropriate PPE;
- Build new Beccari pits at an accelerated pace, taking into account modern safety regulations for their use in a specially designated area. Determine the location based on the selected new area for Landfill expansion;
- Carry out technical inspection of the medical waste incinerator with the determination of its temperature parameters and compare it with the required values to minimize the impact on the health of service personnel and community;
- Carry out a technical inspection of the facilities for neutralization (demercurization) of mercury containing wastes with the determination of its temperature parameters and compare it with the required values to minimize the impact on the health of service personnel and community. Upon resumption of the demercurization of the mercury containing wastes, ensure the delivery of metallic mercury to a specialized organization;
- Allocate a special site at an existing Landfill for the disposal of construction waste, in accordance with the GIIP requirements.

## 5 ENVIRONMENTAL AND SOCIAL BASELINE

This chapter describes the current state of the surrounding natural and social environment and existing trends in the Landfill Expansion Project area: Guliston and Rohati jamoats, Rudaki district. The main focus is on the area adjacent to the MSW Landfill (Guliston and Rohati jamoats of Rudaki district).

### 5.1 Current environmental conditions and trends

#### 5.1.1 Climate and climate change

Within the framework of climatic characteristics, the area of the city of Dushanbe and the adjacent areas of Rudaki district (Guliston and Rohati jamoats) are considered as a single DSUDP Project area. The Project area (**Figure 3**) is similar in its climatic characteristics to the territory of Dushanbe, although it is located 80–150 m higher than the city and existing weather stations. Consideration of climatic characteristics of this area separately from the area of the city of Dushanbe is technically impossible due to the lack of weather stations with completely identical climatic conditions. Therefore, we consider climatic characteristics based on data from existing weather stations and, where possible, introduce refinements (due to the adiabatic gradient).

This section provides a brief analysis of climate characteristics. A more complete analysis of the climate characteristics of the DSUDP Project area and climate change trends are provided in the ESMF<sup>69</sup>. A brief background on climate and climate change issues is provided below.

##### 5.1.1.1 General climatic characteristics of the Project area

**Temperature.** Dushanbe city and the adjacent areas of Rudaki district (Guliston and Rohati jamoats, located at an altitude of 800 – 870 m above sea level in the western part of Tajikistan) are characterized by a mild and moderate climate (Csa according to the classification of Köppen and Geiger), with hot, dry summers and cool, more humid winters. The average air temperature fluctuates from +3°C in January to +27°C in July<sup>70</sup>. The average annual temperature is about 12.1°C<sup>71</sup>. July is the hottest month, when the average maximum exceeds 35°C, and the absolute maximum exceeds 42°C. January is the coldest month, with an average temperature of about 1°C, and nighttime minimums on average reach -4°C<sup>72</sup>. It can be assumed that the temperature at the Landfill and in the villages of Boloshakhr and Teppai Samarkandi may be lower by 0.5-1 degree Celsius (due to the adiabatic gradient).

**Precipitation.** Dushanbe receives a moderate average annual precipitation of 860 mm, but the distribution of precipitation varies by season<sup>73</sup>. April is the wettest month with 153 mm of precipitation, while August is the driest month with 8.9 mm of precipitation<sup>74</sup>. Most precipitation occurs from November to April, with March and April being the wettest months. July and August are the least rainy. Snow in Dushanbe usually falls from December to February, on average over several days per month. Due to the relatively mild winter weather, snow cover is generally unstable<sup>75</sup>.

<sup>69</sup> Environmental and Social Management Framework (ESMF) for Dushanbe Municipal Solid Waste Landfill Collection System. Ecoline International Ltd and NGO 'Peshsaf,' 2025

<sup>70</sup> [https://www.dwd.de/DWD/klima/beratung/ak/ak\\_388360\\_kt.pdf](https://www.dwd.de/DWD/klima/beratung/ak/ak_388360_kt.pdf)

<sup>71</sup> <https://en.climate-data.org/asia/tajikistan/districts-of-republican-subordination/dushanbe-488/>

<sup>72</sup> <https://nomadseason.com/climate/tajikistan/dushanbe/dushanbe.html>

<sup>73</sup> <https://en.climate-data.org/asia/tajikistan/districts-of-republican-subordination/dushanbe-488/>

<sup>74</sup> <https://weather-and-climate.com/average-monthly-precipitation-Rainfall.dushanbe.Tajikistan>

<sup>75</sup> <https://en.climate-data.org/asia/tajikistan/districts-of-republican-subordination/dushanbe-488/>

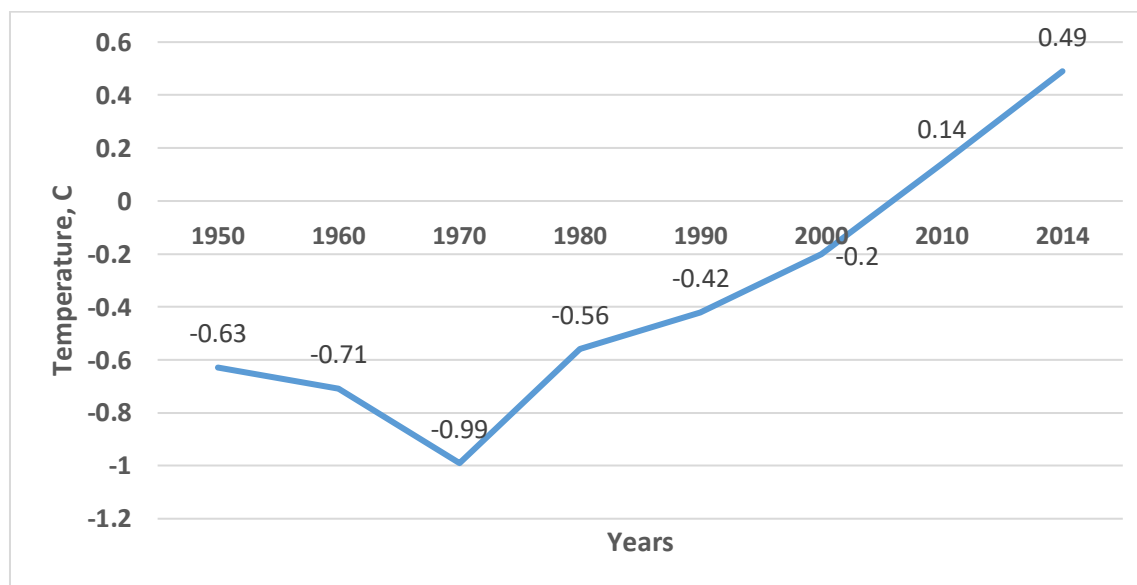
**Insolation.** Dushanbe has a high level of sunshine - about 2,700 hours per year. The greatest number of sunny hours is observed in June and July - both months provide more than 300 sunny hours. The cloudiest months are from December to February<sup>76</sup>.

**The windy season** in Dushanbe lasts about 4 months, usually from late May to late September, when the average wind speed exceeds 8.5 km/h. It is during this period that dust storms occur. July is the windiest month, with an average hourly wind speed of about 10.0 km/h. The calm season lasts 8 months - from late September to late May. November is the calmest month, with an average hourly speed of 7.2 km/h<sup>77</sup>. During storms, wind gusts can reach 10-15 m/s. Analysis of the local wind regime is difficult due to the lack of meteorological observations at a comparable altitude.

#### 5.1.1.2 Analysis of climate change in the Project area

**Temperature trends.** Since 1940, the average annual temperature in Tajikistan has increased by 0.3–1.2°C, averaging 0.1–0.2°C per decade. Minimum average temperatures have also increased by 0.5–2.0°C, with the exception of some highland areas where a slight decrease of 0.1°C was recorded. Notably, the warming has been less pronounced at higher altitudes, while lowland areas have seen a more significant increase in temperatures. In addition, urbanization has contributed to an increase in surface air temperatures in major cities by 1.2–1.9°C<sup>78</sup>. **Figure 4** shows a pronounced upward trend in average annual surface air temperatures since the early 1970s<sup>79</sup>.

In Dushanbe, the average annual temperature has increased from 13.7°C to 16.9°C over the past 50 years. It is predicted that by 2070, the average annual temperature in the city could reach 19.0°C<sup>80</sup>.



Data source: World Bank. Climate Change Knowledge Portal, Tajikistan<sup>81</sup>

**Figure 4. Average annual surface air temperature in Tajikistan, 1950 - 2014.**

<sup>76</sup> [https://weather-and-climate.com/average-monthly-hours-Sunshine\\_dushanbe,Tajikistan](https://weather-and-climate.com/average-monthly-hours-Sunshine_dushanbe,Tajikistan)

<sup>77</sup> <https://weatherspark.com/y/106691/Average-Weather-in-Dushanbe-Tajikistan-Year-Round>

<sup>78</sup> <https://crva.centralasiacclimateportal.org/tajikistan-climate-summary>

<sup>79</sup> <https://climateknowledgeportal.worldbank.org/country/tajikistan>

<sup>80</sup> <https://cabar.asia/en/climate-change-and-temperature-increase-future-forecast>

<sup>81</sup> <https://climateknowledgeportal.worldbank.org/country/tajikistan/climate-data-projections>

**Precipitation and snow cover.** Since 1940, Tajikistan has seen mixed changes in precipitation. In areas up to 2,500 meters above sea level, annual precipitation has increased by about 8%, while in mountainous areas it has decreased slightly by about 3%. A more pronounced decrease in precipitation has been noted in the Eastern Pamirs (by 5-10%) and especially in Murghab, where it has reached 44%. A similar trend has been observed in the southern lowland areas. At the same time, precipitation has increased by 5-10% in the central part of the country, by 20% in the southern mountainous areas, and by 5-30% in the northern mountainous areas (except for the highlands). At the same time, the total number of days with precipitation has decreased throughout the country, most significantly in the Iskanderkul area, where there are 48 fewer days<sup>82</sup>.

Extreme weather events and vulnerability. Since 1940, Tajikistan has experienced eight droughts affecting the entire country, including periods in 1940, 1947, 1956, 1971, 1980, 1988, 2000 and 2001. The droughts in 2000–2001 affected 3 million people and resulted in economic losses amounting to 5% of the country's GDP<sup>83</sup>.

Since 1940, *accelerated melting of glaciers*, the main source of water in Tajikistan, has been observed. This may lead to a decrease in river flow and drying up of some glacial springs at altitudes of 2,500 - 3,000 meters<sup>84</sup>.

*Sand and dust storms (SDS)* are among the dangerous natural phenomena characteristic of Tajikistan and are clearly evident in Dushanbe and the surrounding region. A distinction is made between sand and dust storms.

*Sandstorms move* relatively close to the surface of the earth. The relatively large size of the particles (60 microns and more) limits the distance that each particle can travel. However, even sandstorms can cause significant harm to the country's economy (reducing crop yields) and human health (irritating the mucous membranes of the respiratory organs and exacerbating respiratory diseases).

*Dust storms* lift fine dust particles into the air, throwing them into the higher layers of the atmosphere. Dust storms can travel thousands of kilometers. In Tajikistan, dust storms are popularly called "Afghans". Strong winds lift dust and sand particles into the atmosphere from the deserts of Kandahar, Afghanistan, and Kerman, Iran, and carry them north. Residents of the southern regions of Tajikistan and the capital Dushanbe most often suffer from the "Afghan" wind. In recent years, dust storms have increasingly formed on the dried-up part of the Aral Sea. These dust storms affect all countries in the region. In Tajikistan, they reach the upper reaches of the Zarafshan River. According to expert estimates, over the past 30 years, the frequency of dust storms in Tajikistan has increased more than 10 times: if in the early 1990s only 2-3 dust storms occurred per year, then in recent years more than 35 sand and dust storms have been recorded annually<sup>85</sup>.

The situation with dust storms and dust haze in Dushanbe is unpredictable, and at the same time it has a decisive impact on air pollution<sup>86</sup>. Due to dust storms penetrating the country from the southwest, south and north, air pollution with suspended particles (dust), particles of

<sup>82</sup> <https://crva.centralasiacclimateportal.org/tajikistan-climate-summary>

<sup>83</sup> [https://www.researchgate.net/publication/254385974\\_Tajikistan%27s\\_Vulnerability\\_to\\_Climate\\_Change](https://www.researchgate.net/publication/254385974_Tajikistan%27s_Vulnerability_to_Climate_Change)

<sup>84</sup> [https://www.researchgate.net/publication/254385974\\_Tajikistan%27s\\_Vulnerability\\_to\\_Climate\\_Change](https://www.researchgate.net/publication/254385974_Tajikistan%27s_Vulnerability_to_Climate_Change)

<sup>85</sup> Under a layer of dust and sand. What sand and dust storms threaten Tajikistan with and how to prepare for them - <https://carececo.org/main/news/pod-sloem-pyli-i-peska/>

<https://www.asiaplustj.info/en/news/tajikistan/incidents/20250505/a-powerful-dust-storm-expected-to-hit-tajikistan-in-the-coming-days>

<sup>86</sup> "Dust storms in Dushanbe. What we breathe and how to protect ourselves from them" - <https://your.tj/vseobshhee-pomutnenie-kak-uberechsja-ot-pylnoj-buri-v-dushanbe/>

2.5 microns in size (PM-2.5) and particles of 10 microns in size (PM-10) has increased. Due to frequent dust storms:

- in 2023, Tajikistan entered the top ten countries with the most polluted air<sup>87</sup>;
- in 2024, Dushanbe was ranked fourth among the world's capitals with the most polluted air.

### 5.1.2 State of the atmosphere and quality of atmospheric air

Dushanbe is one of the cities with a high level of air pollution<sup>88</sup>. The situation with air quality in Dushanbe is worsened by the low ability of the city's atmosphere to self-purify due to the fact that the capital is surrounded by mountain ranges from the north, east and south with the only exit to the west in the Gissar Valley. The wind rose has a main north-south direction along the Varzob River valley. The state of calm weather, in which there is no circulation of air masses, according to the Hydrometeorology Agency of the Republic of Tajikistan, is about 38%. For these reasons, the degree of dispersion of pollutants in the atmosphere of Dushanbe is low, most of them settle within the city. Even with small emissions, harmful substances can accumulate in the atmospheric air to high concentrations.

Monitoring in the city is carried out by two automatic stations that record the concentration of fine suspended particles PM2.5, wind speed and direction, installed at the US Embassy and School No. 14 at Rudaki Boulevard. All readings in real time, including wind strength and direction, are displayed on the Internet<sup>89</sup>. In addition, there is a network of mobile and stationary posts of the Agency for Hydrometeorology of Tajikistan (Hydromet), which also record the content of harmful substances in the atmospheric air with an established frequency. A brief analysis showed that in densely populated areas of Dushanbe, the content of PM2.5 is two or more times higher than in areas located higher in relief and characterized by better "ventilation" of the territories.

Air pollution in the Landfill area is not regularly monitored, only one-time observations are available, usually related to emergency situations. The landfill is a source of emissions, both organized and unorganized (**Section 4.3.1.1**). Considering the higher location of the landfill, it can be assumed that there are improved conditions for the dispersion of emissions, compared to low-lying areas, especially in the conditions of possible ground inversions in the valley.

The next step is to:

- conduct a brief survey of the areas adjacent to the landfill in order to study the contamination of the area by emissions from the operating landfill (**ANNEX 5**);
- based on all available data, approximate greenhouse gas (methane) emissions;
- perform a calculation of the dispersion of emissions from the landfill after its reconstruction.

### 5.1.3 Geomorphology, geology

The urban agglomeration and its surrounding areas are located in the central part of the northern foothill side of the Gissar tectonic intermountain depression and are characterized by absolute heights from 700 to 1100 m above sea level. Urbanized areas are located on the

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<sup>87</sup> According to IQAir, a Swiss company that monitors air quality around the world - [IQAir | First in Air Quality](https://www.iqair.com)

<sup>88</sup> Air Quality Management in the Republic of Tajikistan. World Bank. 2023. <https://documents1.worldbank.org/curated/en/099081723150529416/pdf/P18001408270f40e80b900006bd7a098720.pdf>

<sup>89</sup> <https://www.iqair.com/ru/tajikistan/dushanbe/dushanbe>

floodplain river terraces from the north and south of the Varzob River and the north-east of the Kafirnigan River. From the north and north-east, the city and the Project area are surrounded by the Gissar Range and its spurs - adirs with an altitude of 900 - 1000 m above sea level. The difference in altitude in the city is significant. The southern and western parts of the city are located at an altitude of 750 - 800 m, while the northern and north-eastern have an altitude of 900 - 950 m. Some peaks of the Gissar Range are over 4000 m above sea level. The Gissar Range provides good protection for the city from cold north-eastern winds. In general, the terrain is hilly.

The Dushanbe intermountain depression, according to the regulatory map of seismic zoning of Tajikistan, belongs to the nine-point zone. HIGH seismicity is due to the location of the city between two large active seismogenic faults. The high degree of seismic hazard is due to the fact that almost along the northern outskirts, at the foot of the Gissar Range, a large tectonic fault of deep foundation is traced - the Gissar-Kokshaal fault. The magnitude (M) of seismic events can reach 7.5 - 8.0 points.

The Dushanbe trough is an independent oil and gas region. Three gas fields have been discovered and explored here: Andygonskoye, Komsomolskoye (Luchob) and Shambarinskoye. According to available data, the area around the solid waste landfill is rich in deposits of common natural resources: cement raw materials, building stones, sandstones, conglomerates, carbonate rocks (limestones, dolomites, marbles), building sand, sand and gravel materials, gypsum, anhydrite and mineral paints. The Gulbistinskoye limestone deposit (9 km northeast of Dushanbe), loess-like loams suitable for brick production and can also be used in cement production, and the Kharangon quartz sand deposit (15 km northeast of Dushanbe) are located here. The raw materials of the Kharangon deposit are suitable for the production of green bottle glass, molding materials in foundry production and for plastering. In general, it is also possible to use fossil raw materials for pouring and interlayering layers at the solid waste landfill.

#### 5.1.4 Hydrological and geotechnical conditions

According to previously conducted geological and hydrogeological studies, the site of the Landfill and the adjacent area is characterized by a low level of groundwater; its depth reaches 150 meters<sup>90</sup>.

Primary studies of the hydrogeological and geotechnical conditions of the Landfill area were carried out by the Swedish company SWECO International in 2008-2009<sup>91</sup>. For these purposes, five boreholes were drilled within and around the Landfill at a depth of 5 to 20 meters (**Figure 5**). During the drilling, samples were taken in accordance with national standards. Geological profiles of the boreholes were compiled, and soil samples were taken for geotechnical laboratory studies.

The results of the studies of samples from five boreholes showed that the permeability coefficient of the studied soils (water seepage potential) is low and is within the range of 0.3-2.3  $10^{-9}$  m/day. These values are comparable with similar indicators for soils ( $9^{-10}$  m/s) recommended in the EU Landfill Directive<sup>92</sup> for use for the initial compaction of landfill beds and the final insulation of their surfaces. At the time of the survey, natural soils with low permeability, common in the territory of the landfill, prevent contamination of underground

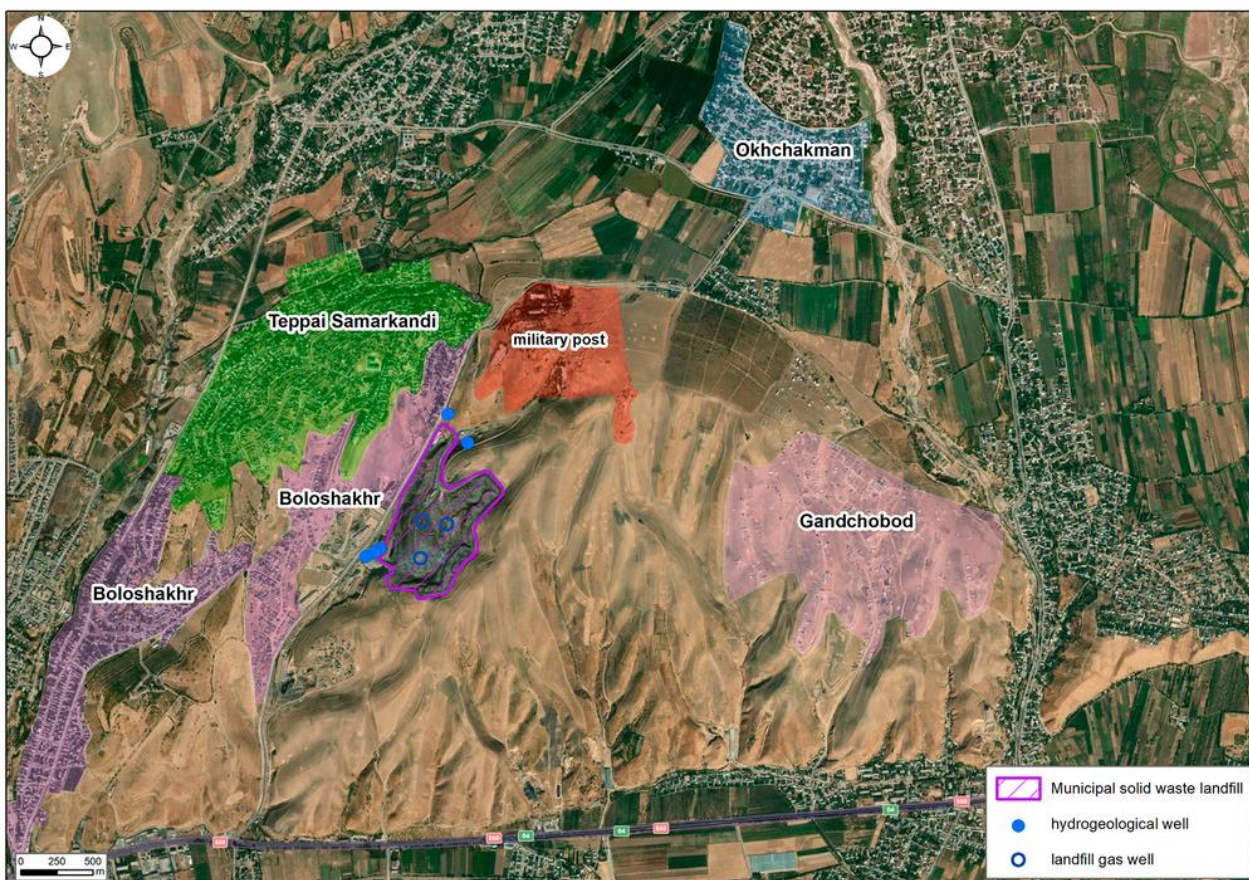
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<sup>90</sup> Dushanbe Solid Waste Management Project Draft Final Report. SWECO, 2008

<sup>91</sup> Dushanbe Solid Waste Management Project. Extension Phase – Draft Report (Project No. 1989145 - EBRD, SIDA). SWECO, 2009

<sup>92</sup> Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives

aquifers. From this point of view, the initial selection of the site for the Landfill was made correctly.



Source: Prepared by the E&S Consultant based on the SWECO 2008-2009 materials

**Figure 5. Map of the Landfill with topographic marks and location of drilled wells (situation at the end of 2008)**

However, from 2008 to the present time, a significant amount of waste has accumulated at the Landfill, which increases its hydrodynamic pressure on the underlying water-bearing rocks and, in general, on the environment. In addition, the area in the middle of the landfill, not filled with waste in 2008, is currently filled, i.e. the configuration of the landfill's volumetric body has changed and, consequently, the indicators of evaporation and moisture accumulation in the landfill's body have changed.

During the research, water was found in one of the wells. According to SWECO experts, the reason for its appearance is seepage from the irrigation channel located above. In any case, this fact indicates a possible seepage of landfill leachate. This circumstance allows us to assume that such seepage may also occur in other areas, including the current area of the Landfill cells.

In addition to soil permeability, indicators of their subsidence and stability were also determined, and the safety of further waste storage and the time frame for exhaustion of the allocated site of the Landfill were assessed.

According to the opinion of the E&S Consultant, it is necessary to confirm the presence or absence of risks of pollution of aquifers due to stored waste, and also to clarify the geotechnical conditions for the further operation of the Landfill and its expansion. For this, detailed engineering and geological surveys are required taking into account previously

conducted studies of mineral and thermal waters of the Dushanbe artesian basin<sup>93</sup> and the results obtained in 2008-2009 directly on the territory of the Landfill.

These engineering and geological surveys during the restoration and modernization of the solid waste landfill will create a reliable basis for ensuring the sustainability and safety of the landfill structures, preventing the negative impact of the landfill on the environment. The planned surveys will allow optimizing design solutions, will serve to reduce the risks of accidents and emergency situations, and will significantly contribute to determining the possible use of the landfill territory after its closure.

### 5.1.5 Soils

In accordance with general characteristics of soils within the northern and north-eastern parts of Dushanbe, mainly on hills 900-1,000 m above sea level, highly subsiding loess formations are widely developed on slopes of varying steepness. During heavy rainfall, erosion processes are formed and mudflows and landslides may form. Within the northern and north-eastern parts of Dushanbe, mainly on hills 900-1,000 m above sea level, virgin, rainfed brown carbonate soils with a humus content of 3-4% in the upper horizon are widespread. They have a slightly alkaline reaction and heavy loamy mechanical composition. Carbonates are absent or are found at a depth of 20-40 cm. Virgin soil varieties develop under tall-grass vegetation and xerophytic shrubs. These soils are formed mainly on loess deposits and loess-like loams, on slopes of varying steepness. Here, the soils are characterized by strong subsidence. Therefore, during the construction of civil facilities and irrigation systems, their deformation is observed.

The landfill was built on non-irrigated lands of the Lenin collective farm, possibly intended for cattle grazing. The allocated area and the territories adjacent to the landfill have been completely technogenically transformed, so that an initial description of the soil cover is impossible. The E&S Consultant was not provided with information on soil studies on the territory of the landfill and adjacent areas. The soils can be characterized as sandy loam or loam, underlain by pebbles. It was previously established that the soil on the territory of the landfill and around it is significantly susceptible to erosion. Therefore, in the Soviet times, the entire territory of the gorge was covered with protective terraces, effective in combating erosion. To prevent erosion processes in the landfill modernization project, it is necessary to develop additional preventive measures.

The main contamination of the soil cover, noted visually during a visit to the Landfill in February-March 2025, is typical for waste storage areas and a network of roads leading to these. Contamination with municipal solid waste is observed, including its light fractions (bags, paper, etc.), which are subject to wind dispersion.

In residential areas adjacent to the Landfill, the spread of light fractions of solid waste is also visually recorded, thus, in these areas, the transfer and settling of small suspended particles is also possible, on which hazardous bioaerosols and other products of biotransformation of organic fractions of solid waste are sorbed. In regularly recorded cases of fires or blazes in solid waste areas, hazardous VOCs are formed, including dioxins and furans.

### 5.1.6 Surface waters

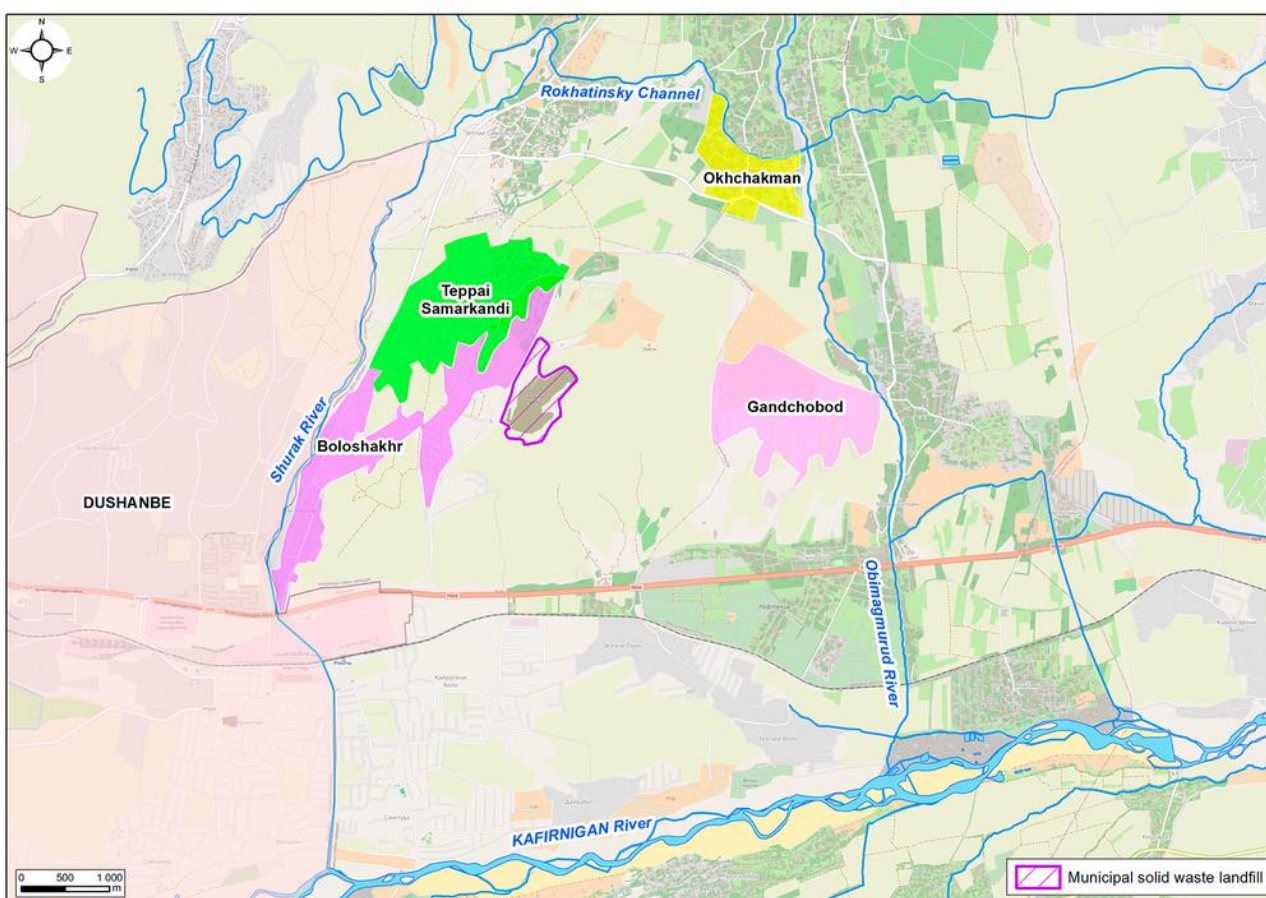
There are no permanent watercourses in the area of the solid waste landfill - the nearest large river Kafirnigan flows at a distance of three and a half kilometers to the east of the landfill. However, the hilly terrain contributes to the formation of temporary streams: during heavy

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<sup>93</sup> N.M. Churshina. Dushanbe artesian basin and its mineral and thermal waters. DONISH Publishing House, Dushanbe, 1972. <https://www.geokniga.org/bookfiles/geokniga-dushanbinskiy-artezianskiy-basseyn-i-ego-mineralnye-i-termalnye-vody.pdf>

rains and snowmelt, streams of water flow down the bottoms of ravines, which can reach the territory of the landfill. One of these temporary streams runs at the foot of the hill on which the landfill is located, and during the rainy season it can collect wastewater from its slopes.

There are several small irrigated areas with local ditches near the solid waste landfill, however, no special hydraulic structures have been built around the dump. It should also be noted that standing water often accumulates at the landfill itself: temporary puddles and ponds are formed in the depressions of the terrain and pits from the soil sample after rains. Two special pools for collecting filtrate have been built in the southern part of the landfill. These ponds are designed to settle polluted water before pumping it into the city sewer system. They are artificial open reservoirs and belong to the category of surface water bodies (anthropogenic).



Source: Developed by E&S Consultant based on open source data

**Figure 6. Map of watercourses in the vicinity of the solid waste landfill**

**Floods and freshets.** No significant spills have been recorded in the immediate vicinity of the Landfill - it is located on an elevated site. However, traces of surface erosion on the slopes of the landfill indicate that during heavy rains, water flows along the surface of the landfill, forming erosion furrows. This confirms the need to arrange storm drains or ditches to collect and drain these waters outside the body of the landfill.

The hydrological regime affects the Landfill in two ways: (1) through the wetting/erosion of the waste mass itself by precipitation and seasonal flows; (2) through the spread of pollutants from the landfill into the surrounding hydrographic network. During the period of maximum wetting (spring), the formation of filtrate increases - a liquid phase seeping through the waste mass. If it is not pumped out, it can penetrate into gully streams or groundwater, which then flows into riverbeds. Therefore, the most critical time in terms of protecting water from landfill

pollution is spring, when there is a lot of water and the maximum amount of filtrate is formed. In summer, on the contrary, the landfill dries out, there are no flows, and the migration of pollutants slows down, but the risk of fires increases.

### 5.1.7 Underground water

*Groundwater near the solid waste landfill.* From the hydrogeological point of view, the landfill is located at the transition from valley deposits to foothill deposits. Here, the aquifer of the first deposits is probably intermittent: in the ravines there may be local lenses of groundwater, fed seasonally, while the main flow of groundwater in the valley passes somewhat to the west, closer to the main channel of the Kafirnigan River. Data on the depth of the aquifer level under the solid waste landfill are limited. However, if we focus on the elevation marks of the terrain, the depth of the well is 30-50 m below the surface of the landfill.

*Undergroundwater quality.* In relation to the solid waste landfill, the main risk is the filtrate that penetrates downwards. The filtrate is a highly mineralized solution (mineralization can reach 3-10 g/l) with a high content of ammonium nitrogen, chlorides, organic matter and metals (iron, manganese, lead, etc.). If such solutions reach groundwater, they become contaminated.

*Undergroundwater as a resource.* There are no known large springs in the area of the landfill, but there are springs on the slopes of the Gissar Mountains north of Dushanbe that are used by the population.

*Soil permeability.* The loess loams on which the landfill is located have moderate permeability (filtration coefficient of about 0.1–0.01 m/day). The underlying sand layers are more permeable (up to 1–5 m/day). Therefore, the filtrate, seeping through, is probably partially retained in the upper layers, but having found a way through cracks or gullies, it can quite quickly reach the deep horizons.

### 5.1.8 Biodiversity

Degradation or preservation of natural and biological diversity is one of the dominant indicators in the economic development of an area. MSW landfills usually form special biocenoses both on the body of the landfill itself and in its surroundings. Often, such an impact can be spread due to migrating (daily, seasonal feeding migrations) animals - birds, rodents, insects. Weed ruderal vegetation always changes the floristic composition of adjacent territories, dispersing the seed fund.

Valuable sites of biodiversity conservation and notable historical and cultural sites are located quite far from the project area (**Figure 7**). Direct negative impact of the landfill on unique natural complexes should not be expected.

Only one green area – the city Victory Park – is located on the eastern side of the city. Daily feeding migrations of birds are possible between the park and the landfill. The transfer of combustion products, volatile compounds during periodic fires and fires at the landfill cannot be ruled out.

### 5.1.8.1 Specially Protected Natural Areas



Source: Developed by E&S Consultant based on open source data

**Figure 7. Location of the nearest SPNA, IBAs, KBAs**

**Victory Park.** The architectural and sculptural Memorial Complex and Flame of Eternal Glory are located on the eastern side of Dushanbe. Victory Park was opened on the desert hills in the elevated eastern part of the city in 1975, in honour of the 30th anniversary of the Victory. To reach the upper terraces of the park, a cable car was built in the 1970s (it is no longer in operation). The park occupies 35.5 hectares; this territory is distinguished by a variety of flora and fauna. Cypress and pine trees are planted near the memorial. Beautiful views of Dushanbe from above open up from the terrace of the park. The park is a recreational area for city residents. The distance to the Landfill is less than 10 km.



Source: <https://www.youtube.com/watch?v=kjAhFUQU5Y>

### Figure 8. Victory Park

*The Ramit State Nature Reserve* (Romit, Tajik: Мамнӯъгоҳи давлатии табиӣ Romit) is a specially protected natural area of Tajikistan<sup>94</sup>. The total area is 16.2 thousand hectares. It was established by the decree of the government of the Tajik SSR in 1959 on an area of 161.39 sq. km (16,139 hectares). Its main function is to preserve and study representatives of flora and fauna listed in the Red Book of the republic, in particular, the Tien Shan brown bear, snow leopard, otter, porcupine, golden eagle, as well as many species of plants, such as anzur onion, kholmon, Suvorov onion, etc. It is located in the picturesque Ramit Gorge, near the city of Vahdat. It is located far beyond the Landfill's possible impact area.

*Almosi State Nature Reserve*. The reserve was established in 1984 on an area of 6,000 hectares. The purpose of establishing the reserve was to preserve the gene pool and restore the habitats of a valuable species of Tajikistan flora - *Ungernia Victor*, included in the Red Book of Tajikistan. The Almosi Reserve is located on the southern spurs of the Hissar Range, between the Karatag and Khonaka Rivers, at relatively low altitudes - up to 2,100 m above sea level. The integrated mountain agropastoral system in the Almosi Valley is officially recognized as an agricultural heritage site of global significance (Food and Agriculture Program of the United Nations (FAO) on July 8, 2025).

The Reserve is located at a distance of more than 50 km from the Landfill; mutual impact is not expected.

*Hissar Historical and Cultural Reserve*<sup>95</sup>. Hissar Fortress is a historical and architectural monument with the ancient history and archeology of the Hissar Valley. Here are presented traditional economic activities of the Tajiks (agriculture and cattle breeding); traditional crafts and works of artisans (wood carving, blacksmithing and metalworking, weaving and embroidery), traditional housing of the Tajiks of the Hissar region and its furnishings, a traditional Tajik wedding. The Reserve is located at a distance of about 40 km from the Landfill, outside its impact area.

<sup>94</sup> <https://ru.wikipedia.org/wiki/Рамит> Romit Nature Reserve

<sup>95</sup> [https://elint.kunstkamera.ru/catalog/gissarskij\\_istoriko\\_kulturnyj\\_zapovednik](https://elint.kunstkamera.ru/catalog/gissarskij_istoriko_kulturnyj_zapovednik)

*Shirkent Historical and Natural Park* (Tajik: Borykoreiy Tabiya Shirkent)<sup>96</sup> is a national park of Tajikistan, located in Tursunzade district, in the basin of the river with the same name, on the southern slopes of the Hissar Range. The monument of inanimate nature unites about 40 unique objects related to the following categories: geological, hydrological, glaciological. It is located far beyond the Landfill's possible impact area.

*The Kondara Gorge*<sup>97</sup> *Important Bird Area (IBA)* is located in the Kondara River Gorge in the southern spurs of the Hissar Range, 36 km north of Dushanbe. The IBA list of birds includes 146 species from 11 orders and 44 families. Of these, 34 species are sedentary, 87 are nesting, 28 are migratory and 20 are wintering. In addition to birds, another 1,800 species of animals (including invertebrates) have been recorded in the IBA. It is located outside the Landfill's impact area.

#### 5.1.8.2 Landscapes

The Project area is located at the foothills of the Hissar Range, and its dominant landscape features are hills and adyrs (**Figure 9**). The Landfill is considered as an anthropogenic landscape microstructure formed as a positive relief form. The undulating foothills are covered with sedge meadow grass and ephemeroïd couch grass with an admixture of pistachio, rose hips and ephemeroïd tall grass on dark gray soils. Ravines and mudflow thalwegs are widespread. The hills and adyrs adjacent to the landfill are devoid of shrub and tree vegetation and forests. In this regard, intense precipitation and torrential rains cause soil erosion, form mudflows and deepen their bottoms. Grassy pastures are used by the population for grazing cattle in the immediate vicinity of the Landfill.



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<sup>96</sup> [https://www.liveinternet.ru/journal\\_proc.php?action=redirect&url=http://www.tajik-gateway.org/index.phtml?lang=ru&id=4826](https://www.liveinternet.ru/journal_proc.php?action=redirect&url=http://www.tajik-gateway.org/index.phtml?lang=ru&id=4826)

<sup>97</sup> <https://datazone.birdlife.org/site/factsheet/kondara-gorge>



Photo by E&S Consultant, May 2025

**Figure 9. Landscapes and grazing in the area of the Landfill**

### 5.1.8.3 Flora

The surrounding area and the adjacent terrain are located in the ephemeretum belt (ephemeral deserts) and partly in the lower strip of desertified low-grass ephemeroïd semi-savannas with fragments of shiblyak (thickets of drought-resistant shrubs). The grass stand consists mainly of ephemerals and ephemeroïds (bulbous bluegrass, desert sedge, three-inch aegilops, sherokhov's ribbon-like awn, etc.). The study area is located in a landscape with rolling foothills covered with sedge meadow grass and ephemeroïd couch grass with an admixture of rose pistachio and ephemeroïd tall grass on dark gray soils. The vegetation of the area is characterized by a stormy, short-term (ephemeral) spring growing season, timed to coincide with the season of optimal combination of heat and moisture. Natural vegetation has been preserved only in undeveloped areas around the landfill.

There are four settlements located at different distances around the landfill, where fruit and ornamental trees are widely represented: apricot, peach, quince, pomegranate, mulberry, pistachio, walnut. In addition, residents plant various vegetable crops in their garden plots.

During the survey of the territory around the landfill, the E&S Consultant recorded the following main plant species: *Silybum marianum* (L.) Gaertn, *Hordeum bulbosum* L., *Hordeum leporinum* Link., *Matricaria chamomilla* L., *Rumex crispus* L., *Centaurea iberica* Trevir. Ex. Spreng, *Conium maculatum* L. The following plant species were recorded on the territory of the landfill: *Solanum tuberosum* L., *Cucúrbita pepo*.

Representatives of 11 botanical families grow on the territory of the municipal solid waste (MSW) landfill in Dushanbe and in its immediate vicinity. **ANNEX 3** contains a list of established species with abundance characteristics, grouped by families.

### 5.1.8.4 Fauna

Only 14 species of mammals<sup>98</sup> have been registered in the residential sector and urban landscape of Dushanbe city and its environs. Of the rodents, 5 species form a stable and

<sup>98</sup> The First Encyclopedia of Dushanbe, 2004 / Collective monograph. 139 p., Edited by Dinorshoev M.D.

numerous population: the Turkestan, gray and plate-toothed rats, house mouse, and oriental mole vole. During the survey of the landfill, 33 rodent specimens were registered - shrews, wood mice, common voles, while the tamarisk gerbil and long-eared hedgehog are rarely encountered. In recent years, the number of the Turkestan rat has increased sharply in Dushanbe region. The grey rat has recently appeared here<sup>99</sup>, which has filled not only the landfill area, but also basements, garden plots, and utility buildings in Dushanbe. The holes discovered to the east of the landfill suggest that foxes or jackals inhabit this area.

Residential and commercial buildings are used as shelter by several species of bats: the common pipistrelle, the whiskered bat, the late bat, the white-bellied bat, the broad-eared bat, among which the common pipistrelle is widespread and numerous.

The diversity of bird species varies depending on the season. In autumn and spring, more than 50 species of migratory birds migrate through the region, nesting in Kyrgyzstan, Kazakhstan and Western Siberia. In winter, a flock of wintering birds is formed, arriving from October - November and flying away from mid-February to the first ten days of May. More than 130 species of birds from 385 taxa, characteristic of the entire Republic of Tajikistan, permanently live in the vicinity of Dushanbe. Rock pigeons, small and common turtle doves, collared turtle doves nest everywhere. Scops owls and white-winged woodpeckers nest in the hollows of old trees (especially plane trees). On the walls of ravines and in the slopes of hills, a large number of holes-nest of rollers or golden bee-eaters are noted. The orchards are home to nesting magpies, great tit, long-tailed shrike, golden oriole, blackbird, myna, tree sparrow, and Indian and Spanish sparrows.

Of the avifauna representatives (**Figure 10, ANNEX 4**), 630 birds, 62 species and subspecies belonging to 7 orders and 19 families were counted during the spring survey of the Landfill (4 – 6 of April and 16 – 17 of May 2025). According to the nature of their stay, they are divided into: sedentary - 16, migratory - 11, migratory-nesting - 20, wintering - 14, vagrant - not encountered. 8 species from the IUCN list, 21 CITES species and 8 species from the Red Book of the Republic of Tajikistan were registered. Representatives of the order Passeriformes (52.85%), birds of prey (26.34%) and Columbiformes (16.50%) turned out to be dominant in the area of the landfill and its environs. The remaining orders were so few in number that they were classified as subdominant (chicken, charadriiformes, owl-like birds and crustaceans). By the number of species occurrence by orders: passerines - 26 species, birds of prey - 24 species, charadriiformes, columbiformes and coraciiformes - 3 species each, owl-like birds - 2 species and chickens - 1 species.

Of the 47 species of reptiles recorded in Tajikistan, the following are found in local buildings, ravines and gullies in the city's outskirts: the Caspian gecko, the patterned snake, the blunt-nosed viper, the Turkestan naked-toed gecko, the Turkestan agama and the long-legged skink. Of the reptiles, only the steppe tortoise (8 individuals, April 4–5) was recorded at the site; it has the status of VU according to the IUCN and is included in the Red Book of the Republic of Tajikistan. Also, two individuals of each steppe agama and yellow-bellied toad were found. Of the amphibians (according to literary data), the green toad may inhabit here.

In Dushanbe and its environs there are more than 300 species of insects, mainly cicadas, psyllids, aphids, mealybugs, scale insects, bugs, beetles and butterflies. In recent years, there has been an increase in the number of blood-sucking insects, including the anopheles, a carrier of malaria, and the kuliks (urban mosquito), a carrier of infectious diseases in humans and animals.

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<sup>99</sup> The grey rat has been found in the vicinity of Giprozemgorodok in June 2003

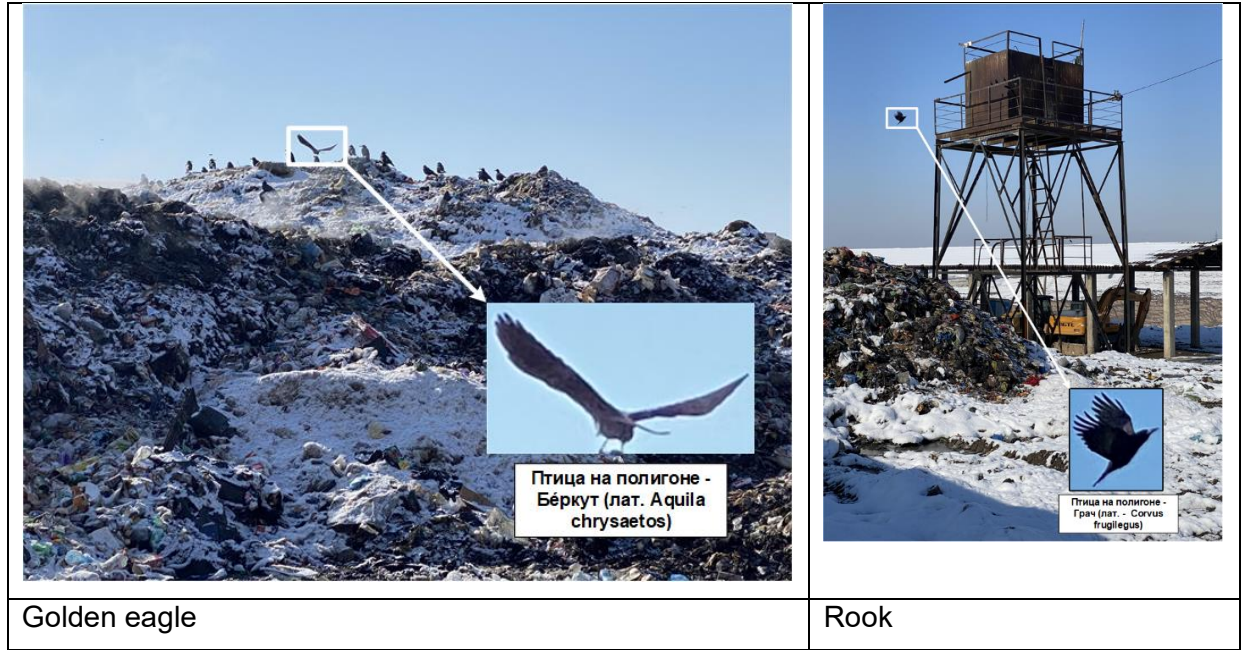


Photo by E&S Consultant, March 4, 2025

**Figure 10. Birds at the Landfill**

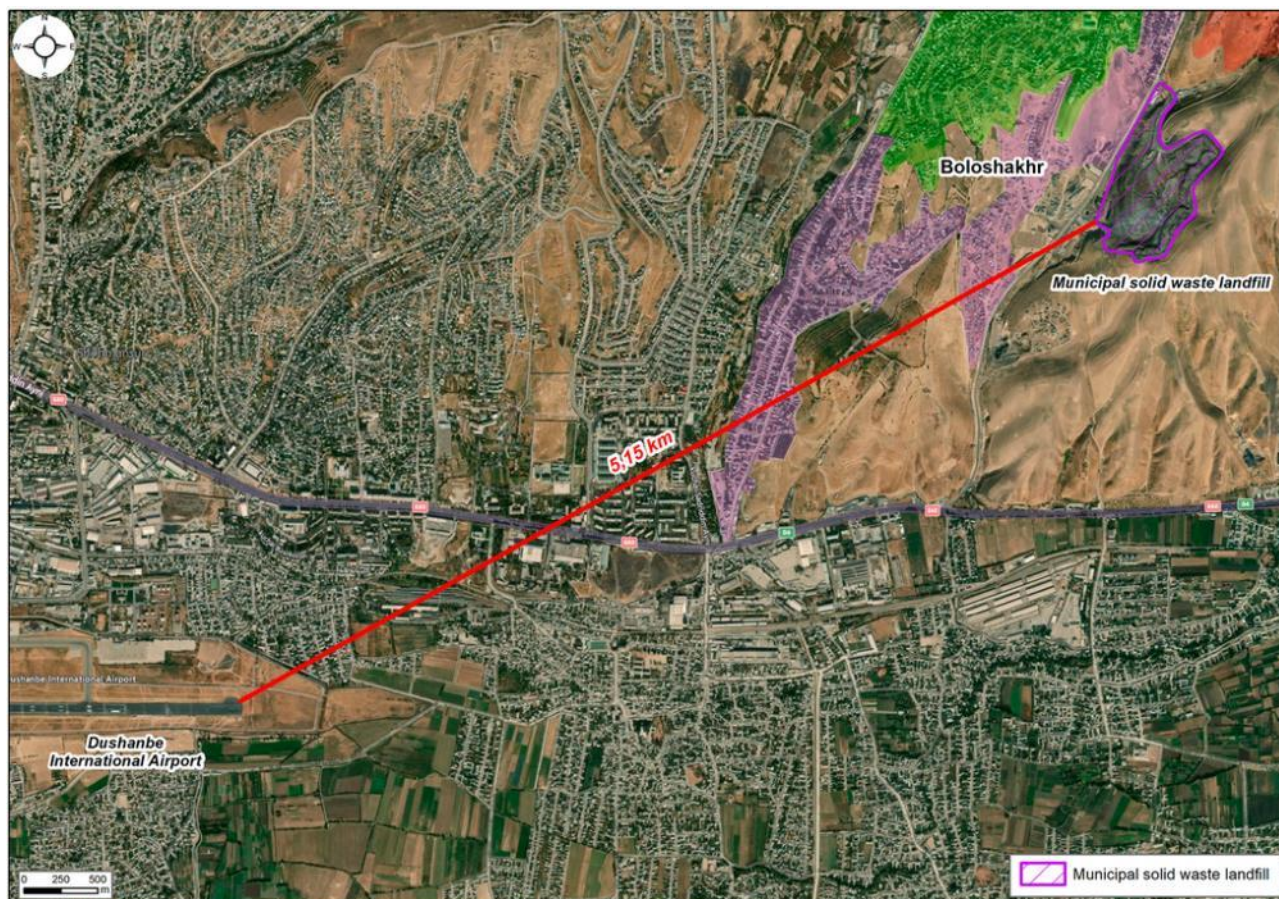


Photo by E&S Consultant, March 4, 2025

**Figure 11. Tiger Central Asian Shepherd puppy**

**5.1.8.5 Ornithological danger, risk levels and approaches to their reduction**

As part of the ESIA Scoping, a large concentration of birds, including birds of prey, was found at the solid waste landfill in Dushanbe. Such a concentration of birds in the area of the landfill may create hazards and risks for Dushanbe International Airport, located at a distance of 5 km (Figure 12). The airport has a runway of 3,112 m. In 2024, Dushanbe International Airport JSC served 2 million 338 thousand passengers, of which 1 million 161 thousand were arriving passengers and 1 million 177 thousand 442 were departing passengers.



Prepared by E&S Consultant based on open-source data

**Figure 12. Mutual location of the landfill and Dushanbe airport**

World experience in the development of civil aviation demonstrates that bird concentrations near airports create an ornithological hazard; and the levels of risks associated with it can be very high, and in some cases have led to catastrophic consequences. For each airport, it is necessary to assess the risks associated with ornithological hazard, which will directly depend on the proximity of facilities that attract birds (including solid waste landfills) and the number of birds at these facilities. Some approaches and recommendations are briefly summarized below:

1. In 2024, the Combined Aerodrome Safeguarding Team under the UK Civil Aviation Authority issued a document, "Aerodrome safeguarding Advice Note"<sup>100</sup>, which explains in detail the risks associated with the proximity of bird hazards to aircraft and, in particular, makes the following provisions and recommendations:
  - 1.1. Both man-made and natural landscape sites outside the airfield can attract wildlife to the airfield. These include: **waste disposal sites**; sewage treatment plants; building sites; drainage systems; reservoirs; gravel pits; coastal areas; rivers and estuaries; forests; and agricultural land;

<sup>100</sup> "Aerodrome safeguarding Advice Note" Combined Aerodrome Safeguarding Team under UK Civil Aviation Authority", 2024 - <https://www.caa.co.uk/media/0vjkbyeh/cast-advice-note-3-wildlife-hazards-around-aerodromes-april-2024.pdf>

- 1.2. For landfills, risks are associated with specific bird species and the potential to provide food for large numbers of scavenging birds (e.g. gulls, jackdaws, starlings, pigeons, raptors);
- 1.3. In international practice, the bird hazard protection zone is defined by the International Civil Aviation Organization (ICAO) as a radius of 13 km around the aerodrome reference point (ARP). Most birds use airspace close to the ground, with most bird strikes occurring at altitudes below 2,000 feet. An aircraft performing a standard approach to an airport enters this zone at a distance of approximately 13 km from the runway. Within this zone, aerodrome operators are required to conduct an inventory of sites that attract wildlife within a specified radius around the aerodrome, with particular attention to sites located near the airside and approach and departure corridors;
- 1.4. To decide on the possibility of placing facilities and the necessary measures, it is necessary to conduct a risk assessment, taking into account the location and distance of the facilities from the aerodrome, the presence of other wildlife sites on the territory and the width of the aircraft movement corridors at each specific aerodrome.

Direct bans on the placement of facilities posing an ornithological hazard at a certain distance from airfields exist in the legislation of many countries:

2. The Russian Federation has a "Regulation on the Aerodrome Territory"<sup>101</sup>. For airfields with a runway (RWY) from 2,600 m to 3,200 m long (and a strip width of 45 m), the airfield is assigned class B. In this case, the recommended minimum distance from the aerodrome control point to the landfill is 10 km if the facility (in this case, the landfill) is equipped with a bird repelling system and 7.5 km if the facility is equipped with an automated integrated bird detection and repelling system.
3. India has developed the Municipal Solid Waste Management Guidelines of the Office of Civil Aviation or Air Force (2016) which stipulates a minimum distance of 20 km between an airport and a solid waste landfill; in special cases the distance can be reduced (between 10-20 km); however, this requires obtaining a No Objection Certificate from the Civil Aviation Authority or the Air Force, as the case may be.
4. The Republic of Kazakhstan has "Rules for issuing permits for activities that may pose a threat to the safety of aircraft flights". According to these Rules, "it is prohibited to locate food waste disposal sites, construction of fur farms, slaughterhouses and other facilities that attract and cause mass gatherings of birds closer than 15 km from the aerodrome control point (ACP)".
5. In the Republic of Uzbekistan, the Civil Aviation Agency under the Ministry of Transport of the Republic of Uzbekistan issues permission to carry out activities that may pose a threat to flight safety. Obtaining permission is necessary for the design, construction, expansion, reconstruction and technical re-equipment of buildings and structures, facilities that lead to a mass concentration of birds and wild animals (rodents), located within the boundaries of air approach strips, as well as outside the boundaries of air approach strips within a radius of 15 km from the aerodrome control point.

The next stage will involve detailed consultations of the Designer and the E&S Consultant with the airport management regarding the assessment of risks associated with the ornithological hazard caused by the proximity of the solid waste landfill.

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<sup>101</sup> [https://www.consultant.ru/document/cons\\_doc\\_LAW\\_284306/ee045a6e4cab71b5aa0ede2c00b5b7573ae0c668/](https://www.consultant.ru/document/cons_doc_LAW_284306/ee045a6e4cab71b5aa0ede2c00b5b7573ae0c668/)

### 5.1.8.6 "Positive" function of the landfill as a specific biocenosis

Field studies at the landfill confirmed that within a radius of 1.5 km from the active MSW cells, xero- and mesophytic communities have been preserved, serving as representative areas of the foothill Hissar Valley; two endemic species of flora and one endemic species of fauna have been noted here, as well as at least three protected taxa, including the steppe tortoise *Testudo horsfieldii* (VU, Red Book of the Republic of Tajikistan).

An important migration corridor for birds passes through the area: during the study period, 62 species from seven orders were recorded here, including eight species from the IUCN lists and the Red Book of the Republic of Tajikistan; passerines and birds of prey dominate.

Presence of a permanent source of food waste forms a kind of trophic "attraction point" for rooks, jackdaws, mynas, seagulls and black kites; some of these birds use the landfill for overnight stays or feeding during periods of snowfall. The earthen slopes of the technical cells and fresh ravines formed during the construction of the fence have already been inhabited by rollers and European bee-eaters, and granivorous passerines feed nearby. A small number of representatives of the gull family remain at the landfill at night, and black kites use trees near the landfill in nearby villages for overnight stays. Several thousand rooks and common jackdaws, mynas, living and spending the night in Dushanbe during the winter, fly to the landfill every day in search of food from the incoming waste. The landfill is a stable food niche for saprophages and birds of prey. In winter, the garbage "canteen" increases the survival rate of black kites and spotted eagles, which indirectly supports the ecological function of the ecosystem's orderlies. Slopes and man-made slopes, if left untouched after reclamation, can serve as artificial "banks" for nesting colonial birds.

However, these advantages are unstable and do not compensate for the long-term damage from habitat degradation. Landfills have often caused poisoning and death of wild animals and rare species, as well as a source of mutations. According to literary sources<sup>102, 103</sup>, as a result of constant presence on and in the vicinity of a landfill, some birds can breed here. Chicks can inherit the habit of feeding on garbage from their parents. Ornithologists call this an **acquired instinct**, which can then become conditioned and remain in the next generations. Thus, a landfill paradoxically combines a negative impact on natural habitats and a local "reception" function for individual trophic groups. Landfill reclamation helps not only to preserve soil and water bodies but also protects animals from mutations and poisoning.

## 5.2 Socio-economic baseline

The Landfill is located in Rudaki district (**Figure 1, Figure 13**, but is subordinate to Dushanbe hukumat. All nearby settlements belong to Rudaki district, Guliston and Rohati jamoats.

### 5.2.1 Rudaki district:

The district covers an area of approximately 1.8 thousand km<sup>2</sup>. The district includes 3 urban-type settlements (UTS) (Somoniyon, Navabadskey, Mirzo Tursunzoda) and 13 rural jamoats. The administrative center of the district - the urban-type settlement of Somoniyon - coordinates the work of jamoats through rural hukumats and specialized departments (finance, education, health care).

<sup>102</sup> <https://www.mk-mosobl.ru/social/2023/04/15/svalki-delayut-dikikh-zhivotnykh-lenivymi.html> Landfills make wild animals lazy.

<sup>103</sup> Faunistic analysis of the small mammal population of the solid waste landfill of the Chamzinsky district and the Saransk solid waste landfill, Andreychev A.V., Kuznetsov V.A. / Alexey Andreychev, 2009.

Rudaki district is considered to be one of the largest districts of the republic and has 14 urban and rural communities where Tajiks, Russians, Uzbeks, Lakays, Kyrgyz and other peoples live. The district borders on the cities and districts of Varzob, Hissar, ShakhriNAV and Vahdat from the districts of republican subordination in the north and northeast, on Kubadiyan, Dostinsky, Khorasan and Yavan districts of Khatlon region in the east and south, and on Surkhandarya region of Uzbekistan in the west.

The permanent population of the district in 2023 was 404.8 thousand people. The population growth is 2-3% per year. The population dynamics is shown in the graph (**Figure 14**). In 2020, 52 settlements of Rudaki district were fully or partially incorporated into the city of Dushanbe<sup>104</sup>. This is reflected in the graph as a sharp decrease in the population of the district.

The population density is 238.1 people/km<sup>2</sup> (2023); the average housing availability is 10.1 m<sup>2</sup>/person. 83.4% of the population are rural residents, and 16.6% - urban residents.

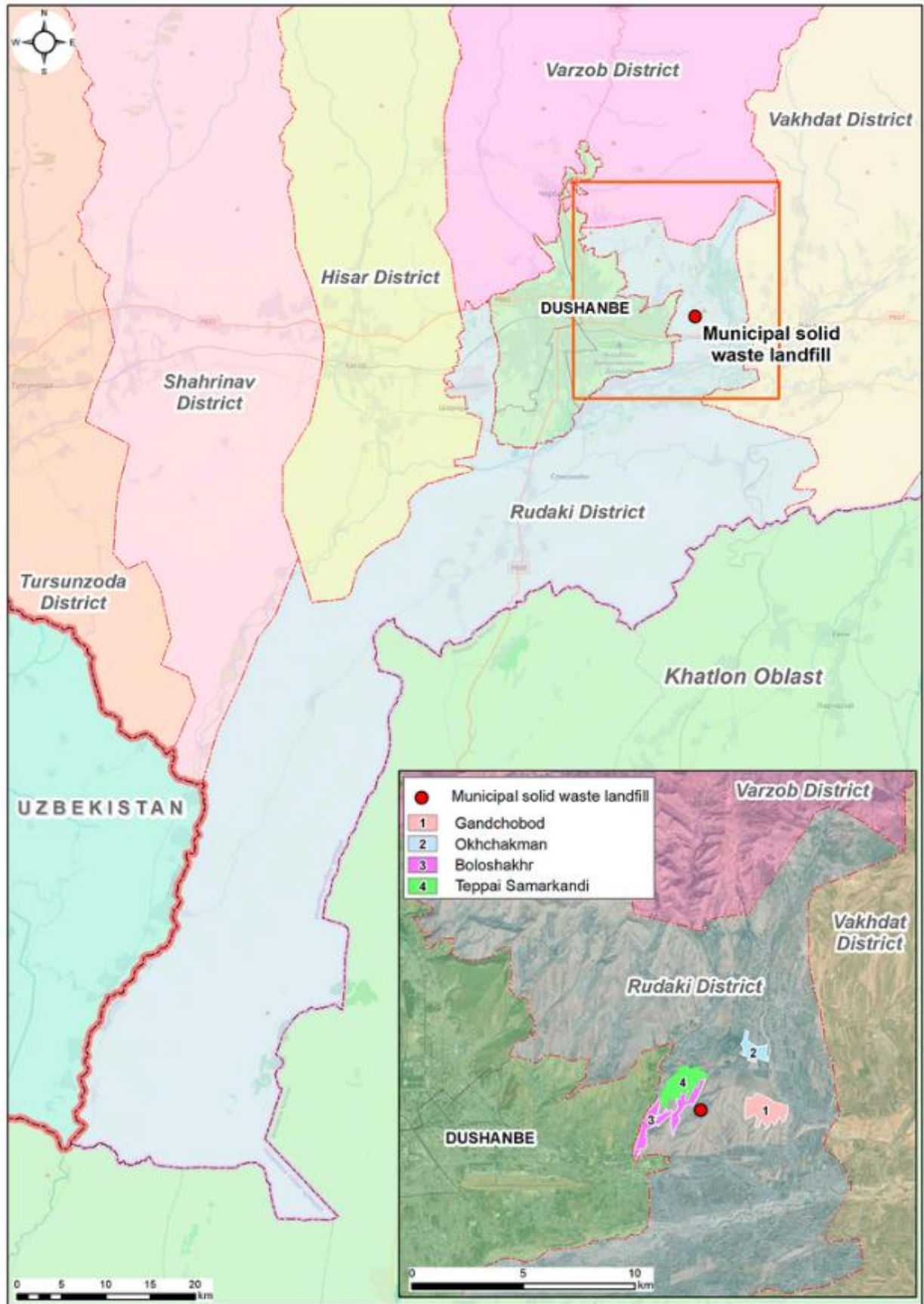
In 2023, 11,804 people were born in the district, or 29.5%. The number of deaths was 1,309, or 3.3%. The natural population increase, therefore, was 10,495 people, or 26.2%. It should be noted that the high natural population increase in the district has remained stable since 1991.

In 2023, 3,226 marriages and 442 divorces were registered in the district. This situation is typical for the district: since 1991, the divorce rate in the district has been 5 to 10 times lower than the marriage rate.

The main sources of income for the population are agriculture, small businesses, and remittances from migrant workers. In 2023, there were 15,600 employed people in the district. The average monthly salary was 1,605.09 somoni, significantly lower than not only the salary in the nearby capital (2,836.38 somoni) but also the national average (2,013.11 somoni).

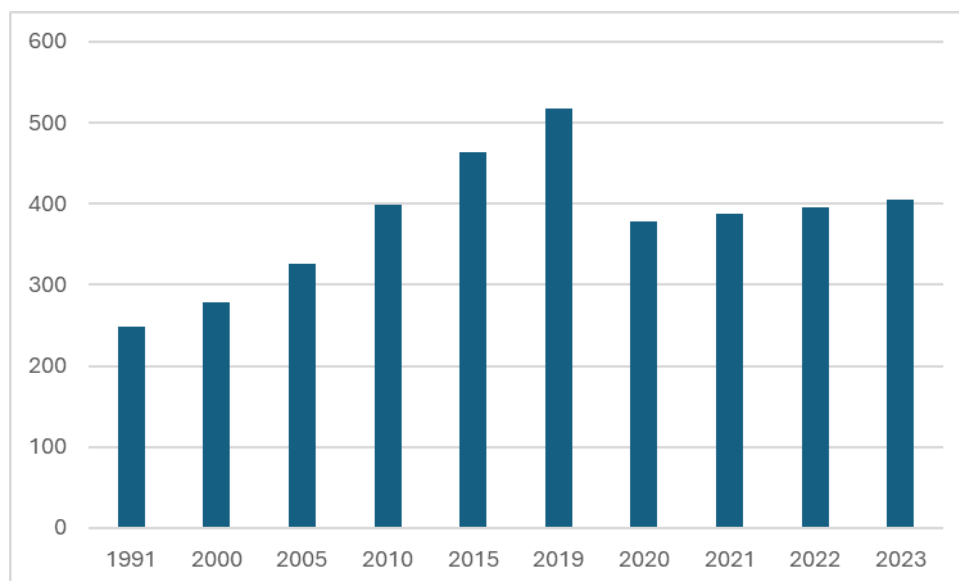
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<sup>104</sup> <https://asiaplustj.info/news/tajikistan/society/20191130/ni-k-selu-ni-k-gorodu-kak-raion-rudaki-stanovitsya-chastyu-dushanbe>



Developed by E&S Consultant based on open sources and information provided by Rudaki district hukumat

**Figure 13. Administrative division of the Project area**



**Figure 14. Dynamics of the permanent population of Rudaki district**

There are 25.6 thousand pensioners in the district (6.3% of the total population). The average pension is 337.27 somoni (4 times less than the average salary, also less than the average pension in the capital (468.82 somoni) and slightly less than the average pension in the country (370.61 somoni).

Food accounts for approximately 60% of household expenditure, followed by utilities, education and health care. Official unemployment is comparable to the national average ( $\approx$  1.8%), but the actual level is higher due to the large share of informal employment and seasonal migration. There are approximately 1,400 low-income families registered with social security agencies.

### 5.2.1.1 Economy

The annual retail turnover in the district is 1,905.6 million somoni (2023). In 2025, the district was allocated 130.6 million somoni in subventions from the republican budget. There are about 122 industrial enterprises producing construction materials, glass, paper and processing plastic. The volume of industrial production in 2023 amounted to 613 million somoni.

Agriculture is one of the leading areas in the district. Cultivated areas occupy over 21,200 hectares, including 13,845 hectares of grain crops, 109 hectares of cotton, 1,563 hectares of vegetables, 37 hectares of melons, and 305 hectares of forage crops. The livestock population in 2023 was 79,415 heads. There are 5,031 dehqan farms, making the district the largest supplier of vegetables and grain for Dushanbe.

Retail turnover in actual prices amounted to 1,905.6 million somoni in 2023. The volume of sales of paid services to the population amounted to 64.8 million somoni, the volume of sales of household services - 9.8 million somoni.

In the urban and rural communities of Rudaki district, artisans are engaged in various professions and earn a living by exhibiting and selling their products. Skilled craftsmen work in the field of textile production from satin and adras, gulduzi, suzani embroidery, sheroz, skullcaps, handicrafts (kurokduzi), in the field of metal products, wood processing, jewelry, knife making, blacksmithing, comb making, wood carving, basket weaving, pottery, painting and other types of folk crafts.

### 5.2.1.2 Social infrastructure

Education: there are 153 day schools in the district, with approximately 105.7 thousand pupils and 4.4 thousand teachers. Healthcare: there is a central district hospital with 396 beds and 31 paramedical health stations; 352 doctors and 1,018 mid-level medical workers work here.

The “Victory” cultural and entertainment park in Rudaki district was built in 1970 for the 25th anniversary of the Victory in the Great Patriotic War against fascism on 3.2 hectares of land. It has been renovated since the beginning of 2021 and has a tiled arch, a fountain, a modern entrance, a sports ground (football), a chess field, a tennis court, 3 attractions and a spacious amphitheatre building.

According to the Ministry of Internal Affairs, 734 crimes were registered in the district in 2023.

### 5.2.1.3 Gender aspects

Women make up ~49% of the population but occupy only 0.5% of management positions. Men are more likely to work in construction or be labour migrants; women — on household plots, in trade, and in the public sector. The share of female school graduates entering colleges and universities has increased by 7 percent over 5 years.

## 5.2.2 Settlements in the Landfill area: general information

This section briefly describes Guliston and Rohati jamoats and four villages belonging to these jamoats and located in close proximity to the solid waste landfill (**Figure 15**):

- the villages of Boloshakhr (Guliston jamoat) and Teppai Samarkandi (Rohati jamoat), affected by the current activities of the Landfill, and
- the villages of Okhchakman (Rohati jamoat) and Ganjobod (Guliston jamoat), which may be in the potential impact zone of the Landfill expansion project.

In terms of ethnic composition, the inhabitants of the villages in question are predominantly Tajiks, but in some there are also Russians and Uzbeks, which gives the local community a certain cultural and linguistic diversity. The language of everyday communication is Tajik; however, knowledge of the Russian language is also preserved, especially among older generations and mixed families. The Uzbek language is also present. The predominant religion is Islam, which reflects the traditional cultural and spiritual way of life of the local community.

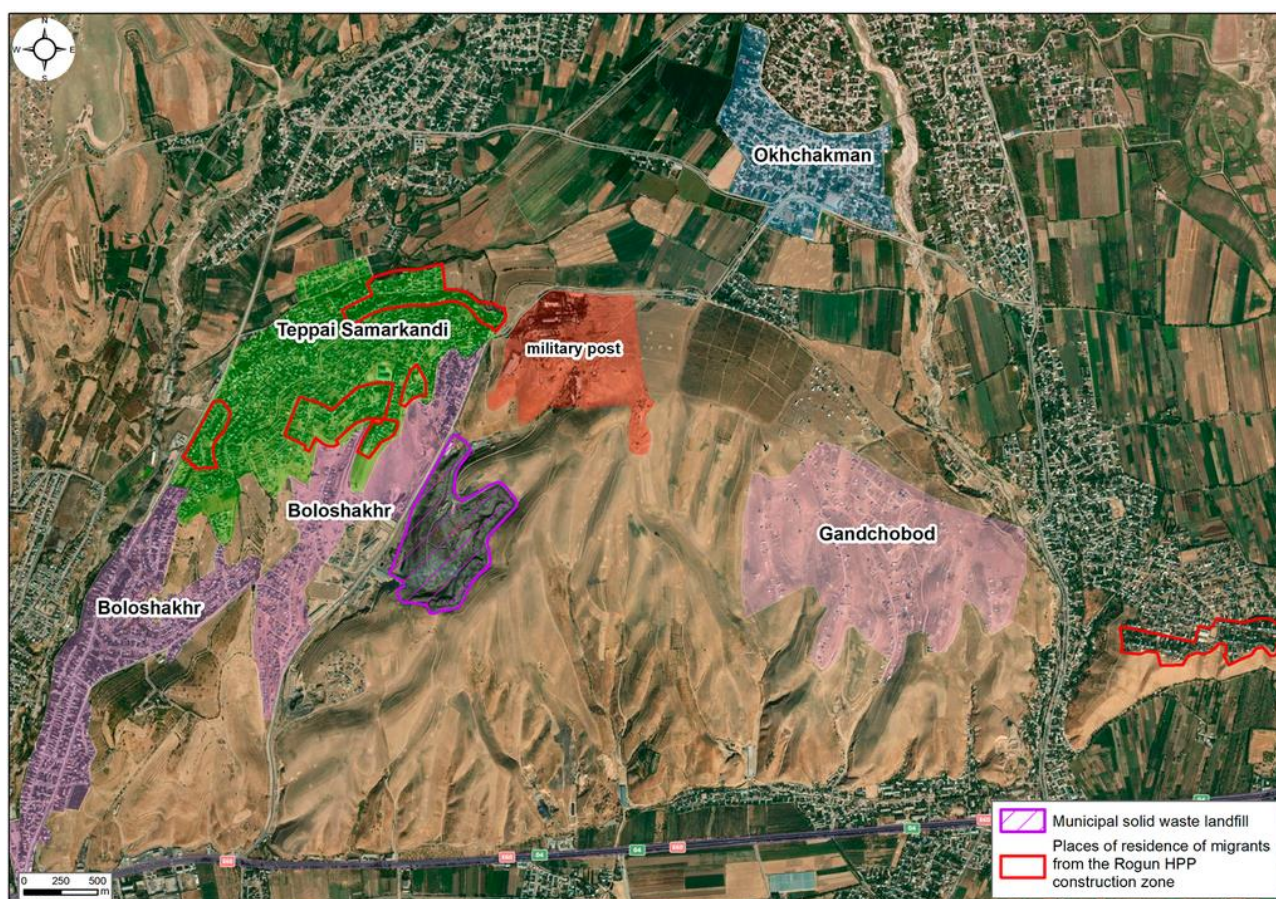
**Households** are the basis of the rural economy and social structure. They provide not only for the daily life of residents, but also for participation in agricultural activities, raising children, caring for the elderly, as well as in public initiatives aimed at the development of the village. Each household is a separate socio-economic unit, usually consisting of members of one or more related families living together and running a common household.

Migration processes are an important demographic feature: all four villages have a significant number of labour migrants. Traditionally, the main direction of labour migration was Russia, but in recent years there has been a tendency to expand the geography - more and more migrants are also heading to European countries. Migrants working abroad regularly send remittances to their families, which significantly supports the standard of living in the village.

There are no pasture lands on the territory of all 4 villages under consideration, which significantly limits the possibilities for large-scale livestock farming and requires more rational use of other types of land resources. The land fund is represented by the following main categories:

- Arable land - used for the cultivation of agricultural crops, as the main source of plant products;
- Rainfed lands are non-irrigated areas suitable for growing crops that are resistant to drought conditions;

- Lands intended for horticulture and viticulture play a key role in the rural economy, providing both food and income functions;
- Household plots - provided to households for personal use, including growing vegetables, fruits and keeping small livestock;
- Presidential lands (in the village of Okhchakman) - allocated within the framework of state programs and can be used for various purposes, including support for socially vulnerable groups of the population.



Prepared by E&S Consultant based on information provided by Rudaki District hukumat and Consultant's own research

**Figure 15. Settlements located in the immediate vicinity of the Landfill. Places of residence of migrants from the Rogun HPP construction zone**

It is important to note that in 2009, Rohati jamoat accepted migrants from the Rogun Hydroelectric Power Plant construction zone. The areas of compact residence of the "Rogun people" (or, as the locals say, "Roguni") are marked on the map below (Figure 15).

**Gender distribution** in villages is influenced by economic and social factors specific to rural areas of Tajikistan. In recent years, there has been a steady trend of outflow of able-bodied men, especially young people, to work in cities and abroad, in particular to Russia and European countries. This leads to the fact that mostly elderly men, as well as women of all ages, remain in the village. Women, as a rule, perform a wide range of duties: they run the household, look after children, elderly parents and other family members, and are engaged in garden plots and small-scale agricultural work. Their contribution to the life of the village is significant but often remains outside the formal economy. Certain difficulties are also created by the lack of preschool institutions and home care services. This limits the opportunities for early development of children, and also hinders employment, especially for women who have to independently care for and look after children and elderly relatives at home.

### 5.2.3 Guliston jamoat

Guliston is a suburban jamoat with its center in the village of Shakhriston; it includes 13 villages.

There are 28 industrial enterprises in the jamoat (bricks, sand and gravel, glass, paper, plastic, vegetable oil). Agricultural lands make up 660 hectares of irrigated land; there are 300 dehqan and 5 subsidiary farms; fish farming is well developed.

As of January 1, 2025, there were 34,233 residents (4,983 households) in the jamoat. Income is generated by agricultural products, small businesses and migrant remittances; 265 families are officially registered as low-income. Employment is focused on agriculture, fisheries, construction. The area is characterized by high migration.

Men are engaged in hard and better-paid work; women – in housework and low-paid agricultural work. The number of female students is steadily growing.

There are 7 schools, 2 rural health centers, 5 first aid posts, 2 libraries, 2 sports grounds in the jamoat.

#### 5.2.3.1 Boloshakhr village

##### *General information. Demography*

The village of Boloshakhr is located in Rudaki district of the Republic of Tajikistan and is part of Guliston jamoat. The village is in close proximity (2 km) to the city of Dushanbe, which provides good transport accessibility and communication with administrative, educational and medical institutions of the capital. Boloshakhr is located at a distance of 22 km from the district center (urban settlement of Somoniyon) and 2 km from the center of the jamoat - the village of Shakhriston. This geographical location creates favorable conditions for access of the population to the services and infrastructure of larger settlements.

The village has an interesting historical background: it was founded in 1950-1955, and its original name was Karagachak, which means "elm" (a type of tree). By 1961, there were only 10 households in Boloshakhr, but since then the village has grown and developed significantly. Administrative management is carried out through the executive bodies of Guliston jamoat, which are responsible for issues of local government, social development, land relations and interaction with district authorities.

According to the municipal passport, the population of the village of Boloshakhr as of January 1, 2025, was 3,222 people, 1,550 out of whom are women. The main ethnic group is Tajik, which reflects the demographic structure of most rural areas in southern Tajikistan. The official religion is Islam, the language used is Tajik.

There are 518 households in the village of Boloshakhr. The population of the village of Boloshakhr is mainly engaged in agriculture, which remains the main source of income and food self-sufficiency for most households. Almost all household plots are actively used for vegetable growing. Residents grow tomatoes, cucumbers, potatoes, as well as various greens, which allows them to provide families with food and, if there is a surplus, sell them at local markets. Large cattle are usually kept in yards, and the nearest rural pasture area is used for grazing. At the same time, small cattle and poultry are kept exclusively in farmsteads, as part of a closed cycle of household farming.

##### *Local economy, income, expenses*

Despite its rural character, the village of Boloshakhr has developed an industrial base and plays a significant role in the local economy of Rudaki district due to the combination of industrial facilities and farms.

According to information received from the head of the village, the following enterprises are functioning on the territory of Boloshakhr <sup>105</sup>:

- 7 brick factories, providing production of building materials for both local population and foreign markets. These enterprises create jobs and promote development of small and medium businesses;
- 1 plastic recycling plant, which indicates the presence of elements of modern recycling and environmentally significant production. The enterprise is involved in the collection, sorting and recycling of plastic waste, reducing the burden on the environment;
- 14 dehqan farms working in the agricultural sector. They grow crops, raise livestock, and sell their products at local markets. Farms complement traditional forms of subsistence agricultural practices and play an important role in food security.

The income of the residents of Boloshakhr village is formed from mixed sources, while the level of stability of earnings remains limited. The main income consists of:

- Wages, mainly at government and municipal institutions where part of the population is employed, including in education, health care and administrative structures;
- Remittances from migrant workers who have gone to work in the cities of Tajikistan, Russia and other countries. These funds play an important role in maintaining the standard of living of families who remain in the village.

Seasonal unemployment is typical for Boloshakhr. It is especially acute in the winter and off-season periods, when employment in agriculture and construction decreases. Many working-age residents are forced to look for part-time jobs or temporarily leave the village.

Major expenditures of the population include:

- Buying food;
- Utility costs (water, electricity, heating);
- Healthcare and purchasing medicines;
- Transportation costs;
- Purchasing feed and livestock maintenance supplies;
- Expenses for children's education and school supplies.

#### *Residential development, social and engineering infrastructure*

The village of Boloshakhr has a traditional rural development, represented by individual residential houses with garden plots. The houses are located along the main streets; many plots are actively used for agricultural needs - especially vegetable growing and livestock farming. The development is mainly low-rise, with a relatively dense placement in the central part of the village and more sparse - on the outskirts.

The social infrastructure in the village is developed at a basic level. At the moment, the following is functioning in Boloshakhr:

- 4 grocery stores providing the population with basic everyday goods;
- There are no post offices or ATMs in the village, which creates certain difficulties in obtaining financial and postal services. Residents have to go to neighbouring

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<sup>105</sup> This information will be clarified and supplemented at the next stage, within the framework of the full ESIA.

settlements (for example, to the village of Shakhriston or the urban-type settlement of Somoniyon) to receive money transfers, send correspondence or withdraw cash.

**School and preschool institutions.** There is one comprehensive school No. 166 (Figure 16) in the village, which is the only primary and secondary education institution for children in the village. About 900 pupils study at the school, and classes are held in three shifts, which indicates a significant overload of the educational process and a shortage of classrooms. The educational process is carried out in two buildings:

- The old school building, built in the 1950s as a primary school, is now used for teaching lower grades. It was originally designed for 4 classrooms and does not meet modern sanitary and educational requirements;
- The new school building, designed for 17 classrooms, was a significant improvement. Of these, 6 classrooms were built in 2024 by the local community on the site of former cattle shed. This demonstrates the high level of self-organization of the population and the desire to improve the educational environment. However, the school remains overcrowded, and its living conditions are unsatisfactory: concrete floors; lack of natural and artificial lighting; cramped classrooms: children are forced to sit three at a desk.

There is no kindergarten in the village, which limits preschoolers' access to organized education and makes it difficult for parents, especially women, to find employment.

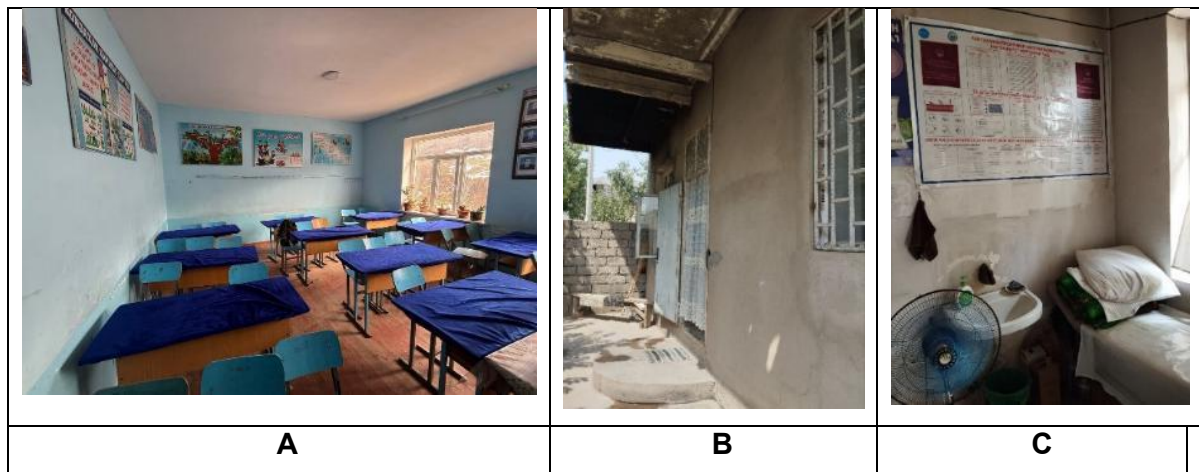


Photo of the E&S Consultant, 2025

**Figure 16. Boloshakhr village: School No. 166 (A) and medical centre (B, C)**

**Medical care** in the village is provided by one medical centre (Figure 16), which operates in extremely limited conditions. This building was previously used as a warehouse. It was donated by a local resident free of charge for the purpose of creating a medical centre, which demonstrates high civic responsibility and the desire of the community to provide basic medical access to villagers.

For 30 years, the medical centre has had one nurse who has provided primary care, treated patients with acute and chronic complaints, performed simple procedures and, where possible, advised on preventive treatment. Despite limited resources, she performs her duties conscientiously and remained the only available specialist in the village, until 2025 when another nurse was hired.

According to the observations of the medical worker serving Boloshakhr village, the village currently faces an increase in the number of visits with a number of common diseases typical for rural areas and current season. The following categories of diseases are most frequently recorded:

- Intestinal infections accompanied by diarrhea, nausea, vomiting and abdominal pain.
- Elevated body temperature, especially with children and the elderly - as a manifestation of colds, viral or infectious diseases.
- Hypertension – a persistent or recurring increase in blood pressure, especially with people over 50 years of age.
- Pregnant women regularly visit the medical center for consultations and basic monitoring, but the lack of specialized care limits the ability to safely manage pregnancy.

### *Civic activism, vulnerable groups*

There is an effective informal self-government in Boloshakhr village. The key public leaders are: the chairman of the mahalla; the mullah of the mahalla. They actively participate in the life of the village, decide on issues of improvement, sanitary condition of the area, assist in solving everyday problems of residents. Under their leadership, initiatives are regularly held to clean the streets, repair infrastructure facilities, plant greenery and other public events. In addition, the mahalla leaders provide support to low-income and vulnerable families, facilitate the organization of collection of aid and involve residents in participation in joint charitable and social initiatives.

Vulnerable groups in Boloshakhr include:

- *large families*: due to the large number of children and limited sources of income, such families often experience financial difficulties, especially in terms of food, medical care, school expenses and clothing;
- *single women with young children*: with no childcare facilities and limited access to stable work, some are forced to leave their children in the care of neighbours or relatives in order to earn a living themselves. There are cases of women going to work at the dump collecting recyclable materials;
- *housewives* generally lack economic independence, which can lead to additional difficulties. If men migrate, women remain responsible for the household and childcare. However, due to limited access to education, employment and resources, their opportunities to earn a living or participate in economic life are severely limited. Women may be forced into low-paid work without social benefits, such as waste collection and recycling.

### 5.2.3.2 Ganjobod village

#### *General information. Demography*

The village of Ganjobod occupies a favourable geographical location - near the main highway Dushanbe-Vahdat, which ensures good transport accessibility and communication with major administrative and economic centers of the region. The village is located on the border of Guliston and Rohati jamoats. This location contributes to sustainable socio-economic contacts with neighbouring areas and facilitates access to external resources and services.

According to the municipal passport, as of January 1, 2025, the population of the village of Ganjobod was 2,264 people. Of these, 1,025 are women and 1,226 are men. The ethnic composition is predominantly represented by Tajiks, but representatives of the Russian community also live in the village. According to data as of January 1, 2025, 87 residents of Ganjobod are outside the country as labour migrants. Most of them are men of working age. Additional sources of income are seasonal construction work and work as general labourers, especially in the warm season.

#### *Local economy, income, expenses*

There are 418 households in the village of Ganjobod. The village has its own specifics, which distinguishes it from traditional rural settlements of the district. The main factor determining the characteristics of employment is the lack of household plots and the predominance of multi-story residential buildings. Unlike other villages, where agriculture plays a leading role,

in Ganjobod residents are practically not engaged in agriculture and are forced to buy all food products in stores and markets. Due to limited opportunities for farming, a significant part of the population works in the service sector, trade, and in government agencies. Due to the proximity to the city of Dushanbe and the city of Vahdat, many residents go to work in these settlements every day, which makes Ganjobod a kind of suburban settlement with an urban employment model.

The village of Ganjobod is conditionally divided into two parts: one is located near the main highway Dushanbe-Vahdat, and the second is on a hill, near the Landfill. This geographical location affects the nature of employment and the type of economic activity in different parts of the village. There are no operating industrial enterprises or agricultural production facilities on the territory of Ganjobod, which is due to the lack of suitable land plots and the specifics of residential development. Nevertheless, small businesses are actively developing in the part of the village that is located near the Dushanbe-Vahdat highway. There are car washes, grocery and hardware stores, as well as several canteens. These small businesses provide jobs for part of the population and help meet the basic needs of residents and travelers.

Residents of Ganjobod village receive income from a variety of sources, reflecting the mixed nature of the local economy, which is primarily focused on the service sector and suburban employment. The main forms of income are labour activity in the private and public sectors, as well as small businesses. Part of the population is employed in local service enterprises. These facilities provide services to both local residents and transit clients, providing a stable, albeit often seasonal, income. A separate category of residents is employed in government institutions and receives official wages, which creates a basis for the financial stability of families. In addition, forms of individual entrepreneurship are actively developed in the village: some residents run their own businesses in trade, public catering or consumer services.

The expenditures of the population include the purchase of food, payment of utilities, expenses on health care, transport and education. In the absence of household plots, residents are almost entirely dependent on market sources of supply, which increases the share of food expenses in the family budget.

#### *Residential development, social and engineering infrastructure*

The village of Ganjobod has an atypical layout and development for a rural area: a significant part of the population lives in multi-story buildings, which brings it closer to suburban and semi-urban settlements. The street and road network includes sections along the highway and adjacent neighbourhoods, and the residential and public infrastructure is formed taking into account the high population density.

The main educational institution in the village of Ganjobod is secondary comprehensive school No. 48 (**Figure 17**). The school is located in a two-story, detached building, that was recently renovated, which improved the learning and living conditions for students.

The total number of pupils is 1,390, of which 634 are boys and 756 are girls. This indicates a high proportion of school-age children in the total population and emphasizes the importance of the institution for the local community. The educational process is provided by 52 teachers, of which 39 are women and 13 are men. The staff covers all key subject areas and plays an important role not only in teaching, but also in educational work with young people. There is no kindergarten in the village.

The main institution of the healthcare system in the village of Ganjobod is the Health Centre, located in a modern two-story detached building (**Figure 18**). The medical facility serves the entire population of the village and provides access to a wide range of primary health care. The Health Centre employs 8 doctors and 23 nurses, which allows for uninterrupted patient reception, and both planned and emergency medical procedures. The medical staff provides qualified outpatient care, conducts preventive examinations, consultations, and vaccinations in accordance with the National Immunization Schedule. On the second floor of the Health Centre building, there is a maternity hospital where women from the village and nearby

settlements give birth. After providing primary obstetric care, women in labour are sent to specialized maternity hospitals in Dushanbe or Vahdat for further observation and recovery. The Centre also performs various medical procedures, including intramuscular and intravenous injections, IV drips, and basic laboratory tests. The level of equipment and the availability of qualified personnel make the institution an accessible and functional link in the healthcare system in rural areas.



Photo of the E&S Consultant, 2025

**Figure 17. Secondary School No. 48, Ganjobod**



Photo of the E&S Consultant, 2025

**Figure 18. Health Center, Ganjobod**

According to the Ganjobod Village Health Center, the largest number of requests are related to several common diseases and conditions characteristic of the current climatic and living conditions. In summer, there is an increase in cases of heat and sunstroke, especially among the elderly and children. Associated dehydration conditions are also a common reason for seeking medical help. This is due to high air temperatures, insufficient fluid intake and the lack of adequate conditions for cooling the premises. Among chronic and acute diseases, the incidence of cardiovascular diseases remains high, especially among the elderly. High blood pressure, tachycardia and angina require regular monitoring and drug treatment. Intestinal infections accompanied by diarrhea, vomiting and elevated body temperature have also been recorded among children and adults. These cases may be related to the quality of drinking water, violations of sanitary conditions for storing food and insufficient hygiene. Particular attention is paid to the treatment and monitoring of children with fever and symptoms of acute respiratory infections, especially during periods of seasonal outbreaks.

In addition to those listed above, the following social infrastructure facilities are located on the territory of the village:

- Savings Bank No. 093 is a previously functioning financial institution. It is currently not operating, but the building is preserved, and it may be re-commissioned if there is demand and support from the banking system.
- The library provides the population with access to literature, educational materials and space for self-education and leisure.
- Six grocery stores provide the population with essential goods.
- Public transport stops - facilitate transport links with the cities of Dushanbe and Vahdat, as well as neighbouring settlements.

#### *Civic activism, vulnerable groups*

In the village of Ganjobod, there is a public council that plays an important role in the life of the local community. The council consists of 7 people and unites respected and authoritative representatives of the village, including the chairman of the mahalla, the local mullah, labour veterans and activists. The public council performs advisory and coordinating functions, promotes social cohesion, participates in resolving domestic and interfamily disputes, organizes collective initiatives for improvement and provides assistance to vulnerable groups of the population. The council actively interacts with local government bodies, educational and medical institutions, and also takes part in the discussion and implementation of initiatives aimed at improving living conditions in the village.

In the village of Ganjobod, vulnerable groups include:

- single women without permanent family or financial support (4 persons);
- disabled people in need of medical, social and infrastructural support, including access to medicines, an adapted environment, and support (12 persons);
- housewives: about 30% of women are not officially employed, which limits their economic independence and opportunities to improve their standard of living.

Women, as a rule, work in the sphere of trade, education, household services, and also work on a part-time basis. Such employment allows combining professional duties with the traditional role of housekeeping, caring for children and elderly relatives. At the same time, a positive trend is observed in the village: more and more young girls are striving to obtain higher education and are entering universities, including in the cities of Dushanbe and Vahdat. This indicates a growing desire for professional growth, broadening horizons and increasing the level of independence among women.

*Labour migration:* 35-40% of young people have left the country to earn money, primarily to Russia and other regions, which creates a deficit of the working-age population and puts a burden on the remaining families, especially in terms of caring for the elderly and children.

#### **5.2.4 Rohati jamoat**

The jamoat consists of 12 villages and 1 settlement: Moinkach, Rohati, Okhchakman, Nilkon, Teppai Samarkandi, Mekhtari, Shaikhon, Khokali, Dova, Navobod, Magmurud, Kandi, Dara, Ganchobod. There live 45,513 residents (6,244 households); including 20,018 able-bodied people. 1,400 families are considered low-income. The source of income of the population is work in the budgetary sphere, agriculture, labour migration; the basis of expenses is food, fuel, services.

Agriculture provides  $\approx$  90% of the gross development product (GRP). There are 2 poultry farms in the jamoat. Of the 6,956 hectares of land, 2,365 hectares are agricultural lands (784 hectares irrigated, 1,581 hectares non-irrigated).

There are 15 schools, 8 first aid posts, 5 health centers, 1 maternity hospital, a branch of Amonatbank, 3 libraries, 13 sports grounds, 6 gyms.

95% of the staff of schools and health centers are local residents. 50% of men are in migration. The proportion of female students has reached 50%.

#### 5.2.4.1 Teppai Samarkandi village

##### *General information. Demography*

The village of Teppai Samarkandi is located in the central part of Rudaki district and borders on Guliston jamoat. The village is the administrative center of Rohati jamoat, which gives it special significance in the management and organization of local life. The village is located at a distance of about 37 kilometers from the administrative center of Rudaki district, which allows maintaining stable communication with district institutions and services. The functions of local government are carried out by the executive body of Rohati jamoat, located in the village itself. The executive body is responsible for the implementation of municipal powers, the development of social infrastructure, improvement, support for vulnerable categories of the population and interaction with district and national structures.

According to the municipal passport, in 2025 the population of the village of Teppai Samarkandi is 8917 people, which makes it one of the most populated settlements in Rohati jamoat. This confirms the status of Teppai Samarkandi as the administrative and social center of the jamoat. The ethnic composition of the village is mainly represented by Tajiks, but Uzbeks and Russians also live there. According to the latest data, 293 residents are in labour migration, mainly in Russia and other CIS countries.

There are 1,162 households in the village of Teppai Samarkandi. Households are represented by both large multi-generational families and individual families with children, and in some cases, single residents. Most households live in individual residential buildings with garden plots, which is typical of the traditional rural way of life.

##### *Local economy, income, expenses*

Despite its predominantly rural nature, the village of Teppai Samarkandi has the beginnings of a local production infrastructure, which distinguishes it from other settlements in the jamoat. The following enterprises operate in the village:

- A poultry farm that produces eggs and poultry meat. This enterprise plays an important role in both ensuring food security and creating jobs for the local population;
- Two mini-workshops for the production of cement blocks, which meet the demand for building materials in the village and nearby settlements. These small business facilities are focused on the local market and seasonal construction;
- A petrol station that meets the needs of local transport and transit vehicles. The presence of petrol stations contributes to the improvement of transport accessibility and the development of infrastructure.

The economic activity of the population of the village of Teppai Samarkand is formed on the basis of several key sources of income but remains subject to seasonality and instability. One of the main sources of livelihood for many families remains labour migration. Men of working age go to work, mainly in spring and summer, to the cities of Tajikistan, as well as abroad - mainly to Russia and other CIS countries. In the autumn-winter period, many of them return, and currently the unemployment rate in the village increases sharply.

A significant part of residents is engaged in livestock farming, which serves as an important form of self-employment and food security. However, livestock farming requires significant expenses, especially for the purchase of feed, care and veterinary services, which affects the overall level of profitability of this activity. An additional source of income is seasonal construction work, in which men participate - both in the district and in other regions of the country. Women are mainly engaged in housework, caring for children and the elderly, as

well as private farming and small-scale livestock farming. Opportunities for their formal employment are limited.

The financial situation of most households in the village of Teppai Samarkandi is characterized by income instability and high sensitivity to external and seasonal factors. Some families do not have a permanent or predictable income. Additional complicating factors include environmental and infrastructure problems. The village experiences interruptions in water supply, as well as air pollution, especially in the area adjacent to industrial facilities and the landfill. This affects the health of the population and creates additional costs for medical services.

Household expenditures tend to be concentrated in the following areas:

- food - takes up the bulk of the budget, especially given rising prices and the lack of domestic agricultural production among a part of the population;
- buying animal feed, especially in winter;
- children's education - including school supplies, uniforms, transportation and tutoring;
- health services, including prevention and treatment of diseases related to environmental conditions;
- transportation costs - related to movement within the district and trips to Dushanbe and Vahdat, as well as migration of family members.

#### *Residential development, social and engineering infrastructure*

The village of Teppai Samarkandi has a mixed type of development, combining traditional individual residential buildings with denser development, typical for administrative centers. Due to its status as a jamoat center, the village has a more developed infrastructure compared to the surrounding settlements.

Teppai Samarkandi has a well-developed social infrastructure. There are three comprehensive schools in the village, providing access to primary, basic and secondary education for children from both the village itself and from adjacent settlements.

- Secondary comprehensive school No. 45 (**Figure 19**): the total number of pupils is 1486, of whom 776 boys and 710 girls; the total number of teachers is 54, of whom 39 women and 15 men. The school has 26 classrooms, allowing for the organization of the educational process in comfortable conditions.
- Secondary comprehensive school No. 179 (Roguni): the total number of pupils is 1910, of whom 992 boys and 918 girls; the total number of teachers is 48, of whom 31 women and 17 men.
- Secondary comprehensive school No. 184 (Navbunyod): the total number of pupils is 425, of whom 223 boys and 202 girls; 15 teachers, of whom 10 women and 5 men.

Educational institutions operate in a standard mode; they provide basic education, preparation for final exams and actively participate in the cultural life of the village. Despite the presence of a developed school network, there is no kindergarten in the village, which creates a significant burden on families with preschool-age children and limits employment opportunities, especially for women.



Photo of the E&S Consultant, 2025

**Figure 19. School No. 45 in Teppai Samarkand**

**Healthcare.** The village of Teppai Samarkandi has several institutions that provide basic medical care to the local population. The medical infrastructure includes both a central institution and paramedic posts, which allows it to cover various parts of the village and adjacent villages. The following facilities are functioning in the village:

- Teppai Samarkandi Health Centre (**Figure 20**) is the main medical institution with 3 doctors, 5 nurses and 1 male nurse. The Centre provides primary medical care, including receiving patients with complaints of acute and chronic conditions, referral for examinations and basic therapy. It also vaccinates the population in accordance with the calendar of preventive vaccinations and carries out medical procedures (injections, IVs, dressings). On average, the Centre receives 5 to 10 patients per day.
- Medical centre (Roguni) and medical centre (Navbunyod) - provide outpatient care, perform sanitary and preventive work, provide assistance on site to residents of remote parts of the village and adjacent areas.

According to the Health Centre and Medical Centres located in the village of Teppai Samarkandi, there is currently an increase in the number of requests for a number of the most common diseases. One of the pressing problems is the increased incidence of intestinal infections, in particular diarrhoea and associated symptoms - vomiting, abdominal pain, general weakness. Often, requests are accompanied by fever, especially among children and the elderly. The level of hypertension is also consistently high among the population. Health workers regularly record cases of blood pressure surges, which require constant monitoring and medication, especially in hot weather. A separate category of patients are pregnant women who regularly visit the Health Centre for examinations, consultations and monitoring of their health during pregnancy.



Photo of the E&S Consultant, 2025

**Figure 20. Health Center, the village of Teppai Samarkandi**

In addition to those listed above, the following social and household infrastructure facilities operate on the territory of the village:

- The library serves as a center for cultural and educational activities, providing access to literature, reference materials, and space for independent study;
- 15 grocery stores - provide a wide range of everyday goods and cover the basic needs of the population;
- 5 building materials stores - reflect the high demand for goods for repair and construction, especially during the seasonal construction period;
- 1 ATM - improves the availability of financial services for residents, especially in conditions of remoteness from the district center;
- Police Department (OMVD No. 2) — ensures public law, order and security and responds to administrative and criminal offenses in the village and nearby settlements.

### **Civic activism, vulnerable groups**

Teppai Samarkandi village has a public council that plays a key role in resolving local issues and mobilizing resources for the benefit of the community. The council brings together authoritative and active representatives of the village, including the mullah, the chairman of the mahalla, veterans of labour and public activists. It performs the functions of civil self-government, helps resolve domestic disputes, participates in organizing social events, supports vulnerable groups and establishes interaction with the executive authorities of the jamoat. Such a structure allows for an effective response to the needs of residents and strengthens social cohesion. The key example of the activity of the local community was a recent initiative to improve the school grounds: at the public council's initiative, voluntary funds were collected from the population, and the area adjacent to the school building was laid with paving stones, which improved the conditions and appearance of the school.

Several socially vulnerable groups stand out among the residents of the village of Teppai Samarkandi:

- First of all, these are elderly people, many of whom live without a regular income and need help with everyday life, medical support and social care. Some elderly citizens receive support from relatives, but there are also those who face difficulties with self-sufficiency.
- Large families, especially those with low incomes, also make up a significant group. Such families face a number of problems: lack of resources for food, clothing and

school supplies for children, difficulties in obtaining medical and transportation services. Lack of preschool institutions exacerbates the burden on parents, especially women. The local community and public council periodically organize initiatives to support those in need, but stable mechanisms for social assistance at the village level are still insufficient.

- A particularly vulnerable group is the resettled people from the Rogun HPP construction area (**Figure 15**). People resettled 15 years ago live in close proximity to the operating Landfill and may be affected by both its current activities and the reconstruction project. This group should be given special attention within the framework of this Project.

In the village of Teppai Samarkandi, gender roles are largely determined by traditional social attitudes and the rural way of life. Women are mainly occupied with housekeeping, caring for children and elderly or sick family members. This burden falls almost entirely on women and is often not accompanied by external support, especially in the absence of accessible social services such as kindergartens and home care services. Most women have general secondary education.

#### 5.2.4.2 Okhchakman village

##### *General information. Demography*

The village of Okhchakman is located on the territory of Rohati jamoat of Rudaki district, Republic of Tajikistan. It is near the capital, Dushanbe, which provides convenient transport accessibility and communication with the administrative and economic center of the country. The village borders on a number of settlements, including the villages of Teppai Samarkandi, Nilkon and Rohati. This contributes to active inter-village relations. Local self-government is carried out through the executive body of Rohati jamoat, which is responsible for resolving issues of local importance, including infrastructure development, organizing public events, coordinating social assistance and interacting with district and national structures.

The population of the village of Okhchakman as of January 1, 2025, was 3,330 people. Of these, 1,842 are men and 1,687 are women. Most residents are Tajiks by nationality. According to local authorities, 239 people are temporarily working outside the country. There are 442 households in the village of Okhchakman.

##### *Employment, income and expenses*

The main type of employment for residents of the village of Okhchakman is agriculture. A significant portion of the population is engaged in crop production, including gardening and viticulture, as well as livestock farming, which covers about 35% of the residents.

The local economy is based on agricultural lands, including orchards and vineyards, which provide residents with seasonal employment and products for personal consumption and partial sale. Currently, there are no operating industrial enterprises in the village of Okhchakman. At the same time, the village has the potential for developing the processing sector. In the future, it is planned to create small enterprises focused on processing agricultural products, primarily fruits and grapes.

The main source of income for residents of the village of Okhchakman is funds received from agricultural activities - mainly gardening and viticulture, as well as income from labour migration. The male part of the population most often becomes labour migrants. Some residents work in the social sphere - in the local school and medical center, providing access to basic educational and medical services. Women are mainly engaged in housekeeping, childcare and work on garden plots.

The main expense items include food, utilities (electricity, water), medical care, home repairs and construction. A significant part of the budget in rural families is taken up by expenses related to keeping livestock, including the purchase of feed, veterinary services and care. It

should be noted that caring for livestock is becoming more labour-intensive and costly every year. Currently, keeping animals is available mainly to those households that have personal land plots or have access to pastures. For families deprived of such resources, livestock breeding is becoming less and less possible, which affects the structure of expenses and self-sufficiency in food products.

### *Residential development, social and engineering infrastructure*

The development of the village of Okhchakman is represented mainly by individual residential buildings. The buildings are located on household plots and formed along the main streets, with a density and layout typical for rural areas. The village infrastructure is developed to a basic level, providing for the basic needs of the local population. The following social and household infrastructure facilities operate on the territory of the village:

*Secondary comprehensive school No. 49 (Figure 21)*, which is the main educational institution for children and adolescents. The total number of students is 972, of which 495 are boys and 477 are girls. The school provides education according to the programs of primary, basic and secondary general education. The teaching staff consists of 34 teachers, including 20 women and 14 men. The teaching staff covers the main subject disciplines and ensures the educational process at the appropriate level. There is no kindergarten in the village, which creates certain difficulties for families with preschool-age children. The absence of a preschool institution limits children's access to early learning and preparation for school, and also reduces the opportunities for parents, especially women, to find employment.



*Photo of the E&S Consultant, 2025*

**Figure 21. School No. 49. Okhchakman**

A *medical centre* located in a new single-story detached building (Figure 22). The institution is the main source of medical care for village residents and provides primary health care services. Three specialists work at the medical centre: a head and two nurses. Despite the limited staff, the institution provides a wide range of basic medical services:

- provision of primary and emergency care;
- outpatient care for women and children;
- vaccination of the population;
- measurement of temperature, blood pressure and other basic procedures;
- conducting preventive examinations;
- implementation of home visits, especially to people with limited mobility.

In case of need for specialized assistance, villagers contact medical institutions of the district or city of Dushanbe.

According to the medical centre of the village of Okhchakman, there is currently an increase in the number of requests related to gastrointestinal diseases. Most often, residents come with symptoms of intestinal infection, including diarrhoea, nausea, vomiting, abdominal pain and fever. These cases may be associated with seasonal factors, the quality of drinking water or sanitary conditions. Medical personnel are actively working with pregnant women, including monitoring their health, counselling and conducting the necessary examinations. Also, preventive measures are regularly carried out in the village - including health education, vaccination and monitoring the epidemiological situation. However, the capabilities of the medical centre are limited - both in terms of personnel and equipment, which emphasizes the need for support from district and national health structures.



Photo of the E&S Consultant, 2025

### Figure 22. Medical centre, village of Okhchakman

Other infrastructure facilities in the village include:

- a stadium - open for football and volleyball, plays an important role in organizing leisure and physical education of young people;
- a building materials store;
- four grocery stores;
- two bus stops - provide transport accessibility and connectivity with neighbouring settlements and the city of Dushanbe;
- one cell tower.

### **Civic activism, vulnerable groups**

There is an established system of informal public leadership in the village of Okhchakman. Elders and respected residents of the village, who have high authority among fellow villagers, actively participate in public life. They play an important role in maintaining social stability, resolving conflict situations, and organizing collective initiatives. An example of a high level of self-organization is the recent initiative of residents to improve the village. At the suggestion of activists, a special bank card was opened, to which anyone could make a voluntary contribution. The collected funds, with the assistance of local governments, were directed to solving key problems:

- asphaltting of sections of intra-village roads;
- replacement of 67 old electric poles with the new ones;
- construction of a new sanitary unit (toilet) in the building of the rural school.

These results demonstrate a high level of civic responsibility and the potential for sustainable development with active participation of the population.

Similarly to most rural settlements, there are vulnerable groups of population in the village of Okhchakman:

- elderly people. Despite the lack of a formalized social assistance system at the village level, elderly residents receive significant support from their families and neighbours. Care for the elderly is provided primarily by their children and relatives. An example of high solidarity can be considered a recent case when a village resident fell ill with cancer - in response to this, the entire community united to raise funds for his treatment.
- There are few single women in the village, but when difficult life situations arise, they also receive help from neighbours and local activists. Mutual assistance and community participation in solving everyday and social problems remain an important part of the rural way of life.

### 5.3 Cultural and historical heritage

#### 5.3.1 Historical context and archaeological findings

The territory of Rudaki district has been inhabited by farmers and cattle breeders since ancient times. At different times, these lands were part of the ancient states of Central Asia: Sogdiana, Bactria, the Kushan Kingdom, and later – the states of the Islamic era, including the Samanid Emirate (9<sup>th</sup>–10<sup>th</sup> centuries)<sup>106</sup>.

The rich past of the area is confirmed by archaeological discoveries. As a result of excavations, large historical and archaeological complexes of the 9<sup>th</sup>-12<sup>th</sup> centuries were discovered, indicating the existence of medieval settlements here. Among them are the Chorgulteppa and Todzhkhon settlements (with the villages of Chorgulteppa, Oli Somon, Kuktosh, Bachamazor, etc.), the Guliston complex (the villages of Mavlavi, Sabzikor, Tezgar, etc.), Rohati (the villages of Machiton, Teppai Samarkandi, Simigandzh, etc.), Chor-teppa (the villages of Kampir-kal'a, Chor-teppa, etc.), Esanboy (the villages of Namozgokh, Khodja-Tutbulok, etc.). Most of these monuments date back to the Middle Ages. Traces of a medieval settlement were found in the Teppai Samarkandi area (literally "Samarkand Hill"), reflecting the trade links of the region.

In 1927, the district was set up within the Tajik ASSR under the name of Lakai-Tajik. In 1935-1970 it was called Kaktashsky, in 1970-2003 – Leninsky<sup>107</sup>.

#### 5.3.2 Architectural monuments and material heritage

Although Rudaki district does not have large urban centres of antiquity, a number of important architectural monuments have been preserved on its territory. One of the main ones is the mausoleum (mazar) of Mawlana Yaqub Charkhi (15<sup>th</sup> century), located in the southeastern outskirts of Dushanbe<sup>108</sup>. Mawlana Yaqub al-Charkhi (1359-1447) was a Sufi teacher, the 18<sup>th</sup> sheikh of the Naqshbandi tariqa, and his tomb is revered as one of the main Islamic shrines in Tajikistan<sup>109</sup>. Historically, the mausoleum was badly damaged by time and was

<sup>106</sup>[https://ru.wikipedia.org/wiki/%D0%A0%D1%83%D0%B4%D0%B0%D0%BA%D0%B8\\_\(%D1%80%D0%B0%D0%B9%D0%BE%D0%BD\)](https://ru.wikipedia.org/wiki/%D0%A0%D1%83%D0%B4%D0%B0%D0%BA%D0%B8_(%D1%80%D0%B0%D0%B9%D0%BE%D0%BD))

<sup>107</sup> <https://tochka-na-karte.ru/Goroda-i-Gosudarstva/10695-Rajon-Rudaki.html>

<sup>108</sup>[https://ru.wikipedia.org/wiki/%D0%AF%D0%BA%D1%83%D0%B1\\_%D0%B0%D0%BB%D1%8C-%D0%A7%D0%B0%D1%80%D1%85%D0%B8](https://ru.wikipedia.org/wiki/%D0%AF%D0%BA%D1%83%D0%B1_%D0%B0%D0%BB%D1%8C-%D0%A7%D0%B0%D1%80%D1%85%D0%B8)

<sup>109</sup><https://traveltajikistan.tj/%D0%BC%D0%B0%D0%B2%D0%B7%D0%BE%D0%BB%D0%B5%D0%B9-%D0%BC%D0%B0%D0%B2%D0%BB%D0%BE%D0%BD%D0%BE->

restored in 2003; inside there are two tombstones covered with a green blanket. An ancient mosque where Yaqub Charkhi preached adjoins the mausoleum complex.

Another attraction of the area is the Kampirkala Mosque (which translates as "old woman's fortress") and the cult site of Namozgokh - an ancient namazgar (open area for prayer) from the early Islamic era<sup>110</sup>. In the village of Khodjabulbulon, architectural remains associated with local shrines have been preserved.

Modern architecture of the Soviet period also left its mark: in the village of Somoniyon (the administrative center of the district) the Memorial Complex of Military and Labour Glory was opened in 1975 with a majestic sculpture "To the Tajik Soldier" in honour of the 30<sup>th</sup> anniversary of the Victory<sup>111</sup>. Here, on the memorial, there are also plaques with the names of 980 residents of the district who died during the Great Patriotic War. In the center of Somoniyon you can also see a monument erected in 2003 to Abu Abdullo Rudaki - the founder of Tajik-Persian literature, when the district was named after this poet.

### 5.3.3 Folklore traditions and folk crafts

Rudaki district is populated by a variety of ethnic groups – Tajiks, Uzbeks, Lakas, Kyrgyz, as well as Russians and others<sup>112</sup>. Each community has contributed to the rich folklore heritage of the region. The folklore of the district reflects the influence of Persian-Tajik classics and local rural motifs.

Oral traditions, legends and tales are still passed down in rural communities. Many of them are associated with local saints and landmarks<sup>113</sup>. Folk games and rituals accompanying the agricultural calendar (Navruz – the spring renewal, and Mehrgon – the autumn harvest) are common in villages.

Along with folklore, folk crafts flourish, many of which are ancient<sup>114</sup>. Textile crafts are especially developed: weaving (satin and adras fabrics), silk embroidery gulduzi, sewing traditional suzani and skullcaps with patterns.

The district is named after a famous poet of the Samanid era, Abu Abdullo Rudaki (858-941), who is considered to be the founder of Tajik and Persian literature<sup>115</sup>.

<https://ctd.tj/ru/2023/12/25/%D1%82%D0%B0%D0%B4%D0%B6%D0%B8%D0%BA%D0%B8%D1%81%D1%82%D0%B0%D0%BD-%D0%B3%D0%BB%D0%B0%D0%B7%D0%B0%D0%BC%D0%B8-%D0%BB%D0%BE%D0%BD%D0%B4%D0%BE%D0%BD%D1%81%D0%BA%D0%BE%D0%B3%D0%BE-%D0%BF%D0%B8%D1%81/#:~:text=%D0%B0%D1%80%D1%85%D0%B5%D0%BE%D0%BB%D0%BE%D0%B3%D0%B8%D1%87%D0%B5%D1%81%D0%BA%D0%B8%D0%B5%20%D0%B8%D1%81%D1%82%D0%BE%D1%87%D0%BD%D0%B8%D0%BA%D0%B8%20%D1%83%D0%BA%D0%B0%D0%B7%D1%8B%D0%B2%D0%B0%D1%8E%D1%82%20%D0%BE%D0%B0%20%D1%82%D0%BE%2C,%D0%B8%20%D0%B8%D0%BC%D0%B5%D1%8E%D1%82%20%D0%B1%D0%BE%D0%B3%D0%B0%D1%82%D1%83%D1%8E%20%D0%B4%D1%80%D0%B5%D0%B2%D0%BD%D1%8E%20%D0%B8%D1%81%D1%82%D0%BE%D1%80%D0%B8%D1%8E>

<sup>111</sup>[https://ru.wikipedia.org/wiki/%D0%A0%D1%83%D0%B4%D0%B0%D0%BA%D0%B8\\_\(%D1%80%D0%B0%D0%B9%D0%BE%D0%BD\)](https://ru.wikipedia.org/wiki/%D0%A0%D1%83%D0%B4%D0%B0%D0%BA%D0%B8_(%D1%80%D0%B0%D0%B9%D0%BE%D0%BD))

<sup>112</sup> <https://traveltajikistan.tj/%D0%B4%D1%83%D1%88%D0%B0%D0%BD%D0%B1%D0%B5-%D1%80%D1%83%D0%B4%D0%B0%D0%BA%D0%B8-%D0%B4%D1%83%D1%88%D0%B0%D0%BD%D0%B1%D0%B5/>

<sup>113</sup> <https://ombudsman.tj/files/razvitiye-turizma-2030.doc>

<sup>114</sup> <https://traveltajikistan.tj/%D0%B4%D1%83%D1%88%D0%B0%D0%BD%D0%B1%D0%B5-%D1%80%D1%83%D0%B4%D0%B0%D0%BA%D0%B8-%D0%B4%D1%83%D1%88%D0%B0%D0%BD%D0%B1%D0%B5/>

<sup>115</sup> <https://ru.wikipedia.org/wiki/%D0%A0%D1%83%D0%B4%D0%B0%D0%BA%D0%B8>

## 6 PRELIMINARY IDENTIFICATION OF IMPACTS AND RISKS

### 6.1 Introduction. Main limitations, assumptions and approaches

This section analyses the **environmental and social aspects of the Landfill's current activities**, identifies and preliminarily ranks the existing and potential risks and impacts on the environment. The section also assesses the information gaps that will need to be filled, the studies and calculations that will need to be carried out at the next stage of the ESIA.

**A significant limitation of this report is the complete lack of project information at the time of the report's preparation.** In this regard, the analysis of the environmental and social aspects of the Landfill Expansion Project, the identification of potential impacts and risks at this stage are impossible and inappropriate, since a full ESIA should be closely linked to the project solutions (which have not been formed yet).

To avoid working purely in the realm of guesswork and assumptions and to bring environmental and social considerations into emerging design decisions already at this stage, we used the following approach:

- Currently, we assume that the Project will improve the current E&S situation. For this assumption to be implemented, the E&S priorities of the Project are proposed, limitations defined, and E&S design criteria developed;
- At the next stage of the ESIA, as design solutions are formed, potential impacts and risks of the Project will be identified and assessed. The assessment will be carried out considering all options proposed by the designer. Based on this, the necessary management plans will be developed, and detailed consultations with stakeholders will be held.

### 6.2 E&S aspects, potential impacts and risks of the Landfill's current activities

As stated in **Section 4**, the following activities are currently being carried out at the Landfill:

- Reception of municipal solid waste and its placement in waste storage areas;
- Transportation, reception and disposal (incineration) of medical waste;
- Transportation, reception and disposal (demercurization) of mercury-containing waste;
- Reception and disinfection of biological waste (animal carcasses, veterinary waste, confiscated goods, etc.) in the Beccari biothermal pits.

Based on the analysis of current activities (**Section 4**), environmental and social aspects have been identified – elements of activities that may impact the natural and social environment and/or create hazards for humans (**Table 6**); possible impacts on the environment, population and personnel of the Landfill have been identified and preliminarily ranked; approaches to further assessment, which will need to be carried out at the next stage of the ESIA, are proposed.

**Table 6. Identification of E&S aspects, potential impacts and risks of the Landfill's current activities**

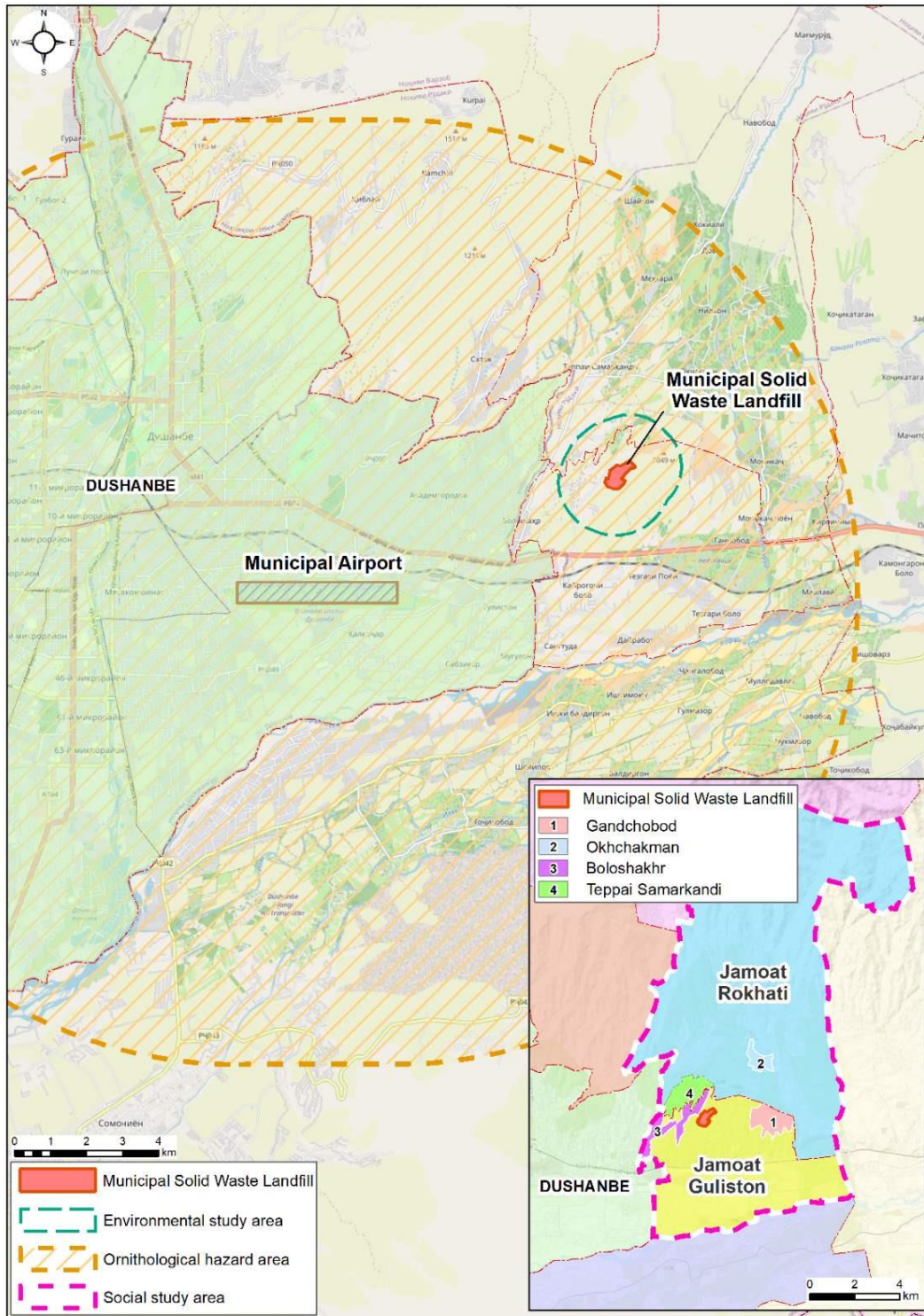
No.	Environmental and social aspect	Impacts / risks	Significance (rank)	Further steps and/or assessment methods within the framework of the ESIA
<b>Reception, unloading and placement of solid waste on the working cells of the Landfill</b>				
1.1	Exhaust emissions from internal combustion engines of garbage trucks, trucks, special equipment (bulldozers, excavators, tractors, loaders)	Pollution of atmospheric air and adjacent areas (soil cover on plots used by the population for growing vegetables and fruits)	■ Moderate	Proposal of measures to reduce emissions
1.2	Dust and wind dispersion of light fractions of municipal solid waste		■ Moderate	Qualitative assessment of the magnitude and significance of the impact based on the criteria proposed in <b>Section 3.2.2.</b>
1.3	Uncontrolled release of landfill gas formed in the body of the Landfill	Release of landfill gas: contributes to greenhouse gas emissions (methane) provokes spontaneous combustion at the Landfill.	■ High	Conduct reconnaissance studies of environmental pollution levels in nearby settlements ( <b>ANNEX 5</b> ). Estimate the approximate amount of landfill gas generated
1.4	Spontaneous combustion of waste, both inside the waste body and on the surface. Long-term internal combustion of waste is possible (and probable)	Pollution of adjacent areas (and populated areas) by smoke emissions from the Landfill; Formation of cavities in the body of the Landfill due to burnout; risks of failures	■ High	Within the framework of the ESIA - expert assessment.  As part of the design, it is necessary to ensure the collection of landfill gas throughout the entire area of the operating Landfill.
1.5	Population living in the regulatory sanitary protection zone / Landfill emissions impact zone	Risks of impact on public health	■ High	Preliminary assessment of the current activities' impact on public health and potential impacts after the implementation of the Project. Adoption of a preliminary decision (by the hukumat) on the need for resettlement or absence of such a need
1.5	Wastewater generation: Surface runoff from the Landfill; Landfill leachate formed inside the body of the Landfill;	Risks of contamination of surface and groundwater by pollutants from the Landfill	■ From moderate to high	Semi-quantitative assessment of the magnitude and significance of the impact based on the criteria proposed in <b>Section 3.2.2.</b>
	Wastewater from washing the undercarriage of vehicles leaving the Landfill			

No.	Environmental and social aspect	Impacts / risks	Significance (rank)	Further steps and/or assessment methods within the framework of the ESIA
		products	Moderate	
1.6	MSW components are a food source for synanthropic animal species, which in turn are a food source for birds of prey and scavengers.	Bird flocks pose an ornithological hazard for Dushanbe International Airport	■ High	Conduct consultations with the airport and the Aviation Security Agency under the Government of the RT on their assessment of the ornithological hazard and the measures taken (or obtain the results of such consultations) from the Developer of the Feasibility Study of the Landfill); Analyse the proposed design solutions; Decisions on further steps within the framework of the ESIA shall be made on the basis of consultations with the competent authorities.
		Animals living at the Landfill may be carriers of dangerous infectious diseases	■ High	
1.7	Informal sorting of solid waste at the Landfill	Health risks of informal waste pickers; Violation of human rights when working without formal contracts; Risks of loss of income source for informal waste pickers	■ High	Additional assessment. Within the framework of the Project, development of measures for the legalization of workers involved in sorting (within the framework of the RP and the Workforce Management Plan)
<b>2</b>	<b>Reception and disposal of medical waste</b>			
2.1	Reception and storage of medical waste	Risk of spreading infectious diseases due to inadequate storage of medical waste	■ High	The company needs to establish adequate storage of medical waste. It is expected that the recommendations in <b>Section 4.4</b> will be implemented by the State Unitary Enterprise "Dushanbe MSW Landfill". If it is not possible to implement the recommendations, stop accepting medical waste. No further recommendations are required within the framework of the ESIA. If necessary, the degree of implementation of the recommendations of the ESIA Scoping and previous instructions of the authorized bodies may be assessed.
2.2	Medical waste disposal. According to the Scoping, the medical waste disposal facility is	Health risks for workers at the Landfill and the population of adjacent villages	■ High	As part of the development of the Project, assess the condition of the medical waste disposal facility and develop solutions necessary for their safe disposal (restoration of the

No.	Environmental and social aspect	Impacts / risks	Significance (rank)	Further steps and/or assessment methods within the framework of the ESIA
	inoperative (needs to be clarified)			existing facility or its replacement); As part of the ESIA, assess E&S impacts and risks of the proposed technical solutions
<b>3</b>	<b>Reception and disposal of biological waste</b>			
3.1	Reception and disposal of biological waste. The Beccari pits are inoperative and cannot be restored.	Risk of spread of dangerous infectious diseases (including epidemics and epizootics)	■ From moderate to high	As part of the development of the Project (Feasibility Study), propose engineering solutions for the arrangement of biothermal pits; As part of the ESIA, assess E&S impacts and risks of proposed solutions.
<b>4</b>	<b>Reception and disposal of mercury-containing waste</b>			
4.1	Reception and storage of mercury-containing waste	Health risks for personnel in contact with mercury-containing waste	■ From moderate to high	It is expected that the recommendations in <b>Section 4.4</b> will be implemented by the SUE "Dushanbe MSW Landfill". Within the framework of the ESIA, the degree of implementation of these recommendations, as well as the instructions of authorized bodies, can be assessed; Additional or corrective measures will be proposed if necessary.
4.2	Disposal of mercury-containing waste	Risks to personnel health during demercurization of mercury-containing waste. Metallic mercury is not collected during demercurization and is not handed over to a specialized organization.	■ High	It is expected that the recommendations in <b>Section 4.4</b> will be implemented by the SUE "Dushanbe MSW Landfill".  The implementation of recommendations ( <b>Section 4.4</b> ) and previous instructions of competent authorities may be assessed within the framework of the ESIA.
5	<b>Reception and disposal of asbestos-containing waste</b> Asbestos-containing waste is sent to the Landfill as part of solid waste (without separation)	Health risks for workers at the Landfill and the population of adjacent villages (exacerbated by spontaneous combustion)	■ Moderate	It is expected that the recommendations in <b>Section 4.4</b> will be implemented by the SUE "Dushanbe MSW Landfill". As part of the ESIA, the degree of implementation of these recommendations will be assessed and, if necessary, additional or corrective measures will be proposed.

### 6.3 Areas of potential environmental and social impacts

Based on the results of the studies conducted as part of the Scoping Report, zoning of the potential environmental and social impacts of the Landfill Reconstruction Project was carried out (Figure 23).



Developed by E&S Consultant based on open-source data, information provided by Rudaki district administration, and Consultant's own analysis

Figure 23. Areas of potential E&S impacts

Further research necessary for the purposes of the ESIA and the refinement of action plans should be concentrated in these areas:

- Environmental study area (see **Annex 5**);
- Ornithological hazard area (will be formed based on the results of consultations with aviation security authorities);
- Social study area (mostly completed to date).

#### 6.4 **Environmental and social priorities and limitations of the Project, design criteria**

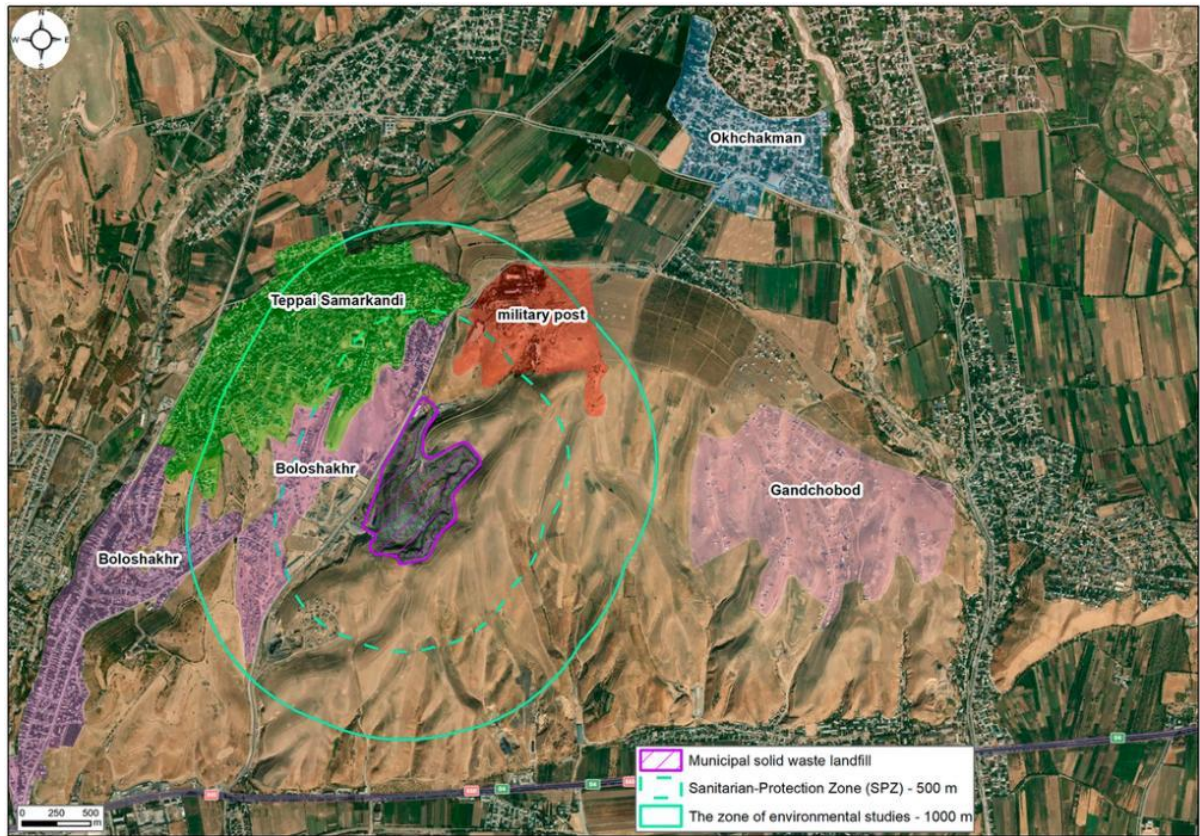
Based on the above analysis of the environmental and social aspects of the Landfill's current activities, the identification of existing and potential impacts and risks, and taking into account the need to continue and expand the activities for the disposal of MSW in Dushanbe, the following E&S priorities, limitations and design criteria are proposed.

**The main environmental and social priority** of this Project is to improve the local environmental and social situation in the area of the Landfill. The main focus (and directions for achieving the main priority) should be on:

- reducing unplanned emissions and spontaneous combustion at the Landfill,
- preventing runoff from the Landfill into the hydrographic network and filtration into underground horizons,
- improving the environmental and social situation in the villages of Boloshakhr and Teppai Samarkandi,
- reducing the ornithological hazard to Dushanbe International Airport;
- termination of informal waste sorting activities at the Landfill and organization of sorting on a legal basis, using modern technical means.

**The main E&S limitation** for the Landfill Expansion Project is the impossibility of its horizontal expansion to the north, northwest, west, and southwest.

**The E&S design criteria (Table 7)** aim to introduce E&S considerations directly into the design process. As a result, the implementation of these criteria will contribute to bringing the situation at the existing Landfill into compliance with the requirements of the legislation of the RT and further expansion of the Landfill by creating a new site for the storage of solid waste that meets the principles of a sanitary landfill and the requirements of the WB.



Developed by E&S Consultant based on open sources and information provided by Rudaki district hukumat

**Figure 24. Location of the MSW Landfill and the regulatory SPZ**

**Table 7. Environmental and Social Design Criteria**

№	Environmental and social criteria and limitations	Recommendations	Limitations and priorities
K1	<p>The distance from the Landfill boundary to the nearest housing should be at least 500 m.</p> <p><b>Justification:</b> the legislation of the RT classifies solid waste landfills as class 2 hazardous facilities and prescribes the establishment of a 500 m SPZ, within which it is prohibited to place human residence and social facilities (schools, hospitals, kindergartens, etc.).</p>	<p>The distance between the actual boundary of the landfill and the residential area is significantly less than 500 m (<b>Figure 24</b>). It is necessary to increase this distance to the value of the normative SPZ. This can be achieved in two fundamentally different ways:</p> <ul style="list-style-type: none"> <li>• Move away residents from the normative SPZ (via physical resettlement), and/or</li> <li>• Move the source of impact at the operating landfill away from residential area (via reclamation).</li> </ul> <p>The second option (landfill reclamation) is preferable from an E&amp;S perspective.</p>	<p>Based on criterion K1, it can be argued that the expansion of the Landfill to the west, north, northwest, and southwest is impossible and not advisable from an environmental and social point of view, since such a solution would lead to the need for the mass resettlement of residents of the villages of Boloshakhr and Teppai Samarkandi.</p> <p>If we plan a horizontal expansion of the existing Landfill, the possible directions of its expansion should be considered to be east, southeast, northeast (if this does not contradict other design criteria).</p>
K2	<p>Stopping (at first stage – sharply reducing) unorganized/site emissions from the Landfill (landfill gas, combustion products). Stopping /preventing spontaneous combustion.</p> <p><b>Justification:</b> requirement of the legislation</p>	<p>To implement this criterion, it is necessary to carry out: High-quality reclamation of all used up cells at the Landfill; taking into account criterion 1 above, the cells facing the western boundary should be reclaimed first. It is necessary to consider that reclamation is carried out after the stabilization of the waste body is completed - the process of strengthening the landfill soil and achieving a permanent stable state.</p> <p>The removal (and, if possible, collection and disposal) of landfill gas throughout the entire area of the operating landfill.</p>	<p>In any case of expansion of the existing Landfill, the priority direction remains the reclamation of the cells decommissioned or planned for decommissioning. Any other solution (not envisaging reclamation) would contradict the legislation of the RT and the principles of the GIIP.</p>
K3	<p>Organization of collection and removal of landfill leachate at the existing landfill and at the new site (landfill expansion), as well as collection of surface runoff from waste storage areas.</p> <p><b>Justification:</b> requirements of the RT legislation and World Bank</p>	<p>Study the possibilities of creating/building a new drainage system to divert the landfill leachate from the "old" body of the landfill, as well as constructing a drainage ditch/channel along the perimeter of the site to collect surface runoff. This wastewater can be used (without preliminary treatment) to moisten the surface of the stored waste in order to accelerate the decomposition of the</p>	

№	Environmental and social criteria and limitations	Recommendations	Limitations and priorities
		waste.	
K4	When selecting and designing a site for landfill expansion, consider:		
K4.1	the site of the currently operating landfill and the planned site must be separated from each other so that the construction of the new landfill (including the functioning of a construction camp) and the continued operation of the existing landfill can be carried out simultaneously.		The lack of reliable insulation and possible contact between the existing and the designed sites may lead to the transfer of the main problems of the existing Landfill to the new (designed) site.
K4.2	Proximity to Dushanbe International Airport (DIA). Presumably, the Landfill is located in the aviation safety zone <sup>116</sup> of this airport, and the current situation (the presence of a large number of synanthropic species, including birds of prey and scavenger birds) may create an ornithological hazard for take-offs and landings at the airfield. <b>Justification:</b> International Civil Aviation Organization (ICAO) recommendations and other International Good Practice: the ornithological danger zone should be 10 km or more.	Establishing aviation safety zones is the responsibility of the airport administration (and not of the existing solid waste landfill). It is necessary to conduct detailed consultations with the airport management and, possibly, with the Aviation Security Agency under the Government of the RT. It is necessary to establish the existing DIA aviation safety zones and, on this basis, to make a coordinated and agreed decision on the possibility of creating a new solid waste landfill site.	The said limitation may prove to be the most stringent one, since the main hazard is the existing habitat of birds, including large predators flying at a considerable height and posing a serious danger to aircraft take-offs and landings. The only way to reduce the population is high-quality reclamation of the existing Landfill and, if possible, the earliest possible cessation of its activities.
K5	The design of the Landfill must ensure the safety of workers and environmental safety at all stages of the life cycle - construction, operation, reclamation, including eliminating the possibility of collapses, fires and other accidents. <b>Justification:</b> requirements of the RT legislation and World Bank	The design documentation must take into account these criteria, as well as the Environmental and Social Management Plan and other management plans that will be developed within the framework of the ESIA.	
K6	When developing design solutions for the expansion and modernization of the landfill, consider approaches to the implementation of a	Measures to reduce the consumption of new resources, including: Envision a recycled water supply for the undercarriage	

<sup>116</sup> Regarding airport safeguarding zones refer for instance to UK Civil Aviation Authority. 2024. Aerodrome safeguarding Advice Note at <https://www.caa.co.uk/media/0vjkbyeh/cast-advice-note-3-wildlife-hazards-around-aerodromes-april-2024.pdf>

№	Environmental and social criteria and limitations	Recommendations	Limitations and priorities
	circular (closed loop) economy that ensure the reduction in use of and savings of new natural resources required. <b>Justification:</b> Good International Industry Practice.	wash system of garbage trucks. This will result in significant savings of "fresh" river or artesian water, and the resulting sludge can be used for separation layers of disposed waste.	

## ANNEX 1. COMPARATIVE ANALYSIS OF TAJIKISTAN LEGAL REQUIREMENTS AND WB STANDARDS

Topic / Issue	WB requirements (SEP, ESS1-6,8,10)	Similar requirements in RT legislation	Gaps and proposed actions to eliminate discrepancies
<b>Environmental and Social Policy</b>			
Project classification	The Bank assigns all projects one of four risk categories: High, Substantial, Moderate, or Low. In doing so, the Bank takes into account factors such as the type, location, sensitivity, and scale of the project; the nature and magnitude of potential environmental and social risks and impacts; as well as the Borrower's capacity and commitment to manage environmental and social risks and impacts in accordance with the ESSs. The Bank discloses the project category and the reasons for its assignment on its website and in the project documentation.	Law on EIA No. 1448 of 18 July 2017 divides projects into 4 impact categories – from significant to minor impact – which determines the scope of necessary assessments and activities within the EIA. For projects of categories “A” and “B”, a full-fledged EIA with the development of a report and an environmental management plan is required, while for categories “C” and “D” the procedure is simplified.	Formally, the regulatory requirements of the RT legislation and Environmental and Social WB Policies are in tune. However, at the level of law enforcement practice, the national EIA can be carried out at a lower level, especially in terms of assessing social aspects.
Use and strengthening of Borrower's Environmental and Social Framework	The Bank supports the use of the Borrower's ES Framework in the assessment, development and implementation of projects provided this is likely to address the risks and impacts of the project and enable the project to achieve objectives materially consistent with the ESSs.	In Tajikistan, there is a multi-tiered system of environmental and social standards: national standards (laws, codes, and GOSTs, mandatory throughout the country); sectoral standards (regulatory acts of individual agencies); and corporate standards (company policies and standards). Government decisions regarding a project are made based on compliance with state standards. The client's capacity and its own environmental and social principles regarding the proposed activity are not taken into account in government decision-making.	The Client does not have its own set of environmental and social principles. One of the Consultant's tasks is to assist in capacity building, which may include the development of the Client's own environmental and social principles.
Preliminary Environmental and Social Assessment (due diligence)	The Bank conducts a preliminary environmental and social assessment of all projects proposed for financing. This preliminary assessment identifies the most significant environmental and social	The preliminary environmental impact assessment is carried out by the Client <sup>117</sup> . The participation of an authorized state body in the preliminary assessment is not provided for.	If/when the World Bank conducts a preliminary environmental and social assessment, the Client will take into account the results and recommendations when

<sup>117</sup> Decree of the Government of the Republic of Tajikistan dated November 1, 2018, No. 532 "On the Procedure for Environmental Impact Assessment, Classification of Assessment Objects by Category, Depending on the Nature of Their Impact on the Environment, as well as on Criteria Determining the Hazard Categories of Planned Activities for the Environment."

Topic / Issue	WB requirements (SEP, ESS1-6,8,10)	Similar requirements in RT legislation	Gaps and proposed actions to eliminate discrepancies
	aspects, the feasibility of preparing and implementing the project in accordance with the ESSs, including an evaluation of the Borrower's capacity required for such a project.		conducting its own environmental and social assessment.
Special project types: Projects involving multiple small subprojects	<p>For projects involving multiple small sub-projects, that are identified, prepared and implemented during the course of the project, the Borrower will carry out appropriate environmental and social assessment of subprojects, and prepare and implement such subprojects, as follows:</p> <p>(a) High Risk subprojects, in accordance with the ESSs;</p> <p>(b) Substantial Risk, Moderate Risk and Low Risk subprojects, in accordance with national law and any requirements of the ESSs that the Bank deems relevant to such subprojects.</p> <p>If the Bank considers that the Borrower does not have sufficient capacity, all high-risk subprojects – and, where necessary, substantial-risk subprojects – are subject to prior review and approval by the Bank until sufficient capacity of the Borrower is established.</p>	The legislation of the Republic of Tajikistan requires an environmental impact assessment and environmental review to be conducted for each project, in accordance with the procedure established by law.	<p>The Project is in the development stage. As the Project progresses:</p> <p>An Environmental Impact Assessment (OBOC) and State Environmental Review (SER of the Project must be conducted in accordance with the requirements of the RT legislation;</p> <p>A brief environmental and social assessment of the project as a whole must be conducted in accordance with the requirements of the ESSs.</p>
Environmental and Social Commitment Plan (ESCP)	The ESCP must outline the material measures and actions required for the project to meet the ESSs over a specified timeframe. The ESCP will form part of the legal agreement. The legal agreement will include, as necessary, obligations of the Borrower to support the implementation of the ESCP.	National legislation does not provide for the preparation of a document similar to the Environmental and Social Commitment Plan (ESCP).	The development of an ESCP for this Project (Improvement of the solid waste collection system in Dushanbe) is not envisaged.
Information Disclosure, Consultation, and Participation.	<p>The Bank will disclose documentation relating to the environmental and social risks and impacts of High Risk and Substantial Risk projects prior to project appraisal. This documentation will reflect the environmental and social assessment of the project and be provided in draft or final form (if available). Final or updated documentation will be disclosed when available.</p> <p>Further details on disclosure, consultation, and participation requirements are discussed below in</p>	The RT legislation guarantees the transparency of environmental information. The mandatory disclosure of data on environmental conditions and pollution is enshrined in law. Furthermore, the Aarhus Convention on Access to Environmental Information, to which Tajikistan became a party in 2001, is in effect.	<p>The process of information disclosure is described in the Stakeholder Engagement Plan (SEP), prepared in accordance with WB requirements.</p> <p>Similarly, the EIA materials will be disclosed within the framework of national legislation. At the level of details in regulatory acts and taking into account law enforcement practices, discrepancies are possible (see the ESS10 subsection for more details).</p>

Topic / Issue	WB requirements (SEP, ESS1-6,8,10)	Similar requirements in RT legislation	Gaps and proposed actions to eliminate discrepancies
	the subsection dedicated to the analysis of ESS10 requirements.		
Associated Facilities	Glossary: the term "Associated Facilities" means facilities or activities that are not funded as part of the project and, in the judgment of the Bank, are: (a) directly and significantly related to the project; and (b) carried out, or planned to be carried out, contemporaneously with the project; and (c) necessary for the project to be viable and would not have been constructed, expanded or conducted if the project did not exist. For facilities or activities to be considered "Associated Facilities," all three criteria must be met.	The concept of "Associated Facilities" is absent from the RT legislation.	Within the framework of this project, it is necessary to take into account the presence of associated facilities. However, at this time, it is impossible to identify associated facilities due to the insufficient elaboration of the project as a whole. It will be necessary to revisit this issue as the project design progresses.
<b>ESS1 Assessment and Management of Environmental and Social Risks and Impacts</b>			
WB Environmental and social assessment	The Borrower undertakes an environmental and social assessment of projects proposed for Bank financing to ensure their environmental and social soundness and sustainability. The environmental and social assessment should be commensurate with the level of risks and impacts of the project. Its results are used in developing the project design and determining mitigation measures and actions, as well as for improving the decision-making process.	The Client/Project Organizer conducts an EIA for all stages of project implementation (this includes a preliminary impact assessment, preparation of terms of reference, consideration of stakeholder opinions, as well as mandatory public discussion of the project).	The formal requirements of the national procedure are in line with the requirements of the WB procedure. However, these requirements differ in detail and especially in the practice of law enforcement. Discrepancies are taken into account in detail during the formation of the methodology.
Managing Environmental and Social Risks and Impacts	The Borrower shall manage and monitor the environmental and social risks and impacts of the project on a systematic basis throughout the project life cycle, proportionate to the nature and scale, as well as potential risks and impacts of the project, in order to ensure that the ESS requirements are met in a manner and within a time frame acceptable to the Bank.	Risk assessment is carried out within the framework of the EIA. During the operational stage, monitoring (industrial and state environmental control) and inspections are carried out.	Risk management will be implemented at all stages of the project lifecycle, in accordance with the requirements of ESS1 and good international practice.
Environmental and social assessment	The environmental and social assessment must be adequate, accurate, and objective, describing the risks and impacts of the project. As part of the environmental and social assessment, a mitigation hierarchy is applied, which includes: (a) Avoiding and preventing risks and negative	A similar concept exists at the methodological level (but is not enshrined in the regulatory framework).	Formally, the regulatory requirements of the RT legislation and the WB Policy are in line. In practice, national EIAs are often carried out at a low-quality level, especially regarding the assessment of social aspects.

Topic / Issue	WB requirements (SEP, ESS1-6,8,10)	Similar requirements in RT legislation	Gaps and proposed actions to eliminate discrepancies
	impacts; (b) Where avoidance is not possible, minimizing or reducing risks and negative impacts to an acceptable level; (c) Once risks and impacts have been minimized or reduced, mitigating any residual adverse effects; and (d) Where significant residual adverse effects remain, compensating or offsetting for them.		
Risks and impacts associated with suppliers of goods and services	The environmental and social assessment must also consider risks and impacts associated with primary suppliers. The Borrower should address issues related to such risks and impacts in a manner proportional to the Borrower's control or influence over the primary suppliers.	Contractor management (in particular, risk and impact assessment) is not considered at the regulatory level.	As part of the environmental and social assessment, a Contractor Management Plan needs to be developed.
Tools and methods of environmental and social assessment	The following are environmental and social assessment instruments and methods recommended by the WB, which, to varying degrees, may be used within the framework of the Project.	The methods listed below are only partially present in the regulatory and methodological framework of the Republic of Tajikistan.	Within the framework of the project's Environmental and Social Management Framework (ESMF), it is anticipated that the following will be used to varying degrees:
	(a) An Environmental and Social Impact Assessment (ESIA) is a tool for identifying and evaluating the potential environmental and social impacts of a proposed project, identifying alternatives, and developing appropriate mitigation, management, and monitoring measures.	The RT legislation relies primarily on EIA (OBOC) tools and the State Environmental Review (SER) for decision-making regarding proposed activities.	Carry out Environmental and social impact assessment for the overall project with high environmental and social risks (if any are identified).
	(b) Environmental and Social Audit is a tool for determining the nature and extent of all concerning social and environmental aspects of an existing project.	The Law "On Environmental Protection" No. 1449 (revised 2017) provides for the environmental audit of existing facilities to establish compliance with environmental regulations. The Law of the Republic of Tajikistan dated December 26, 2011, No. 785 "On Environmental Audit" is also in effect.	Environmental and Social Audit may be used for interim assessments of the Project as a whole (at different stages of its implementation)
	(c) Hazard and Risk Assessment is a tool for identifying, analysing, and controlling hazards associated with the presence of hazardous	Hazard and risk assessment for planned facilities is discussed in the legislation on hazardous industrial facilities <sup>118</sup> .	Hazard and Risk Assessment can be effectively applied to the Landfill Reclamation and Expansion project, as well

<sup>118</sup> Law of the RT dated February 28, 2004, No. 14 "On Industrial Safety of Hazardous Production Facilities," as amended by the Laws of the Republic of Tajikistan dated December 28, 2005, No. 135, June 13, 2007, No. 282, June 18, 2008, No. 398, October 6, 2008, No. 434, December 28, 2013, No. 1053, January 2, 2020, No. 1682.

Topic / Issue	WB requirements (SEP, ESS1-6,8,10)	Similar requirements in RT legislation	Gaps and proposed actions to eliminate discrepancies
	materials and conditions at the project implementation site.		as potentially to a number of subprojects that will be proposed for implementation in Dushanbe.
	(d) Cumulative Impact Assessment is a tool for considering the cumulative impacts of a project in combination with the impacts of other relevant past, present, and reasonably foreseeable future activities, as well as unplanned but predictable developments enabled by the project that may occur later or at a different location.	Cumulative impacts are defined in the "Law on EIA" (Republic of Tajikistan). However, a detailed elaboration of this issue is lacking in the regulatory and methodological framework of the Republic of Tajikistan.	Cumulative Impact Assessment can be effectively applied to the Dushanbe solid waste collection and transportation improvement project, as there are numerous sources of impact within the city, and it is advisable to consider any new impacts (positive or negative) in conjunction with other existing impacts. This tool can also be effectively used in the context of the landfill reclamation and expansion project, including to account for past impacts and accumulated harm.
	(e) Analysis of social factors and conflicts is a tool that assesses the extent to which a project may: (a) exacerbate existing social tensions and inequalities (both within project-affected communities and between these communities and other parties); (b) negatively affect people's stability and security; and (c) adversely impact existing tensions, conflicts, and instability.	There is no specifically regulated tool for the Analysis of social factors and conflicts in the legislation of the Republic of Tajikistan. In the practice of implementing international projects, elements of such analysis are included as part of the environmental and social risk assessment, despite the absence of a direct legal basis.	Analysis of social factors and conflicts is a very useful tool for managing various social factors, including those related to the activities of informal waste pickers, both within the city of Dushanbe and at the landfill, as well as potential tensions in annexed territories (due to changes in the way of life of part of the rural population when rural territories are annexed to the city of Dushanbe).
	f) The Environmental and Social Management Plan (ESMP) is a tool that details: (a) the measures to be taken during project implementation and operation to eliminate or offset adverse environmental and social impacts or reduce them to acceptable levels; and (b) the actions needed to implement these measures.	The legislation of the Republic of Tajikistan does not provide for a tool formally analogous to the Environmental and Social Management Plan (ESMP). Instead, disparate environmental protection measures are implemented, included in the project documentation within the framework of the EIA procedure, and regulated by environmental legislation. Social risk management measures (e.g., working conditions, compensation, access to resources) are regulated by land, labour, and sanitary legislation.	An ESMP will be developed separately for the waste collection and transportation system improvement project and for the landfill expansion project.
	(g) Environmental and social management framework (ESMF) is an instrument that examines the risks and impacts when a project consists of a program and/or series of subprojects, and the risks	There is no analogue to the Environmental and Social Management Framework (ESMF) instrument in the regulatory legal framework of the Republic of Tajikistan.	This tool will be very useful for the Landfill expansion project, but at a later stage of its implementation.

Topic / Issue	WB requirements (SEP, ESS1-6,8,10)	Similar requirements in RT legislation	Gaps and proposed actions to eliminate discrepancies
	and impacts cannot be determined until the program or subproject details have been identified.		
	(h) Regional ESIA examines environmental and social risks and impacts, and issues, associated with a particular strategy, policy, plan, or program, or with a series of projects, for a particular region (e.g., an urban area, a watershed, or a coastal zone); evaluates and compares the impacts against those of alternative options; assesses legal and institutional aspects relevant to the risks, impacts and issues; and recommends broad measures to strengthen environmental and social management in the region. Regional ESIA pays particular attention to potential cumulative risks and impacts of multiple activities in a region.	The legislation of the Republic of Tajikistan lacks an instrument analogous to the Regional Environmental and Social Assessment (Regional ESIA) that is used in international practice. The impact assessment procedure in Tajikistan (OBOC / National EIA) is limited to specific projects and does not cover strategies, plans, programs, or groups of projects at the regional level. There is no obligation to consider alternatives, cumulative effects, or conduct a comprehensive analysis of the regional legal and institutional framework in the context of environmental and social risks.	A Regional ESIA is not within the Consultant's scope of work (under this project). However, it could be very useful for consolidating solid waste management in a wider area encompassing the territories of Dushanbe and the Gissar region.
	(i) Sectoral ESIA examines environmental and social risks and impacts, and issues, associated with a particular sector in a region or across a nation; evaluates and compares the impacts against those of alternative options; assesses legal and institutional aspects relevant to the risks and impacts; and recommends broad measures to strengthen environmental and social management in the region. Sectoral ESIA also pays particular attention to potential cumulative risks and impacts of multiple activities. A Sectoral ESIA may need to be supplemented with project- and site-specific information.	The legislation of the Republic of Tajikistan does not provide for sectoral environmental and social impact assessment (Sectoral ESIA) as a strategic tool for analysing risks, cumulative impacts, and the institutional sustainability of an industry. The legislative and institutional framework is primarily focused on object-level assessment (OBOC / National EIA), not fully encompassing entire industries or sectors.	Sectoral ESIA is also not within the scope of this Task. However, it would be very useful for the formation of a unified solid waste management system in the Republic of Tajikistan.
	(j) Strategic environmental and social assessment (SESA) is a systematic examination of environmental and social risks and impacts, and issues, associated with a policy, plan or program, typically at the national level but also at the sub-national level. The examination of environmental and social risks and impacts will include consideration of the full range of environmental and social risks and impacts incorporated in ESS1 through 10 SESAs are typically not location specific. They are therefore prepared in conjunction with project and site-specific studies that assess	There is no legal basis for conducting Strategic Environmental and Social Assessment (SESA) in the national legislation of the Republic of Tajikistan. Neither the Law on Environmental Protection, nor the Law on EIA, nor other by-laws provide for mandatory assessment of the environmental and social consequences of strategies, policies, programs, and regulatory initiatives.	Strategic environmental and social assessment (SESA) is the most comprehensive tool that could be recommended for the development and evaluation of a national Solid Waste Management Concept.

Topic / Issue	WB requirements (SEP, ESS1-6,8,10)	Similar requirements in RT legislation	Gaps and proposed actions to eliminate discrepancies
	the risks and impacts of the project.		
<b>ESS2 Labor and Working Conditions</b>			
Project workers	The term "Project Workers" includes: Workers directly involved in the project (direct workers); Contract workers hired or engaged by a third party (contracted workers); Workers of primary suppliers (primary supply workers); Workers engaged in public works (community workers).	These definitions are absent in the RT regulatory framework, but they do not contradict it and can be used for methodological purposes.	In this Project, the term "project workers" is used as defined by the WB (World Bank).
Terms and conditions of employment	Project workers will be provided with information and documentation that is clear and understandable regarding their terms and conditions of employment. Project workers will be paid on a regular basis as required by national law and labour management procedures.	The RT legislation stipulates formal contracts with workers. However, cases of work being performed without formal employment arrangements are quite frequent in the Republic of Tajikistan.	Within the framework of this project, there is a group of people, collecting MSW components subject to recycling (both at collection points in Dushanbe and at the landfill). These are the so-called "informal collectors" who, in violation of the law, work without contracts and social guarantees.
Non-discrimination and equal opportunity	The employment of project workers will be based on the principle of equal opportunity and fair treatment, and there will be no discrimination with respect to any aspects of the employment relationship, such as recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment, access to training, job assignment, promotion, termination of employment or retirement, or disciplinary practices.	The Constitution and legislation of the Republic of Tajikistan declare equal opportunities for men and women and the absence of discrimination.	In practice, gender inequality exists in the Republic of Tajikistan, and it is not always possible to fully ensure women's rights. To address this issue, it is necessary to provide for special measures (within the framework of the Environmental and Social Management Plan, ESMP).
Child labour and minimum age	A child over the minimum age and under the age of 18: 1. may be employed or engaged in connection with the project only under the following specific conditions: (a) the work is not harmful to health; (b) an appropriate risk assessment is conducted prior to the work commencing; and (c) the Borrower conducts regular monitoring of health, working conditions, hours of work and the other requirement of this ESS. 2. will not be employed or engaged in connection	According to the Labor Code of the Republic of Tajikistan, the minimum age for concluding an employment contract is 15 years, and in exceptional cases — 14 years with parental consent and subject to safety conditions (Article 21). The Labor Code of the Republic of Tajikistan directly prohibits the involvement of minors in heavy, underground, and harmful work (Article 4). Mandatory medical examinations and reduced working hours are provided, as well as additional guarantees regarding working conditions and safety.	The requirements of the legislation of the Republic of Tajikistan regarding the use of child labour are largely similar to the requirements of ESS2. However, in practice, in violation of the law, child labour may be used in sectors with weak enforcement control. In particular, in the project, a source of risk is the community of informal waste pickers. Necessary measures will be developed within the framework of the ESMP.

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	with the project in a manner that is likely to be hazardous or interfere with the child's education or be harmful to the child's health or physical, mental, spiritual, moral or social development.		
Forced labour	Forced labour, which consists of any work or service not voluntarily performed that is exacted from an individual under threat of force or penalty, will not be used in connection with the project. This prohibition covers any kind of involuntary or compulsory labour.	The legislation of the Republic of Tajikistan prohibits forced labour, enshrining the principle of freedom of labour, according to which everyone has the right to work, free choice of profession, and the prohibition of coercion to perform work. Forced labour is considered a violation of labour rights, and its use is an offense entailing legal liability.	This item/subsection is fully compliant with international standards.
Grievance mechanism	Workers involved in the project should have access to a grievance mechanism to address concerns that arise during the course of their work, commensurate with the nature and level of the project's risks and impacts. The grievance mechanism may utilize existing grievance mechanisms, providing that they are properly designed and implemented, address concerns promptly, and are readily accessible to such project workers.	The RT legislation provides for the right of workers to file complaints on issues related to working conditions, the compliance with labour rights, and occupational safety. The employer is obliged to consider such appeals within the established timeframes and ensure the protection of workers from retaliation for filing complaints. The regulatory framework of Tajikistan does not contain a requirement to create a specialized mechanism adapted to the risks of a specific project. The following options are provided for appeal: a) to a conciliation commission; b) to the Labor Inspectorate under the Ministry of Labor and Employment; and c) to the court. The registration of complaints and subsequent procedures are outlined in the Law on Appeals of Individuals and Legal Entities.	Within the framework of the Project, it is necessary to develop a mechanism for filing and reviewing complaints, accessible to all Project workers. This is being developed within the framework of the Project.
Occupational Health and Safety (OHS)	Occupational Health and Safety (OHS) requirements must incorporate the sanitary and epidemiological standards (SES2) outlined in the General Guidance on Sanitary and Epidemiological Safety Assurance (GGSESA), as well as, where applicable, the sector-specific guidance and other procedural methods and operational provisions (PMOP). All parties employing or engaging project workers shall develop and implement procedures to ensure and maintain workplace safety. A system for the regular monitoring of compliance	The legislation of the Republic of Tajikistan establishes the employer's obligation to ensure safe and healthy working conditions for all employees, including conducting assessments of occupational risks, taking measures to eliminate or reduce hazards, and monitoring compliance with occupational safety requirements. The employer is responsible for creating an occupational safety and health management system, conducting training, regular inspections, and providing employees with personal protective equipment. State authorities supervise compliance with occupational safety	Safety and occupational health procedures must be maintained for all project workers

Topic / Issue	WB requirements (SEP, ESS1-6,8,10)	Similar requirements in RT legislation	Gaps and proposed actions to eliminate discrepancies
	with occupational health and safety rules, technical safety regulations, and working conditions must be implemented. This system should include the identification of safety and health hazards and risks, the application of effective methods for responding to identified threats and risks, as well as the establishment of priorities for taking action and evaluating the results. Safe working conditions must be provided to all categories of Project workers.	rules.	
<b>ESS3 Resource Efficiency and Pollution Prevention and Management</b>			
Resource efficiency	The Borrower will implement technically and financially feasible measures for improving efficient consumption of energy, water and raw materials, as well as other resources. Such measures will integrate the principles of cleaner production into product design and production processes to conserve raw materials, energy and water, as well as other resources.	Similar requirements for the rational use of resources are enshrined in the Law of the Republic of Tajikistan "On Environmental Protection" dated August 2, 2011, No. 760, and a number of related regulatory acts. According to Article 5, one of the main principles of environmental protection is the restoration, conservation, and rational use of the environment to improve living standards and ensure a favourable environment for work and recreation of the population. The Law "On Environmental Review" (No. 818 dated April 16, 2012) provides for the assessment of the effectiveness, validity, and sufficiency of measures for the protection of public health, the rational use of natural resources, and environmental at the examined objects / facilities.	To implement the Green Economy Development Strategy, it is necessary to develop by-laws on the conservation of natural resources and the efficient recycling of secondary materials. These acts will contribute to the introduction of a circular economy, the reduction of waste generation, and the increase of waste recycling.
Pollution prevention and management	The Borrower will avoid the release of pollutants or, when avoidance is not feasible, minimize and control the concentration and mass flow of their release using the performance levels and measures specified in national law or the EHSGs, whichever is most stringent.	The Law of the Republic of Tajikistan "On Environmental Protection" establishes requirements for the prevention of negative environmental impacts and the rational use of natural resources. Article 35 of this law requires that the implementation of economic projects (including solid waste landfills) prevents negative impacts on the environment and ensures environmental safety.	The development of by-laws on efficient waste management (reducing waste generation and increasing its recycling) will indeed contribute to the reduction of environmental pollution.
Management of hazardous and non-hazardous wastes	The Borrower will avoid the generation of hazardous and non-hazardous waste. Where waste generation cannot be avoided, the Borrower will minimize the generation of waste, and reuse, recycle and recover waste in a manner that is safe	The Basic Law of the Republic of Tajikistan on Production and Consumption Waste dated May 10, 2002, No. 44, regulates all types of activities related to waste management. It covers the processes of generation, collection, storage, transportation,	To ensure the Law on Waste works to its full potential, it is necessary to: Regulate the control and monitoring of waste management activities. Mandate the development and

Topic / Issue	WB requirements (SEP, ESS1-6,8,10)	Similar requirements in RT legislation	Gaps and proposed actions to eliminate discrepancies
	for human health and the environment. Where waste cannot be reused, recycled or recovered, the Borrower will treat, destroy, or dispose of it in an environmentally sound and safe manner that includes the appropriate control of emissions and residues resulting from the handling and processing of the waste material.	neutralization, and disposal of waste, and also establishes a system of state management, supervision, and control in this area. The law establishes the principle of priority of environmental and human health protection in waste management, as well as the promotion of the involvement of waste in economic circulation as secondary resources.	implementation of Technological Regulations for waste disposal activities at landfills. Develop the missing documents on handling construction waste, asbestos-containing waste, and biological waste.
<b>ESS4: Community Health and Safety</b>			
Infrastructure and equipment design and safety	The Borrower will design, construct, operate, and decommission the structural elements of the project in accordance with national legal requirements, the EHSGs and other GIIP, taking into consideration safety risks to third parties and affected communities.	Regulatory documents of the Republic of Tajikistan detail the requirements for the sites and equipment of collection points (see <a href="#">Section 2.1</a> ).	It is necessary, as a matter of priority, to achieve compliance with the requirements of national legislation and the regulatory framework in the field of waste collection. The requirements of the WB and good international industry practice should be implemented in the medium term.
Traffic and road safety	The Borrower will identify, evaluate and monitor the potential traffic and road safety risks to workers, affected communities and road users throughout the project life cycle and, where appropriate, will develop measures and plans to address them.	The Law of the Republic of Tajikistan dated May 17, 2018, No. 1533 "On Road Traffic" stipulates that state bodies, organizations engaged in the design, production, and operation of vehicles are obliged to develop a set of measures to prevent and reduce the harmful impact of vehicles on the environment and ensure compliance with the environmental protection legislation of the RT.	The project is primarily being implemented in an urban environment where the risks associated with road traffic and pedestrian safety are high. A Traffic Management Plan for specialized transport will be developed / updated.
Community exposure to health issues	The Borrower will avoid or minimize the potential for community exposure to water-borne, water-based, water-related, and vector-borne diseases, and communicable and non-communicable diseases.	A similar requirement is enshrined in the Health Code of the Republic of Tajikistan. The Code obliges the implementation of a set of sanitary-hygienic and anti-epidemic measures aimed at preventing and reducing the risks of the spread of infectious, waterborne, and other diseases among the population.	Successful implementation of the project will indeed reduce risks to public health. It is crucial to bring the condition of collection points into compliance with national legislation.
<b>ESS5. Land acquisition, restrictions on land use and forced resettlement</b>			
Preventing and minimizing displacement. Preventing forced evictions	The Borrower has an obligation to consider feasible alternative project options in order to avoid or at least minimize physical and/or economic displacement. Forced eviction is not allowed.	The principle of preventing or minimizing impacts on land resources, as well as preventing forced evictions, is enshrined in legislation (Civil and Land Codes, relevant government regulations).	National legislation does not require documentary consideration of alternatives. The Resettlement Framework requires that alternatives be considered in the RP and LRP for those projects and Components where it is necessary to avoid or minimise physical and/or economic displacement.

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			The principles for land acquisition set out in this Resettlement Framework for the Project aim to minimise displacement (unless this is inconsistent with national legislation to protect public health). It is envisaged that any additional land required for the landfill and for Component 1 sub-projects will be allocated from unused reserve or non-agricultural land. In exceptional cases, land may be appropriated for national or public use in accordance with established procedures.
Framework documents/Resettlement plans	Resettlement instruments (framework documents/Resettlement Plans etc.) must be prepared and implemented before any resettlement can take place.	There are no specific provisions for the resettlement planning process, but commissions are being created to determine the type and amount of compensation.	In the Republic of Tajikistan, there is no legal requirement for the availability of framework documents prior to resettlement. This Resettlement Framework is designed to bridge this gap. Further RPs and LRP will be developed for those Project activities where necessary, in particular for Component 2 – landfill expansion.
Providing assistance to PAPs, especially vulnerable persons	For projects that result in economic displacement of people and impact on livelihoods or income generation, the RP provides for additional measures aimed at improving or restoring livelihoods.	There are no specific laws or provisions for livelihood restoration in relation to land acquisition and the impact of forced resettlement.	There are no provisions in the national legislation to provide assistance to vulnerable groups. This Resettlement Framework provides guidelines for the identification of affected groups and PAPs who should be provided with special assistance to restore/improve their standard of living or restore their pre-project livelihoods. Vulnerable groups will be given special attention during the implementation of the Project.
Census of the affected population, inventory of affected property, socio-economic research of the affected PAPs/PAHs	A census of the affected population and an inventory of assets are conducted to identify the persons who will be affected by the project and determine who will be eligible for compensation and assistance.	The legislation provides for an inventory of the affected property, including land, buildings, trees, crops, etc., with drawing up a report signed by the parties. A population census and socio-economic research are not required. Existing regulations do not contain requirements for the restoration of the livelihoods of PAPs in connection with the alienation of land plots.	There are no requirements in the national legislation to conduct a population census or socio-economic research, and there are no requirements to restore the livelihoods of PAPs in connection with the land plots alienation. To bridge these gaps, this Resettlement Framework requires the development of a RP/LRP where involuntary resettlement is

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			<p>envisaged, including through consultation with PAPs, socio-economic surveys, census and vulnerability assessment of PAPs to, for example, ensure inclusion of female-headed households. Approaches and potential preliminary livelihood restoration measures are proposed in this Resettlement Framework.</p> <p>Activities will be implemented in cooperation with the relevant authorities.</p>
Cut-off date (expiry dates of the right to compensation)	<p>The cut-off date is the date after which compensation for lost property is no longer provided. This deadline is set as the date of commencement or completion of the census of PAPs and/or the inventory of the affected property and/or the closest stage of the process in accordance with the law.</p> <p>Persons who acquired or started using land/resources after the cut-off date are not eligible for compensation.</p>	There are no specific requirements.	<p>National legislation does not specify the cut-off date or the procedure for setting it.</p> <p>For different sub-projects of the Project, if they may lead to forced resettlement, cut-off dates may be set either as the date of the start or completion of the inventory, or as the date of the decision to alienate the property.</p> <p>The cut-off date will be communicated to the public through the disclosure of this ESMF (including the Resettlement Framework) and, when developing individual RPs within the sub-projects, to potential PAPs.</p>
Right to receive compensation	<p>The lack of formalized title to property is not a serious obstacle to receiving assistance or alternative forms of assistance. PAPs, without formally registered or recognized rights to land, are entitled to receive assistance for relocation and for the loss of their property located on land that does not belong to them. The borrower is required to offer PAPs with formal land rights the opportunity to make an informed choice between compensation in kind (land for land; a plot of land and a house in place of the plot and house affected by the project) or monetary compensation, as well as monetary compensation for lost property (other than a plot of land) for those PAPs who do not have a legally recognized right to land.</p>	<p>Compensation is only available to registered landowners, users, tenants or owners with legal rights to land who have suffered losses due to the alienation, purchase or temporary occupation of their land.</p> <p>Land within the SPZ is not confiscated.</p> <p>Questions on the legality of compensation due to land use rights restrictions in connection with the establishment of SPZ are subject to review and consultation with authorities.</p>	<p>National legislation provides compensation only for registered owners; there are no guarantees for unofficial users.</p> <p>It is assumed that the land that may be needed for Component 1 is not private property and is not in permanent or temporary use by private individuals, so the state can transfer it to the SUE "Smart City".</p> <p>If alienation of privately owned/used land plots is required, the affected PAPs will be offered alternative plots or cash compensation for the alienated plots and other assets in accordance with the requirements of ESS5. If informal users of the land plots are affected, they will be identified and provided with assistance to restore their livelihoods in accordance with this Resettlement Framework.</p>

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Physical displacement	In the case of physical resettlement, the displaced persons receive assistance during their relocation; they are provided with housing and, if necessary, agricultural land that is at least equivalent in quality to the old land plot.	To the greater extent, regulated by national legislation.	National legislation regulate issues of physical displacement, however, do not regulate the issues of additional assistance to displaced persons. The matrix of entitlements for compensation and assistance (see below in this Resettlement Framework) provides for additional measures to achieve compliance with ESS5.
Restoring livelihoods	Economically displaced persons are provided with an allowance or other support based on the time it is estimated they will need to improve or at least restore their income potential, productivity levels and standard of living. In addition to cash assistance, alternative development assistance such as land preparation, credit, training or employment opportunities is provided.	Restoring livelihoods is not provided for by law. Relocation assistance and allowance, loss of jobs, social subsidies, rehabilitation measures are not mentioned in Resolution No. 641 of RT.	There are no requirements in national legislation for restoring livelihoods. The matrix of entitlements for compensation and assistance (see below in this Resettlement Framework) provides for additional measures to achieve compliance with ESS5 (to restore livelihoods to pre-project levels or above (where possible)).
Relocation timeline / transfer of rights	The acquisition of land and associated property can only take place after resettlement measures have been taken and compensation has been paid and, where necessary, relocation assistance has been provided.	The right to use a land plot may be cancelled after the land user has been provided with an equivalent land plot or compensation has been paid for other damages.	There are no discrepancies. Compensations must be paid before the land acquisition. Livelihood restoration measures may take quite a long time.
Consultations, disclosure of information	PAPs should be informed and consulted about resettlement options and should be given the opportunity to participate in the planning, implementation and monitoring of resettlement. They should be informed about the resettlement aspects of the project at an early stage, and their views should be taken into account in the process of designing. The draft resettlement document should be posted in a place that is accessible to PAPs. When the Borrower and WB approve the document (tool) of resettlement, they place it on their websites.	The legislation does not fully regulate public consultations with PAPs on resettlement options. However, it does require that agricultural production losses be determined by local land committees with the participation of land users. The land user or user of other registered rights related to land must be notified in writing by the local executive body of state authorities no later than one year before the upcoming land plot acquisition. Decisions on a land plot acquisition for state or public purposes are published in national newspapers within five working days from the date of the decision taken by the executive body of state authorities.	National legislation does not regulate consultations with PAPs when planning resettlement. The Project will be implemented in accordance with the requirements of ESS 5 and 10. Consultations will be carried out in accordance with the Stakeholder Engagement Plan (2025) and this Resettlement Framework (and later, in accordance with the developed RP / LRP).
Grievance mechanism	A free, independent and publicly known grievance mechanism, including formal and informal means, should be developed and made available to all	State organizations must follow the requirements of regulatory legal acts governing the procedure for receiving and considering grievances and appeals.	National legislation does not require the creation of a special grievance mechanism for resettlement.

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	PAPs. The Borrower should establish such a mechanism as early as possible to ensure that grievances and appeals concerning physical/economic displacement are received and addressed in a timely manner.	The legislation does not require the creation of a special mechanism for filing and considering grievances for individuals/entrepreneurs affected by the process of acquiring or using land plots. In the event of disagreements regarding the assessment of the value of the alienated land, the landowner and the project developer may file a lawsuit in court.	The grievance mechanism has already been proposed in the Stakeholder Engagement Plan (2025). The mechanism is supplemented by specific activities to support the process of land acquisition and the establishment of land use restrictions (e.g. within the SPZ of the landfill). The grievance mechanism will be published as part of this ESMF (including the Resettlement Framework), and the general grievance mechanism will be published as part of the Stakeholder Engagement Plan (2025).
Monitoring and evaluation of the resettlement process and audit of the resettlement plan implementation	Internal monitoring and evaluation of resettlement activities is required. The Client is responsible for the implementation of the mechanism and must inform the WB about the progress of resettlement. For all projects with significant impacts in the form of forced resettlement, the Borrower will commission an external independent audit of the RP implementation after the completion of mitigation measures. If necessary, corrective measures must be developed and implemented.	Partial regulation - monitoring of compensation for losses of agricultural production is carried out by the State Committee for Land Management and Geodesy. Other measures for compensation for resettlement are not regulated by national legislation.	National legislation regulates it only partially (in terms of crop losses); there are no requirements for conducting an audit. The principles of monitoring are described in this Resettlement Framework; the monitoring itself will be carried out in accordance with the details in the RP / LRP. It is assumed that for the landfill expansion project, after the implementation of its RP, it may be necessary to conduct an audit of the RP implementation.
<b>ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources</b>			
Assessment of risks and impacts	To identify risks and impacts on biodiversity, the Borrower conducts an initial environmental and social assessment, identifying habitat types and potential threats, including significant areas regardless of their legal status. The scope of the assessment corresponds to the likelihood, significance, and severity of the risks, and also takes into account the opinions of stakeholders. The assessment includes a description of baseline conditions and, if necessary, additional studies and monitoring before key project decisions are made.	The Law of the Republic of Tajikistan "On Environmental Review" (2012) and the Law "On Environmental Impact Assessment" (2017) require identifying the potential harm to biodiversity and to provide for measures to prevent and reduce negative impacts.	Within the framework of this Project, significant claims and adverse impacts on biodiversity are not anticipated, and the scope of the necessary assessment will be appropriate.
Conservation of biodiversity and habitats	The WB applies a differentiated approach to habitat risk management, dividing them into modified, natural, and critical, as well as legally protected areas of biodiversity value. Biodiversity offset	Current laws of the Republic of Tajikistan establish the obligation to protect biological diversity. The Law "On Environmental Protection" proclaims the conservation of species and ecosystems, and	The laws do not require ensuring zero net loss to biodiversity, as required by the WB (and a net gain for critical habitats). There is also no differentiation of habitats according

Topic / Issue	WB requirements (SEP, ESS1-6,8,10)	Similar requirements in RT legislation	Gaps and proposed actions to eliminate discrepancies
	measures are considered as a last resort in the presence of significant residual negative impacts after all possible measures to prevent and minimize them have been taken. Such measures are aimed at achieving measurable and long-term conservation outcomes, ensuring no net loss, and in the case of critical habitats, a net gain of biodiversity. In cases where the impact on unique and irreplaceable areas in terms of biodiversity cannot be compensated, project implementation is not allowed, and its redesign is required.	the Laws "On the Animal World" (2008) and "On the Protection and Use of the Plant World" (2004) provide for the protection of rare and endangered species (Red Book) and the responsible use of biological resources. In the event of inevitable damage to the natural environment, the legislation requires compensatory measures – for example, the restoration of plantings during forest felling, the payment of compensation for the seizure of natural fund lands, etc.	to their value (modified, natural, critical) and no mandatory justification for the impossibility of alternatives before the loss of valuable ecosystems. Within the framework of this Project, the requirements of ESS6 will be taken into account where / if applicable
Legally protected and internationally recognized areas of high biodiversity value	When implementing a project in legally protected areas or zones/territories recognized as protected at the regional or international level, the Borrower shall respect the conservation status and management objectives of these areas. It is also necessary to identify and mitigate potential negative impacts so as not to jeopardize the integrity, conservation goals, and biodiversity value of such territories.	The legislation of the Republic of Tajikistan on Specially Protected Natural Areas (SPNAs) (2011) strictly regulates any activity within the boundaries of nature reserves, national parks, and other SPNAs. The Law of the Republic of Tajikistan "On Specially Protected Natural Areas" requires compliance with the protection regime and management goals of such territories. Projects implemented on the lands of SPNAs are allowed only with the permission of authorized bodies and provided that they do not violate the protection regime. Furthermore, if a territory has international status, the Republic of Tajikistan is obliged to comply with the relevant international agreements, which implies the preservation of the integrity and value of these territories.	Not applicable to the current Project. There are no internationally recognized areas of particular biodiversity importance within or near the Project's implementation area. No action is required.
Invasive alien species	The introduction of alien species poses a significant threat to biodiversity due to the risk of their invasive behaviour and displacement of native species. The Borrower shall not intentionally introduce new alien species, especially those with a high risk of invasiveness, except in cases regulated by law and after an assessment of potential threats. Measures must be taken to prevent accidental introduction, and in the case of already established species, to prevent their further spread and, where possible, to take measures to eradicate them in areas under the Borrower's control.	The Republic of Tajikistan has established regulations to prevent the introduction and spread of alien species. The Law "On Quarantine and Plant Protection" contains provisions on preventing the introduction of alien (exotic) species capable of harming ecosystems.	Not applicable to the current Project.
Sustainable management of	Projects involving the use of living natural	The RT legislation stipulates that the use of living	Not applicable to the current Project.

Topic / Issue	WB requirements (SEP, ESS1-6,8,10)	Similar requirements in RT legislation	Gaps and proposed actions to eliminate discrepancies
living natural resources	resources require an assessment of their sustainability and impacts on the environment and local communities, including indigenous peoples, applying recognized management standards or Good International Industry Practice (GIIP).	natural resources (land, forests, water, wild animals, and plants) must be rational and not lead to depletion. The Forest Code of the Republic of Tajikistan requires compliance with forest reproduction standards, logging limits, and restoration during forest use. The Law "On the Animal World" establishes general rules for hunting and fishing on a sustainable basis – through licensing, extraction quotas, and population reproduction measures.	
Primary suppliers	When procuring goods / products associated with the risk of degradation of natural or critical habitats, the Borrower must assess the verification systems of its suppliers, establish the origin of the products, and, where possible, give preference to those that do not contribute to such impacts. The Borrower should strive to replace suppliers with significant negative impacts with more responsible ones, taking into account the degree of its control and influence over them.	There are no direct analogues to this requirement in the legislation of the Republic of Tajikistan, as it is rather a project risk management policy.	Not applicable to the current Project.
<b>ESS8: Cultural Heritage</b>			
Stakeholder consultation and identification of cultural heritage	As part of the environmental and social assessment, the Borrower will identify stakeholders relevant to known and potentially discoverable cultural heritage, including affected communities, regulators, NGOs and experts. The Borrower will meaningfully consult with these stakeholders to identify cultural heritage, assess potential risks and seek ways to prevent and mitigate them, including developing measures to protect cultural heritage during Project implementation.	EIA procedures in Tajikistan provide for public awareness and stakeholder participation in the implementation of major projects, which may include discussions on the protection of cultural values. In addition, the Law of the Republic of Tajikistan "On the Protection and Use of Historical and Cultural Heritage Sites" (2006) establishes that cultural heritage sites are subject to identification and registration in the State Register of Historical and Cultural Heritage Sites. The legislation of the Republic of Tajikistan does not require project initiators to conduct direct consultations with local communities specifically to identify unknown or intangible cultural values.	No significant impacts on cultural heritage are expected within the framework of this Project. Accordingly, this ESS8 norm is not applicable.
	Stakeholder access Where there are cultural heritage sites on the project site or access to them is blocked, the Borrower, in consultation with its users, will ensure continued access or provide a safe alternative	The legislation does not directly regulate the obligation to provide public access to cultural heritage sites during the implementation of projects, but indirectly the right of citizens to access monuments follows from the principles of heritage	Not applicable to this Project

Topic / Issue	WB requirements (SEP, ESS1-6,8,10)	Similar requirements in RT legislation	Gaps and proposed actions to eliminate discrepancies
	route.	protection. Sites included in the register are usually under state protection and can be visited if this does not contradict their maintenance regime.	
Legally protected cultural heritage areas	When implementing a project in protected cultural heritage areas or in their buffer zones, the Borrower must comply with relevant regulations and management plans. It is also necessary to consult with management organizations and stakeholders and, where necessary, implement additional programs to enhance the protection of these areas.	All objects included in the State Register of Historical and Cultural Heritage of the Republic of Tajikistan are protected by law. The Law "On the Protection and Use of Historical and Cultural Heritage Objects" prohibits damage to monuments and regulates any work on their territory and in protected areas. To carry out construction or other work on a monument or within the established protected boundaries, it is necessary to obtain permission from the authorized body (the Ministry of Culture) and comply with the approved use regime.	It is necessary to ensure that there are no Cultural Heritage objects in the immediate vicinity of the implementation sites of the subprojects that will be included in the Project.
Archaeological sites and material	Archaeological sites may contain a variety of physical evidence of past human activity located on, under or above the surface of the land or water. When such evidence is discovered in the project area, the Borrower will undertake research to document and map it, providing the information to the appropriate cultural heritage authorities. Based on consultation with experts, the need for documentation, excavation or conservation on site will be determined, and the rightful owner of the artefacts will be identified for their proper storage, study and analysis.	If archaeological objects are discovered on the project territory, the legislation of the Republic of Tajikistan requires that the work be stopped and the relevant authorities be notified. At the legislative level, it is established that all historical and archaeological finds are subject to state protection. Archaeological objects and remains discovered during excavation work are considered state property.	This Project does not intend to disturb archaeological sites. Moreover, excavation work is only possible on a limited scale. However, in order to avoid unintentional damage to the material evidence of past human activity, it is recommended that a procedure for dealing with the discovery of a previously unknown cultural heritage site be developed and maintained.
Built heritage	Architectural heritage includes individual buildings or complexes of buildings that have historical, cultural or aesthetic value. The Borrower will identify measures to mitigate impacts on such heritage, including documentation, conservation, restoration or relocation, while ensuring that authenticity is maintained. Visual aspects are also taken into account when locating new infrastructure near architectural heritage.	Objects of architectural heritage (historical buildings, structures, architectural monuments) are protected by the norms of the law on culture. Any changes or work with such buildings are permitted only with the permission of heritage protection authorities and under their control. National legislation does not directly mention taking into account the visual impact of new objects on the historical environment - although in practice this aspect is partially considered through urban planning regulations, it is not always strictly observed.	Within the framework of this project, the possible impacts (including visual ones) of the solid waste collection system infrastructure facilities on architectural heritage sites will be taken into account.
Natural features with	Natural sites such as sacred sites and	The legislation of the Republic of Tajikistan	It is assumed that there are no natural

Topic / Issue	WB requirements (SEP, ESS1-6,8,10)	Similar requirements in RT legislation	Gaps and proposed actions to eliminate discrepancies
cultural significance	paleontological remains may also have significant cultural value for particular communities. The Borrower will identify such sites through research and stakeholder consultation, identifying their value and representatives to negotiate their protection and use. In situ conservation is the preferred method of conservation, and relocation is permitted only when in situ conservation is not possible and is undertaken with due regard for the views of affected parties and the preservation of traditions associated with the site.	recognizes that some natural objects may have cultural value.	objects of special cultural significance on the territory of the subprojects. This fact, however, must be verified at the level of each future subproject.
Movable cultural heritage	Movable cultural heritage includes books, paintings, religious objects, archaeological finds and natural history collections. To prevent theft, illegal trade and damage to such artefacts that may become more accessible as a result of the project, the Borrower will take measures to protect them and notify the relevant authorities of any violations. In consultation with the cultural heritage authorities, threatened objects will be identified and measures will be taken to preserve them throughout the duration of the project, informing the responsible institutions of the work schedule and potential risks.	Movable cultural heritage objects include artifacts, collections, art objects, archives. Their circulation and preservation are regulated by a number of regulatory acts. The Law of the Republic of Tajikistan "On the Export and Import of Historical and Cultural Values" (2019) prohibits the export of historical values from the country without a special permit, preventing illegal trade. Museum items are protected by the state - the Law "On Museums and Museum Funds" (2012) establishes requirements for the registration, storage and protection of collections. Theft or intentional damage to cultural monuments and cultural values is a criminal offense (the criminal legislation of the Republic of Tajikistan provides for liability for the theft or destruction of cultural values).	Within the framework of this Project, the risk of loss of movable cultural heritage objects is not expected.
Commercial use of cultural heritage	In the case of commercial use of the cultural heritage of the project's affected parties, the Borrower informs them about their rights, scope and possible consequences of the development. Commercial use begins only after meaningful consultation, fair distribution of benefits taking into account local customs and identification of mitigation measures to minimize negative impacts.	There is no direct equivalent to the WB requirements for the fair sharing of benefits from the commercial use of heritage in the legislation of the Republic of Tajikistan.	Not applicable to this Project
<b>ESS10: Stakeholder Engagement and Information Disclosure</b>			
General requirements	The Borrower shall engage with stakeholders throughout the project life cycle, commencing such engagement as early as possible in the project development process.	In the national system, these obligations are formulated in Article 24 of the Law on Environmental Impact Assessment No. 1448 (2017) and paragraphs 6-11 of Government Resolution	A stakeholder engagement plan will be developed during the implementation of the Project.

Topic / Issue	WB requirements (SEP, ESS1-6,8,10)	Similar requirements in RT legislation	Gaps and proposed actions to eliminate discrepancies
	<p>The nature, extent and frequency of engagement with stakeholders should be proportionate to the nature and scale of the project and its potential risks and impacts.</p> <p>The stakeholder engagement process includes (i) stakeholder identification and analysis; (ii) stakeholder engagement planning; (iii) information disclosure; (iv) stakeholder consultation; (v) responding to and resolving complaints; and (vi) reporting to stakeholders.</p>	<p>No. 532 (01.11.2018): the project initiator is obliged to notify the public already at the preliminary assessment stage, disclose materials, conduct consultations, record and take into account comments, and leave the final package of documents open until a decision is made.</p>	
Stakeholder identification and analysis	<p>The Borrower identifies project-affected parties and other stakeholders, as well as vulnerable groups. The identification and analysis of stakeholders is carried out in sufficient detail.</p>	<p>Law "On Environmental Impact Assessment" No. 1448 (18.07.2017) - Article 3 obliges the Client to take into account the opinion of stakeholders, and Chapter 4 (Articles 22-23) details the participation of public associations and citizens at all stages of the EIA, which implies their preliminary identification.</p> <p>Law "On Environmental Protection" No. 760 (02.08.2011) - Article 5 establishes the principle of mandatory participation of the population in decisions affecting the environment and health, thereby requiring the definition of the range of such groups. Government Resolution No. 532 of 01.11.2018 (clause 6) requires the Client during the preliminary impact assessment to inform the population of the territories that the activity may affect, which in fact requires identifying and describing all relevant categories of stakeholders, including vulnerable groups.</p>	<p>Stakeholder analysis has been completed. A database will be developed and maintained by the Client.</p>
Stakeholder Engagement Plan	<p>A SEP is prepared at the early stages of project preparation and maintained in working order throughout all stages of the life cycle and is periodically updated.</p> <p>The SEP is developed taking into account the key characteristics and interests of stakeholders, as well as different levels of engagement and consultations that are appropriate for different stakeholders. The SEP should be proportionate to the scale of the project and the nature and significance of its risks and environmental impacts.</p>	<p>The regulatory framework of the RT does not provide for a document similar to the SEP.</p>	<p>The SEP for 2025-2026 has been developed. Periodically (but not less than once a year) the SEP implementation will be analysed and updated.</p>

Topic / Issue	WB requirements (SEP, ESS1-6,8,10)	Similar requirements in RT legislation	Gaps and proposed actions to eliminate discrepancies
Information disclosure and consultations with stakeholders	The Borrower provides timely, relevant, understandable and accessible information and conducts meaningful consultations that exclude manipulation, interference, coercion, discrimination and intimidation.	National regulations require early and regular disclosure of information and public consultation. Article 12 of the Law on Environmental Protection establishes the right of citizens to receive complete and reliable environmental information. Law on Environmental Impact Assessment No. 1448 (Articles 3, 22-23) obliges the project initiator to disclose EIA materials and take into account the comments of all affected persons, and paragraphs 6-11 of Government Resolution No. 532 of 01.11.2018 specify the procedure for publishing information, consultation formats and documenting responses.	Disclosure of information and consultation with the stakeholders will be carried out in accordance with the SEP.
Grievance mechanism	The bank's client is obliged to develop and maintain in working order a grievance mechanism.	Law of the Republic of Tajikistan "On Appeals of Individuals and Legal Entities" dated July 23, 2016 No. 1339. The Law requires that organizations and enterprises accept, register and consider incoming complaints and proposals, provide a reasoned response within the established time frame (Articles 15–20), ensure confidentiality and the inadmissibility of persecution of applicants (Article 6).	As part of the SEP, the Grievance Mechanism (previously developed by the SUE "Smart City") has been updated.
Reporting to stakeholders	One of the important elements of stakeholder engagement is periodic reporting on the results of its environmental and social activities.	Law "On Environmental Monitoring" (2011), Art. 3: one of the objectives of monitoring is "ensuring the needs of the state, individuals and legal entities in reliable information on the state of the environment". The Law "On Appeals of Individuals and Legal Entities" (2016) establishes the obligation of organizations to provide applicants with a written response within the established time frame, thereby ensuring feedback on the results of their activities. The Law on Environmental Impact Assessment (2017), Articles 22–23, require open access to EIA materials and their updating, taking into account citizens' comments, before a decision on the project is made.	As part of the Project implementation, the Client will annually prepare and publish reports on his environmental activities.

## ANNEX 2. SOCIO-ECONOMIC PROFILE OF INFORMAL WASTE PICKERS AT THE MSW LANDFILL

**General information.** A team of 3 E&S Consultants conducted two rounds of interviews with 64 informal waste pickers at the MSW Landfill (including 27 women and 37 men). In Dushanbe. On March 4, 2025, interviews were conducted with 36 informal waste pickers (including 13 women and 23 men), and on April 30-May 1, 2025, interviews were conducted with 28 informal waste pickers (including 14 women and 14 men).

First of all, it should be noted that a significant number of respondents answered only some of the questions asked, preferring not to answer the rest. For example, 9 out of 64 respondents did not give their names, 14 respondents did not indicate their age, etc., obviously not wishing to give out their personal data. At the same time, everyone readily indicated their place of residence, marital status, their attitude to waste collection and other information.

**Age and gender.** The age of male waste pickers varies from 18 to 54 years old, and that of female ones from 19 to 60 years old. 68% of those who provided this data are aged 18-39 (32 people), 30% are 40-59 years old (14 people), and 2% are 60-75 years old (1 person). Besides, three of the interviewed informal waste pickers were minors aged 16-17 years (1 girl aged 17 years and 2 boys aged 16 and 17 years).

**Child waste pickers.** Out of 59 respondents, 10 respondents (17%) reported that their children (constantly or sometimes) help to select valuable fractions (including one respondent who said that almost all waste pickers come to the Landfill with children). 12 waste pickers (20%) mentioned that they saw children from other families who collect plastic and cardboard. The rest of the respondents preferred to refrain from answering this question.

**Place of residence:** waste pickers live in different (mostly neighbouring) villages/settlements (villages of Zarteppa, Darebod, Makhvali, Shakhriston, Vahdat, Boloshakhr, Teppai Samarkandi, Okchakman). Of these, 55 people (90%) live there permanently. Only one respondent indicated Dushanbe as his (temporary) place of residence. At the same time, 9 respondents (10%) answered that they do not have permanent housing.

**Family status:** most of the respondents – 52 people (82% of those 62 people who answered this question) have families, of which 19 families live together with the respondents. The remaining families live separately in other settlements of Tajikistan or in other countries (Russia, Uzbekistan). 11 pickers do not have families.

**Period of work at the solid waste Landfill.** 41 out of 61 waste pickers (67%) who answered this question reported that they have been collecting waste at the landfill up to 1 year. 12 people (20%) collect waste from 1 to 5 years, 5 people (8%) – from 5 to 10 years, and 3 people (5%) – over 10 years.

**The problem of sexual harassment and/or violence due to work.** The majority of respondents (48 people out of 50 who responded) answered negatively to the question of whether they had to face the problem of sexual harassment and/or violence due to work. 2 people (a man and a woman) said that “there are rumours”.

**Main and alternative activities and frequency/seasonality of waste collection.** For 39 people (64% of 61 people), waste sorting is the main activity that they do on a permanent basis, for 22 people (36%) it is temporary. 27 respondents (44%) collect waste on a regular basis, 18 people (30%) – “one-time” (once a week or when they consider it necessary and are not busy with another more regular job), another 16 people (26%) sort waste “seasonally”, when they are not busy with other jobs (in agriculture, in construction). 3 respondents did not answer this question.

**Daily income from waste collection.** 31 out of 36 waste pickers named the amount they earn per day:

- the minimum earnings are 20-30 somoni per day,
- the maximum is 100-150 somoni per day.

**Most of the respondents earn from 40 to 60 somoni per day.** Men earn more on average than women, for example, among 9 waste pickers who earn a “large” amount per day (over 50 somoni), only 2 are women.

The share of income from waste collection in the household budget. Only 44 respondents answered this question. 16 waste pickers reported that their income is the only one in the family and makes up 100% of the budget. The approximate share of income from waste collection in the monthly household budget is presented below.

**Table 8. Approximate share of income from waste collection in the monthly budget of households of the surveyed waste pickers**

Share of income from waste collection, %	0-24%	25-49%	50-75%	76% and more	Total
Number of waste pickers, people		12	14	18	14
including women		3	3	9	
% of waste pickers		27	32	41%	100

Source: Compiled by the E&S Consultant based on social research (March 2025).

According to interviews, other sources of income in the households are agriculture, construction, sewing, remittances from their relatives who live abroad.

**Satisfaction with current work.** 61 waste pickers answered the question whether they like this work. Only 19 (31%) of those who responded answered affirmatively and said that they want to continue working provided that the working conditions improve. 9 (15%) said that they got used to it, but there is no other work, and the majority – 33 people (54%) said that they do not like waste collection but are forced to do it due to the lack of other work.

**Willingness to undergo training and work at the landfill/waste disposal site officially.** 37 out of 60 waste pickers (62%) expressed interest in working with waste in the future. According to the waste pickers, the amount of the possible salary in the official job is the main consideration that can influence their decisions (it cannot be lower than the current income). All those who expressed interest in the possibility of employment in the waste/landfill sector also expressed willingness to undergo training.

Women are equally interested in formal work and education (18 women, or half of all those interested).

**The number of people working at the Landfill on a permanent basis.** According to one group of respondents, on average, from 30 to 40 people, and according to the second group, on average, from 60 to 80 people, collect recyclable materials at the Landfill on a regular basis.

### ANNEX 3. LIST OF PLANT SPECIES OCCURRING ON DUSHANBE MSW LANDFILL AND IN ITS IMMEDIATE VICINITY

№	Scientific name Латинское название	Russian name Русское название	English name Английское название	Characteristics of abundance Характеристика обилия
<b>1.</b>	<b><i>Apiaceae</i></b>	<b>Зонтичные</b>	<b>Apiaceae</b>	-
1.	<i>Conium maculatum</i>	Болиголов пятнистый	Poison hemlock	sol
<b>2.</b>	<b><i>Brassicaceae</i></b>	<b>Капустные</b>	<b>Brassicaceae</b>	-
2.	<i>Alyssum desertorum</i>	Бурачок пустынный	Desert alyssum	sp
3.	<i>Leptaleum filifolium</i>	Лепталеум нителистный	Leptaleum filifolium	sp
4.	<i>Strigosella africana</i>	Стриголлета африканская	African strigosella	sp
5.	<i>Strigosella turkestanica</i>	Стриголлета туркестанская	Turkestan strigosella	sp
<b>3.</b>	<b><i>Fabaceae</i></b>	<b>Бобовые</b>	<b>Fabaceae</b>	-
6.	<i>Trigonella arcuata</i>	Пажитник дугообразный	Arcuate trigonella	sol
7.	<i>Trigonella geminiflora</i>	Пажитник арноцветковый	Twin-flowered trigonella	sol
<b>4.</b>	<b><i>Gentianaceae</i></b>	<b>Горечавковые</b>	<b>Gentianaceae</b>	-
8.	<i>Gentiana oliveri</i>	Горечавка	Gentiana oliveri	sol
<b>5.</b>	<b><i>Lamiaceae</i></b>	<b>Яснотковые</b>	<b>Lamiaceae</b>	-
9.	<i>Phlomis bucarica</i>	Зопник бухарский	Phlomis bucarica	sp
<b>6.</b>	<b><i>Plantaginaceae</i></b>	<b>Подорожниковые</b>	<b>Plantaginaceae</b>	-
10.	<i>Veronica verna</i>	Вероника весенняя	Spring speedwell	sp
<b>7.</b>	<b><i>Polygonaceae</i></b>	<b>Гречишные</b>	<b>Polygonaceae</b>	-
11.	<i>Rumex crispus</i>	Щавель курчавый	Curly dock	cop 1
<b>8.</b>	<b><i>Cyperaceae</i></b>	<b>Осоковые</b>	<b>Cyperaceae</b>	-
12.	<i>Carex pachystylis</i>	Осока толстостолбиковая	Carex pachystylis	cop2
<b>9.</b>	<b><i>Asteraceae</i></b>	<b>Астровые</b>	<b>Asteraceae</b>	-
13.	<i>Artemisia turanica</i>	Полынь туранская	Turanian wormwood	sol
14.	<i>Centaurea iberica</i>	Василек иберийский	Iberian knapweed	cop 1
15.	<i>Matricaria chamomilla</i>	Ромашка обыкновенная	German chamomile	sol
16.	<i>Silybum marianum</i>	Растропша пятнистая	Milk thistle	sol
17.	<i>Taraxacum tadshikorum</i>	Одуванчик таджикский	Tajik dandelion	sol
<b>10.</b>	<b><i>Ranunculaceae</i></b>	<b>Лютиковые</b>	<b>Ranunculaceae</b>	-
18.	<i>Anemone bucharica</i>	Ветриница бухарская	Bukhara anemone	sp
19.	<i>Ceratocephalus orthoceras</i>	Рогоглавник пряморогий	Straight-horned ceratocephalus	sp
20.	<i>Ranunculus pinnatisectus</i>	Лютик перисто-рассечённый	pinnatisect buttercup	sp
<b>11.</b>	<b><i>Poaceae</i></b>	<b>Злаки</b>	<b>Poaceae</b>	-
21.	<i>Anisantha tectorum</i>	Костер кровельный	False oat-grass	sol
22.	<i>Bromus japonicus</i>	Костер японский	Japanese brome	sol
23.	<i>Bromus oxyodon</i>	Костер острозубый	Sharp-toothed brome	sol
24.	<i>Hordeum bulbosum</i>	Ячмень луковичный	Bulbous barley	sp
25.	<i>Hordeum leporinum</i>	Ячмень заячий	Barley grass	sol
26.	<i>Poa bulbosa</i>	Мятлик луковичный	Bulbous bluegrass	cop2
27.	<i>Vilpia myuros</i>	Вульпия мышехвостниковая	Rattail fescue	sol

#### ANNEX 4. LIST OF ANIMAL SPECIES ENCOUNTERED ON THE TERRITORY OF THE DUSHANBE CITY MSW LANDFILL IN ITS IMMEDIATE VICINITY (APRIL 4-6 AND MAY 16-17, 2025)

No.	Scientific name Латинское название	Russian name Русское название	English name Английское название	Habitats Среда обитания	Number and time of animal species encountered during monitoring	IUCN*	CITES**	RBT***
<b>1.</b>	<b>Amphibia</b>	<b>Земноводные</b>	<b>Amphibians</b>		-	1		1
1.	<i>Bufo viridis</i>	Зеленая жаба	European Green Toad	Lives in very different places (mixed and broad-leaved forests, steppes and deserts). Common.	-	LC		+
	Total / Всего							
<b>2.</b>	<b>Reptilia</b>	<b>Рептилии</b>	<b>Reptiles</b>		<b>12</b>	7		2
1.	<i>Testudo (Agrionemys) horsfieldii</i>	Степная черепаха	Central Asian tortoise	On clayey-sandy areas. Not numerous.	8 ind. 4-5.04	VU		+
2.	<i>Cyrtopodion fedtschenko</i>	Туркестанский голопалый геккон	Eversmann's fringe-toed Gecko	In loess cliffs. Common.				
3.	<i>Agama sanguinolenta</i>	Степная агама		Areas with dense vegetation. Common.	2 ind. 16-18.05			
4.	<i>Ablepharus pannonicus</i>	Азиатский гологлаз	Asian Snake-eyed Skink	Lives with dense grassy vegetation. Common.	-			
5.	<i>Eumeces schneideri</i>	Длинноногий сцинк	Long-legged skink	Lives with dense grassy vegetation. Common.	-	EN		+
6.	<i>Ophisaurus apodus</i>	Желтопузик	European Legless Lizard	Lives with dense grassy vegetation. Common.	2 ind. 16-18.05			
7.	<i>Vipera lebetina</i>	Гюрза	Blunt-nosed viper	In tugai forests, in river floodplains on clayey-sandy mounds and low cliffs. Rare.	-	EN		
	Total / Всего							
<b>3.</b>	<b>Отряд хищные птицы – Falconiformes – Bird of prey</b>							
<b>I.</b>	<b>Aves</b>	<b>Птицы</b>			<b>166 ind.</b>	8	20	8
<b>1.</b>	<b>Ястребиные</b>	<b>Accipitridae</b>	<b>Hawk, accipitrides</b>		<b>160 ind.</b>	6	15	6
1.	<i>Milvus korschun</i>	Чёрный коршун	Black Kite	Inhabits forests near swamps, rivers, lakes and reservoirs. Previously nested on large trees. At present, within the republic, it is found only during wintering. Numerous.	150 ind. 4-6.04		II	

2.	<i>Aegyptius monachus</i>	Чёрный гриф	Cinereous Vulture	Inhabitant of mountains, forests and deserts. Nests on rocky massifs and large trees. Not numerous.	Settled	-	VU	II	(NT)
3.	<i>Gyps fulvus</i>	Белоголовый сип	Griffon vulture	Inhabitant of mountains, forests and deserts. Nests on rocky massifs and large trees. Not numerous.	Settled	-		II	
4.	<i>Neophron percnopterus</i>	Стервятник	Egyptian Vulture	Inhabits cliffs, and during hunting hovers over plains and pastures, near populated areas. Nests on conglomerate cliffs. Not numerous.	Migratory	7 ind. 16-18.05	EN	II	(VU)
5.	<i>Gypaetus barbatus</i>	Бородач	Bearded vulture	Inhabits hard-to-reach mountains with rocky cliffs. Nests in inaccessible rocks. Rare.	Settled	-	EN	II	(NT)
6.	<i>Aquila chrysaetus</i>	Беркут	Golden eagle	Inhabitant of mountains, forests and deserts. Nests on rocky massifs and large trees. Rare.	Settled	-	VU	II	(VU)
7.	<i>Aquila heliaca</i>	Могильник	Imperial eagle	Inhabitant of mountains, forests and deserts. Rare.	Migratory	-		I	
8.	<i>Aguila rapax</i>	Степной орёл	Steppe Eagle	Inhabitant of mountains, forests and deserts. Not numerous.	Migratory	-			
9.	<i>Aquila clanga</i>	Большой подорлик	Greater spotted eagle	Inhabitant of mixed forests, floodplain meadows, swamps, rivers and lakes, which are excellent hunting grounds for it. Rare.	Migratory	-			
10.	<i>Buteo buteo</i>	Обыкновенный канюк	Common buzzard	Inhabits places where woody vegetation alternates with open spaces. Not numerous.	Wintering	3 ind. 4-6.04		II	
12.	<i>Buteo rufinus</i>	Курганник	Long-legged buzzard	Inhabits places where woody vegetation alternates with open spaces. Nests on rocks. Not numerous.	Wintering	-		II	
13.	<i>Buteo hemilasius</i>	Мохноногий курганник	Upland buzzard	Inhabits places where woody vegetation alternates with open spaces. Not numerous.	Wintering	-		II	
14.	<i>Accipiter gentilis</i>	Ястреб-тетеревятник	(Northern) goshawk	Inhabits forest and forest-steppe zones. Rare.	Wintering	-			
15.	<i>Accipiter nisus</i>	Ястреб-перепелятник	(Europea) sparrow hawk	Inhabits the edges of large or riverine forests. Rare.	Wintering	-	EN	II	(LC)
16.	<i>Circus cyaneus</i>	Полевой лунь	Hen Harrier	Inhabits large fields, meadows and steppes. Not numerous.	Migratory	-		II	
17.	<i>Circus macrourus</i>	Степной лунь	Pallid harrier	Inhabits large fields, meadows and steppes. Not numerous.	Migratory	-		II	
18.	<i>Pandion haliaetus</i>	Скопа	Osprey	Inhabits forest zones, steppes, rivers and ponds with clear water. Rare.	Migratory	-	EN	II	(EN)
<b>2.</b>	<b>Соколиные</b>	<b>Falconidae</b>	<b>Falcons</b>			<b>6 ind.</b>	2	5	2
19.	<i>Falco cherrug coasti</i>	Туркестанский балобан	Saker Falcon	Inhabits forest and meadow zones. Nests on high clay hills. Rare.	Settled	-	EN	II	(EN)
20.	<i>Falco peregrinus babylonicus</i>	Рыжеголовый сапсан	Peregrine Falcon	Settles in old forests near swamps, lakes and rivers. Rare.	Settled	1 ind. 4.04	EN	I	(EN)

21.	<i>Falco subbuteo</i>	Черлок	Northern Hobby	Inhabits forests and steppes. Nests in the nests of crows or magpies. Not numerous.	Migratory, nesting	4 ind. 4-6.04, 1 ind. 16.05		II	
22.	<i>Falco vespertinus</i>	Кобчик	Red-footed Falcon	Inhabits forest zones, forest-steppes and steppes. Rare.	Migratory	-		II	
23.	<i>Aesalon columbarius</i>	Дербник	Merlin, pigeon hawk	Inhabits small island forests, sparse woodlands and parks. Rare.	Migratory	-		II	
24.	<i>Cerchneis tinnunculus</i>	Обыкновенная пустельга	(Common, rock kestler	Inhabits groups of trees, including settlements. Nests, occupying the nests of crows or magpies. Not numerous.	Migratory	-			
<b>II Отряд Куриные – Galliformes –Fowl-like birds</b>						<b>5 ind.</b>			
<b>3.</b>	<b>Фазановые</b>	<b>Phasianidae</b>	<b>Pheasants, peacocks</b>			<b>5 ind.</b>			
25.	<i>Coturnix coturnix</i>	Перепел	Common Quail	Inhabits open grassy areas. The nest is placed in thick grass. Numerous.	Migratory, nesting	5 ind. (heard the voice) 4-6.04			
<b>III Ржанкообразные – Charadriiformes – Charadriiformes</b>						<b>20 ind.</b>			
<b>4.</b>	<b>Сем. Чайковые</b>	<b>Laridae</b>	<b>Gulls</b>			<b>20 ind.</b>			
26.	<i>Larus argentatus</i>	Серебристая чайка	Caspian Gull	Inhabits lakes and are also found on gentle and rocky river banks and swamps. Numerous.	Wintering	5 ind. 4-5.04			
27.	<i>Larus ridibundus</i>	Озерная чайка	Black-headed Gull	Inhabits coasts and islands of rivers and reservoirs. Also settles in populated areas with reservoirs. Numerous.	Wintering	3 ind. 4-5.04			
28.	<i>Larus genei</i>	Морской голубок	Slender-billed Gull	Inhabits coasts and islands of rivers and reservoirs. Also settles in populated areas with reservoirs. Numerous.	Wintering	12 ind. 4-5.04			
<b>IV Отряд Голубеобразные – Columbiformes – Pigeons, doves</b>						<b>104 ind.</b>			
<b>5.</b>	<b>Голубиные</b>	<b>Columbidae</b>	<b>Pigeons, doves</b>			<b>104 ind.</b>			
29.	<i>Columba livia</i>	Сизый голубь	Rock Pigeon, rock pigeon	Inhabits human settlements. Nests in attics and ravines with clay soils and flies into the reserve territory to feed. Numerous.	Settled	75 ind. 4-6.04 12 ind. 16-18.05			
30.	<i>Streptopelia decaocto</i>	Кольчатая горлица	Collared (turtle) dove	Inhabits settlements with tree plantations near the reserve. Nests in tree plantations. Numerous.	Settled	8 ind. 4-6.04 2 ind. 16-18.05			
31.	<i>Streptopelia senegalensis</i>	Малая горлица	Laughing dove	Inhabits settlements with tree plantations near the reserve. Nests in tree plantations. Not numerous.	Settled	5 Settled 4-6.04 2 Settled			

						16-18.05			
<b>V</b>	<b>Отряд СOVOобразные – Strigiformes –Owls</b>								
<b>6.</b>	<b>Настоящие совы</b>	<b>Strigidae</b>	<b>(Typical) owls</b>			-		1	
32.	<i>Otus scops</i>	Сплюшка	Eurasian Scops owl	A permanent inhabitant of the semi-desert lowlands, nesting in tree hollows and loess cliffs. Not numerous.	Migratory, nesting	-			
33.	<i>Athene noctua</i>	Домовый сыч	Little Owl	A permanent inhabitant of the semi-desert lowlands, nesting in burrows or crevices between stones. Not numerous.	Migratory, nesting	-		II	
<b>VI</b>	<b>Отряд Ракшеобразные –Coraciiformes –Coraciiformes</b>						<b>7 ind.</b>		
<b>7.</b>	<b>Сизоворонковые</b>	<b>Coraciidae</b>	<b>Rollers</b>				<b>5 ind.</b>		
34.	<i>Coracias garrulous</i>	Сизоворонка	European Roller	Inhabits dry landscapes from forests, meadows and deserts. Nests in the hollows of other birds. Numerous.	Migratory, nesting	5 ind. 16-18.05			
<b>8.</b>	<b>Щурковые</b>	<b>Meropidae</b>	<b>Bee-eaters</b>				-		
35.	<i>Merops apiaster</i>	Золотистая щурка	European Bee-eater	Inhabits steppe areas with ravines and steep river banks. Nests in burrows on bank cliffs. Numerous.	Migratory, nesting	-			
36.	<i>Merops superciliosus</i>	Зелёная щурка	Blue-cheeked Bee-eater	Inhabits steppe areas with ravines and steep river banks. Nests in burrows on the bank cliffs.	Migratory, nesting	-			
<b>9.</b>	<b>Удодовые</b>	<b>Upupidae</b>	<b>Hoopoes</b>				<b>2 ind.</b>		
37.	<i>Upupa epops</i>	Удод	Hoopoe	Lives on loess cliffs and clayey gullies, in tree hollows. Not numerous.	Migratory, nesting	2 ind. 16-18.05			
<b>VII</b>	<b>Отряд Воробьиные – Passeriformes –Perching birds</b>						<b>333 ind.</b>		
<b>10.</b>	<b>Жаворонковые</b>	<b>Alaudidae</b>	<b>Larks</b>				<b>25 ind.</b>		
38.	<i>Galerida cristata</i>	Хохлатый жаворонок	(Common) crested Lark	Lives in open spaces: meadows, fields. Nests near populated areas in the form of a pit. Not numerous.	Settled	-			
39.	<i>Alauda arvensis</i>	Полевой жаворонок	Sky lark	Lives in open areas with sparse vegetation. Numerous.	Migratory, nesting	25 ind. 4-6.04			
<b>11.</b>	<b>Ласточковые</b>	<b>Hirundinidae</b>	<b>Swallows</b>				<b>39 ind.</b>		
40.	<i>Hirundo rustica</i>	Деревенская ласточка	(Barn, European swallow	Lives in human settlements. Flies into the vicinity of the reserve and the gamekeepers' house. Builds a nest from mud on village buildings. Not numerous.	Migratory, nesting	17 ind. 16-18.05			
41.	<i>Hirundo daurica</i>	Рыжепоясничная ласточка	Red-rumped	Lives in human settlements. Nests in balconies and cracks in buildings. Not numerous.	Migratory, nesting	22 ind. 16-18.05			

<b>12.</b>	<b>Трясогузковые</b>	<b>Motacillidae</b>	<b>Wagtails, pipits</b>			<b>5 ind.</b>			
42.	<i>Motacilla flava plexa</i>	Жёлтая трясогузка	Yellow Wagtail	Inhabits damp meadows, pastures and wet coasts.	Migratory, nesting	-			
43.	<i>Motacilla alba personata</i>	Туркестанская белая трясогузка	Pied [white] wagtail	Settles in open areas near roads, fields, gardens and parks. Nests in the form of a hole in the ground.	Migratory, nesting	5 ind. 4-6.04			
<b>13.</b>	<b>Дроздовые</b>	<b>Turdidae</b>	<b>Thrushes</b>			<b>4 ind.</b>			
44.	<i>Saxicola carpata</i>	Чёрный чекан	Pied Buchchat	Inhabits the outskirts of floodplain tugai forests, loess and conglomerate cliffs, and along rivers. Not numerous.	Migratory, nesting	1 ind. 16-18.05			
45.	<i>Luscinia megarhyncha</i>	Южный соловей	Common Nightingale	Lives in dense woody thickets in foothill and mountainous areas. Not numerous.	Migratory, nesting	1 ind. 16-18.05			
46.	<i>Turdus merula</i>	Черный дрозд	Common blackbird	Lives in dense woody thickets in foothill and mountainous areas. Not numerous.	Settled	2 ind. 4-6.04			
<b>14.</b>	<b>Славковые</b>	<b>Sylviidae</b>	<b>Old World warblers</b>			<b>2 ind.</b>			
47.	<i>Phylloscopus collybitis tristis</i>	Теньковка	Siberian Chiffchaff	Lives in tugai forests, mainly in areas with more sparse and tall-stemmed tree vegetation. Not numerous.	Wintering	-			
48.	<i>Acrocephalus arundinaceus</i>	Дроздовидная камышёвка	Clamorous Reed Warbler	Inhabits the banks of rivers, irrigation ditches, lakes overgrown mainly with tall reeds and other water-loving plants. Not numerous.	Migratory, nesting	2 ind. 16-18.05			
<b>15.</b>	<b>Ткачиковые</b>	<b>Ploceidae</b>	<b>Weavers</b>			<b>68 ind.</b>			
49.	<i>Passer domesticus</i>	Индийский воробей	House Sparrow	Inhabits fields, gardens near populated areas. Nests in populated areas and their surroundings. Numerous.	Migratory, nesting	27 ind. 16-18.05			
50.	<i>Passer montanus</i>	Полевой воробей	(Eurasian) tree sparrow	Inhabits fields, gardens near populated areas. Nests in populated areas and their surroundings. Numerous.	Settled	25 ind. 4-6.04 16 ind. 16-18.05			
<b>16.</b>	<b>Скворцовые</b>	<b>Sturnidae</b>	<b>Starlings</b>			<b>60 ind.</b>			
51.	<i>Acridotheres tristis</i>	Майна	Common [Indian] myna	Inhabits settlements with tree plantations. Nests in cracks in buildings. Numerous.	Settled	25 ind. 4-6.04 12 ind. 16-18.05			
52.	<i>Sturnus roseus</i>	Розовый скворец	Rose-coloured Starling	Lives on low mountain slopes. Nests in foothills and, less frequently, in open spaces and watering places. Numerous.	Migratory, nesting	23 ind. 16-18.05			

53.	<i>S. vulgaris poltaratskyi</i>	Сибирский скворец	Common Starling	Inhabits winter grain crops after snowfall in the vicinity of populated areas. Numerous.	Wintering	-			
<b>17.</b>	<b>Иволговые</b>	<b>Oriolidae</b>	<b>Oriolus</b>			<b>2 ind.</b>			
54.	<i>Oriolus oriolus</i>	Иволга	European Golden Oriole	Forest tugai are rarely used for nesting, artificial plantings are less common. Common.	Migratory, nesting	2 ind. 16-18.05			
<b>18.</b>	<b>Врановые</b>	<b>Corvidae</b>	<b>Crows</b>			<b>68 ind.</b>			
55.	<i>Pica pica</i>	Сорока	Eurasian Magpie	Lives in floodplain tugai thickets in groups of trees among fields, meadows and populated areas. Nests in tall trees. Not numerous.	Settled	2 ind. 4-6.04			
56.	<i>Corvus monedula</i>	Обыкновенная галка	Eurasian Jackdaw	Lives in floodplain tugai thickets in groups of trees among fields, meadows and settlements. Nests in ravines along rivers. Numerous.	Wintering	19 ind. 4-6.04			
57.	<i>Corvus frugilegus</i>	Грач	Rook	Lives in floodplain tugai thickets in groups of trees among fields, meadows and populated areas. Numerous.	Wintering	25 ind. 4-6.04			
58.	<i>Corvus corone</i>	Чёрная ворона	Carrion [hooded] crow	Lives from floodplain tugai to groups of trees among fields, meadows and settlements. Nests in tall trees. Common.	Settled	3 ind. 4-6.04 2 ind. 16-18.05			
59.	<i>Corvus cornix</i>	Серая ворона	Hooded Crow	Lives in floodplain tugai thickets in groups of trees among fields, meadows and populated areas. Not numerous.	Wintering	5 ind. 4-6.04			
60.	<i>Corvus corax</i>	Ворон	Raven	Settles in rocky places. Nests on rocks, ravines and trees. Rare.	Settled	2 ind. 4-6.04			
19.	<i>Laniidae</i>	Сорокопудовые	Shrikes			2 ind.			
61	<i>Lanius excubitor</i>	Длиннохвостый сорокопуд	Northern shrike	Lives along river floodplains with tugai vegetation. Not numerous.	Migratory, nesting	2 ind. 16-18.05			
	Total / Всего								
<b>4.</b>	<b>Mammalia</b>	<b>Млекопитающие</b>							
<b>1.</b>	<b>Chiroptera</b>	<b>Рукокрылые</b>	<b>Bats</b>						4
1.	<i>Rhinolophus ferrumequinum</i>	Большой подковонос	Greater Horseshoe Bat	Found in abandoned adits, natural niches, cowsheds, underground ditches. Rare.		-			NT
2.	<i>Myotis blythii</i>	Остроухая ночница	Lesser Mouse Eared Bat	Lives in cracks and crevices of rocks, as well as in a few loess gullies and caves. Common.		-			
3.	<i>Otonycteris hemprichii</i>	Белобрюхий стрелоух	Desert long-eared bat	Inhabits various cracks in limestone and red sandstone outcrops. Rare.		-			VU
4.	<i>Plecotus auritus</i>	Ушан	Brown long-eared bat	Lives in cracks and crevices of rocks, as well as in a few loess gullies and caves. Common.		-			
5.	<i>Myotis emarginatus</i>	Трёхцветная ночница	Geoffro's bat	Inhabits abandoned adits and caves in the foothills and		-			VU

				mountains. Rare.				
6.	<i>Pipistrellus pipistrellus</i>	Нетопырь карлик	Common Pipistrelle	Lives in human-made structures located in desert areas. Common.	-			
7.	<i>Pipistrellus savii</i>	Кожановидный нетопырь	Savi's Pipistrelle	Cracks and fissures in rocks, abandoned adits in the foothills and mountains. Rare.	-			VU
<b>2.</b>	<b>Carnivora</b>	<b>Хищные или плотоядные</b>	<b>Carnivorans</b>		-			
8.	<i>Canis aureus</i>	Шакал	Golden jackal	Settle on the slopes of ravines and hills, caves, rock crevices. Common.	-			
9.	<i>Vulpes vulpes flavescens</i>	Лисица	Turkmenian Fox	Settle on the slopes of ravines and hills, in areas with sandy soil, and also use natural shelters - caves, rock crevices. Common.	-			
<b>3.</b>	<b>Rodentia</b>	<b>Грызуны</b>	<b>Rodents</b>		<b>33 ind.</b>			
1.	<i>Rattus turkestanicus</i>	Туркестанская крыса	Turkestan Rat	Lives in tugai forests and on the edges of reed beds. After the settlement of the brown rat, it began to displace it from its former habitats. Numerous.	5 ind. 4-6.04 7 ind. 16-18.05			
2.	<i>Rattus norvegicus</i>	Серая крыса	Grey Rat	Inhabits anthropogenic landscapes. Numerous.	2 ind. 4-6.04 4 ind. 16-18.05			
3.	<i>Mus musculus</i>	Домовая мышь	House mouse	Inhabits tugai biocenoses, river floodplains, reed and tamarisk thickets, as well as anthropogenic landscapes. Numerous.	11 ind. 4-6.04 9 ind. 16-18.05			
4.	<i>Ellobius talpinus</i>	Слепушонка	Northern mole vole	Inhabits non-flooded areas of tugai and mobile sands sparsely overgrown with shrubs. Numerous.	3 ind. 4-6.04 2 ind. 16-18.05			
	Total / Всего							

## ANNEX 5. ENVIRONMENTAL RECONNAISSANCE SURVEY PROGRAMME WITHIN THE FRAMEWORK OF A FULL ESIA

### 1. Introduction

At present, **there are no plans** to conduct a full program of environmental surveys on the territory of the Solid Waste Landfill (hereinafter referred to as the Landfill) and in its impact area; its development will be carried out on the basis of the provided design solutions for the modernization of the Landfill and the results of engineering and environmental surveys. The Program for conducting reconnaissance surveys (hereinafter referred to as the Program) presented below will be updated as pre-project and project information becomes available, as well as based on the results of planned engineering and environmental surveys.

### 2. Survey of the state of the environment in the impact area of the Landfill

### 3. Reconnaissance Survey Program

The environmental survey program should be based on existing information about the environmental conditions within the Landfill, as well as the living environment of nearby villages. The program should also be based on design proposals or solutions for the construction or modernization of planned facilities, as well as the expansion of the waste storage area – either vertically or horizontally. Currently, **this information has not been provided to the Consultant, so a Reconnaissance Survey Program has been developed.**

#### Atmospheric air

The survey of atmospheric air quality and pollution involves sampling at two stations. The locations of the stations are shown in **Figure 25**:

- on the territory of the households closest to the Landfill in the village of Boloshakhr (2 points):
- Station No. 1 and Station No. 2

Measurements and/or sampling should be carried out in dry, windless weather.

Samples are analyzed for chemicals characterizing waste decomposition processes and landfill gas release, as well as waste combustion processes at waste storage sites. A list of the determined parameters is provided in the table (**Table 9**).

Hydrogen sulfide, mercaptans, or, in extreme cases, ammonia, which are present in landfill gas and flue emissions, can be used as indicators of unpleasant odors generated by landfill gas released through the biotransformation of stored waste within the waste body, as well as waste combustion. Currently, the Committee for Environmental Protection (CEP) and the State Sanitary and Epidemiological Surveillance Service (SES) do not have indicators for hydrogen sulfide and mercaptan levels in atmospheric air in their laboratory accreditation programs.

*The recommendations for the SUE "Clean City" is to contact the Laboratory Center of the (CEP) to propose expanding its accreditation scope and purchasing sensors or cassettes for the determination of hydrogen sulfide and mercaptans, as well as the corresponding verification tools, for the GANK-4 gas analyzer. If this purchase is technically impossible, we recommend implementing a method for determining hydrogen sulfide in atmospheric air into the laboratory center's laboratory practice, such as the following: "Mass concentration of hydrogen sulfide in atmospheric air samples.*

*Measurement technique using the photometric method based on the methylene blue formation reaction<sup>119</sup>".*

Each measurement station should be located in an open, fully ventilated area with a dust-free surface (hard ground). The air sampling period for determining single concentrations of impurities should last 20-30 minutes (GOST 17.2.3.01-86). However, to improve the reliability of the results, single measurements should be taken at least 4-5 times per day during the day and, if possible, 2-3 times at night. Averaging the results in this way will yield measurements closer to the average daily standards. If automated analyzers are available, daily measurements should be scheduled using them.



**Figure 25. Location of environmental sampling stations**

#### Surface waters

Sampling is performed at the following locations:

- Station No. 3 is a permanently operating man-made watercourse located below the waste body and collecting waste leachate and surface runoff from the waste body, or if it is impossible to take a sample from the watercourse, sampling must be carried out in natural or man-made depressions in the terrain.

The collected samples are examined for helminthological, bacteriological, and sanitary-chemical parameters. The list of parameters determined is given in the table (**Table 9**).

#### Soil cover

The location of soil sampling points in the impact area of the Landfill coincides with points on the territory of the households closest to the Landfill in the village of Boloshakhr (2 points):

<sup>119</sup>RD 52.04.795-2014 "Mass Concentration of Hydrogen Sulfide in Atmospheric Air Samples. Measurement Procedure by Photometric Method Based on the Methylene Blue Formation Reaction." [https://e-ecolog.ru/docs/TXSj5JFi3NeXyNeVdsRhg?utm\\_referrer=https%3A%2F%2Fyandex.ru%2F](https://e-ecolog.ru/docs/TXSj5JFi3NeXyNeVdsRhg?utm_referrer=https%3A%2F%2Fyandex.ru%2F)

- Station No. 3 and Station No. 4

To determine background pollutant concentrations in the soil, the sampling site should be located 500 m uphill from the waste storage area. The site should be away from unpaved roads and upwind of the Landfill's operational maps. Soil samples should be collected in dry weather using the square method (5 x 5 m), followed by averaging of the combined sample using the quartering method.

#### **4. Media and indicators for reconnaissance survey in the impact area of the MSW**

Summary information on media and indicators for reconnaissance survey is provided in the table below.

**Table 9 Media and indicators for reconnaissance survey in the impact area of the MSW****Center for Analytical Control and Analysis of the CEP**

Media	Measurement / sampling station	Indicators	Duration of measurements (for air)
<b>Atmospheric air</b> <b>2 samples</b>	The village of Boloshakhr  The nearest residential development to the Landfill  Station #1 Station #2	<ol style="list-style-type: none"> <li>1. nitric oxide NO</li> <li>2. nitrogen dioxide NO<sub>2</sub></li> <li>3. sulfur dioxide SO<sub>2</sub>,</li> <li>4. carbon monoxide,</li> <li>5. suspended matter PM<sub>2.5</sub>,</li> <li>6. suspended matter PM<sub>10</sub>,</li> <li>7. methane,</li> <li>8. ammonia,</li> </ol> <p><i>Selection criteria:</i> Record wind direction and speed, atmospheric pressure, air temperature, humidity. <b>Do not carry out</b> measurements and sampling in rainy weather.</p>	<p>5-10 measurements 15 minutes at each station. The interval between measurements is at least 1 hour. during the daytime If possible, conduct measurements 2-3 times at night. Averaging the results will yield values closer to average daily standards and improve the reliability of air pollution assessments.</p>

**Sanitary and Epidemiological Surveillance Laboratory**

Media	Measurement / sampling station	Indicators	Duration of measurements (for air)
<b>Atmospheric air</b> <b>2 samples</b>	The village of Boloshakhr The nearest residential development to the Landfill  Station #1 Station #2	<ol style="list-style-type: none"> <li>1. Microbial contamination of air</li> </ol> <p><i>Selection criteria:</i> Record wind direction and speed, atmospheric pressure, air temperature, humidity. <b>Do not carry out</b> measurements and sampling in rainy weather.</p>	<p>5-10 measurements 15 minutes at each station. The interval between measurements is at least 1 hour. during the daytime If possible, conduct measurements 2-3 times at night. Averaging the results will yield values closer to average daily standards and improve the reliability of air pollution assessments.</p>

<b>Soil cover</b> <b>2 samples</b> (the location of the stations coincides with the stations for atmospheric air)	The village of Boloshakhr  The nearest residential development to the Landfill  Station #1 Station #2	<u>Helminthological indicators</u> Helminth eggs, quantity <u>Bacteriological indicators</u> 1. staphylococci 2. Salmonella bacteria 3. fungal content 4. sulfate-reducing bacteria Clostridia	Envelope sampling, laboratory sampling of dried soil using the quartering method
		<u>Sanitary and chemical indicators</u> 1. pH (aqueous extract), 2. chlorides 3. sulfates 4. lead, 5. zinc, 6. copper, 7. iron 8. manganese 9. arsenic, 10. mercury, 11. petroleum products	Envelope sampling, laboratory sampling of dried soil using the quartering method
<b>Surface waters and bottom sediments</b> <b>1 sample</b>	Station No. 3 – A permanently operating man-made watercourse or pond located below the waste body and collecting waste leachate and surface runoff from the waste body	<u>Surface waters</u>  <u>Bacteriological indicators</u> 1. staphylococci 2. Salmonella bacteria 3. fungal content 4. sulfate-reducing bacteria Clostridia  <u>Sanitary and chemical indicators:</u> 1. COD, 2. BOD 3. pH, 4. Dissolved oxygen 5. dry residue, 6. ammonia 7. nitrites 8. nitrates 9. chlorides 10. sulfates 11. calcium 12. iron 13. arsenic	

		<ul style="list-style-type: none"> <li>14. manganese</li> <li>15. cadmium,</li> <li>16. lead</li> <li>17. mercury</li> <li>18. copper</li> </ul>	
	<u>Bottom sediments</u>	<u>Helminthological indicators</u> Helminth eggs, quantity <u>Bacteriological indicators</u> <ul style="list-style-type: none"> <li>5. staphylococci</li> <li>6. Salmonella bacteria</li> <li>7. fungal content</li> <li>8. sulfate-reducing bacteria Clostridia</li> </ul>	Envelope sampling, laboratory sampling of dried soil using the quartering method
		<u>Sanitary and chemical indicators</u> <ul style="list-style-type: none"> <li>1. pH (aqueous extract),</li> <li>2. chlorides</li> <li>3. sulfates</li> <li>4. lead,</li> <li>5. zinc,</li> <li>6. copper,</li> <li>7. iron</li> <li>8. manganese</li> <li>9. arsenic,</li> <li>10. mercury,</li> </ul> petroleum products	
<b>A.N. Severtsov Institute of Ecology and Evolution (IEE RAS), Moscow, Russian Federation</b>			
Soils – 3 samples	The village of Boloshakhr  The nearest residential development to the Landfill  Station #1 Station #2 Station #4 – background sample	Total content of PCDD (dioxins) and PCDF (furans) by chromatograph mass spectrometry	Envelope sampling, laboratory sampling of dried soil using the quartering method
Bottom sediments – 1 sample	Station No. 3 – A permanently operating man-made watercourse or pond located below the waste body and collecting waste leachate and surface runoff from the waste body		