

# Initial Environmental Examination

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July 2025

## Uzbekistan: Rural Roads Resilience Sector Project

(Subproject No. 3 Tashkent Region)

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Role	Position	Date	Remarks
Submitted by	Dongsung Engineering Co., Ltd.	29/06/2025	
Revised by	Dongsung Engineering Co., Ltd.	15/07/2025	
Revised by	Dongsung Engineering Co., Ltd.	23/07/2025	
Reviewed by	Highway Engineer of Dongsung Engineering Co., Ltd.	23/07/2025	
Approved by	Team Leader of Dongsung Engineering Co., Ltd.	23/07/2025	

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## Abbreviations

ADB	Asian Development Bank
EARF	The Environmental Assessment and Review Frameworks
EMP	Environmental Management Plans
IEE	Initial Environmental Examination
TOR	Terms of Reference
SPS	Safeguard Policy Statement
TRTA	Technical Assistance for Rural Transport Activities
CR	Civil Registry
FF	Fact-finding
VO	Variation Order
SDDR	Social due Diligence Report
CHA	Critical Habitat Assessment
IFC	International Finance Corporation
GN6	Guidance Note 6
IBAT	Integrated Biodiversity Assessment Tool
REA	Rapid Environmental Assessment
IBA	Initial Biodiversity Assessment

## I. INTRODUCTION

1. This Initial Environmental Examination (IEE) has been prepared in accordance with the Asian Development Bank's (ADB) Safeguard Policy Statement (SPS, 2009) to assess the environmental impacts of a proposed subproject under the Rural Road Resilience Sector Project. The project proponent is the Committee for Roads under the Ministry of Transport of the Republic of Uzbekistan, with Dongsung Engineering Co., Ltd. serving as the Subproject Preparation Consultant (SPC).

2. The subproject involves the rehabilitation and upgrading of rural road sections located in Tashkent region, aimed at improving climate resilience, safety, and connectivity in rural areas. The project is considered of national importance and supports broader development goals under ADB Loan No. 4426-UZB(COL).

3. The IEE study covers baseline environmental assessments, potential impacts, and mitigation measures across project phases. It has been undertaken by a team of national and international environmental specialists from Dongsung Engineering, in consultation with government agencies and local stakeholders. The consultant acknowledges the support provided by the PMU, local authorities, and affected communities.

### A. Overview

4. The Government of the Republic of Uzbekistan has formally requested technical assistance from the Asian Development Bank (ADB) through an expansion in the scope of the existing support framework for rural road development. This request pertains to the enhancement of the Transaction Technical Assistance (TRTA) Facility, specifically TA 9987-UZB, in order to strengthen planning, implementation, and sectoral coordination in the context of rural road resilience and sustainability.

5. The Rural Roads Resilience Sector Project (RRRSP) is anticipated to receive formal approval by ADB. The project is designed to support the preparation of future rural road development initiatives and promote institutional capacity building. The project will facilitate knowledge transfer in areas such as sustainable asset management, road safety enhancement, climate-resilient design practices, and other relevant technical and policy domains.

6. This Initial Environmental Examination (IEE) has been prepared as part of the environmental due diligence process required under ADB's Safeguard Policy Statement (SPS, 2009). The IEE ensures compliance with environmental safeguards for the proposed RRRSP and provides a framework for identifying, assessing, and mitigating potential adverse environmental impacts. It offers a structured roadmap for implementing necessary environmental protection and management measures throughout the project lifecycle.

7. More specifically, the IEE (i) identifies the anticipated impacts in terms of their extent, duration, and severity; (ii) conducts a comprehensive analysis of both direct and indirect environmental effects; and (iii) proposes appropriate avoidance, minimization, and mitigation strategies. These measures are consolidated into a project-specific Environmental Management Plan (EMP) to guide implementation and monitoring efforts.

8. The proposed project aims to improve transport connectivity in rural regions of Uzbekistan, thereby facilitating access to essential services and economic opportunities. It is expected to contribute positively to the overall quality of life, with particular benefits for women and vulnerable groups. The intended project outcomes include enhanced road efficiency, safety, and resilience to climate risks.

9. The expected outputs of the project include the rehabilitation and maintenance of approximately 61.3 kilometers of rural road sections in the Tashkent Region. In addition to physical infrastructure improvements, the project will also enhance institutional capacities for road maintenance and safety. Furthermore, the integration of climate-resilient design features will strengthen the long-term durability of road assets under changing environmental conditions. Gender equity will be promoted through vocational training for women, potential upgrades to community

infrastructure, and the facilitation of employment opportunities.

10. The designated Executing Agency (EA) for the project is the Committee for Roads under the Ministry of Transport of the Republic of Uzbekistan. The Committee was established in February 2017 and oversees the implementation of national road infrastructure policies. A dedicated Project Management Unit (PMU) has been established to manage the RRRSP. Dongsung Engineering Co., Ltd. ([www.dongsungeng.co.kr](http://www.dongsungeng.co.kr)) is serving as the Subproject Preparation Consultant (SPC), providing technical support for engineering design development as well as guidance on the social safeguard components of the project, particularly in areas related to livelihood restoration and compensation for affected assets.

11. This IEE report provides a comprehensive overview of the environmental baseline of the project area and evaluates the nature and significance of potential environmental impacts during the design, construction, and operational phases. It includes assessments of the effects on physical, ecological, economic, and socio-cultural resources within the project's area of influence, and establishes a foundation for environmentally sound project implementation in accordance with ADB requirements.

12. As part of this Initial Environmental Examination (IEE), an Environmental Management Plan (EMP) has been developed. The EMP outlines specific mitigation measures to address significant environmental impacts that may arise during the implementation phase of the project. It also includes a comprehensive Environmental Monitoring Plan (EMoP), which identifies key environmental indicators to be monitored, frequency of monitoring, and the institutions responsible for both implementing mitigation measures and conducting regular monitoring activities. The IEE has been prepared with the following four core objectives: (i) to identify potential environmental issues that may arise as a result of the proposed project interventions; (ii) to assess the magnitude and significance of these potential impacts and ensure that environmental considerations are adequately integrated into the project planning and decision-making process; (iii) to determine whether additional environmental studies, including a more detailed Environmental Impact Assessment (EIA), are required; and (iv) to propose any necessary enhancement measures that could further improve environmental outcomes of the project.

## **B. Category of Project**

13. In accordance with the Asian Development Bank (ADB) Safeguard Policy Statement (SPS, 2009) and related procedural guidance (2014), this Project has been classified as Category B under ADB's Environmental Safeguard categorization system.

14. The project categorization has been determined based on preliminary site assessments and professional judgment by the environmental team, and is justified for the following reasons:

- i. The Project is not anticipated to result in significant adverse environmental impacts comparable to those under Category A classification. Identified impacts are expected to be site-specific, of limited scale, and largely reversible. Furthermore, effective mitigation measures can be designed and implemented without the need for complex or large-scale environmental interventions.
- ii. The project scope does not include any road sections that are likely to generate significant environmental or social risks that would warrant a Category A classification. As the Project primarily entails the upgrading of existing rural road infrastructure, and in view of the findings of the Initial Environmental Examination (IEE), the proposed interventions are anticipated to cause minimal to no significant adverse environmental impacts. Accordingly, the Project has been assigned Category B.
- iii. In line with Category B classification, an Initial Environmental Examination (IEE) is required to assess potential environmental impacts. This classification is determined based on the most environmentally sensitive component of the Project. All associated project components and activities therefore fall within the scope of Category B. The IEE includes a comprehensive analysis of direct, indirect, cumulative, and induced impacts on the physical, biological, and socio-economic environment. The objective of this assessment is to ensure the overall environmental sustainability of the Project. Mitigation and enhancement measures have been

proposed in accordance with the identified risks.

- iv. In the Republic of Uzbekistan, environmental review and approval processes fall under the authority of the State Environmental Expertise (SEE), which is governed by the Law on Ecological Expertise (2000) and Cabinet of Ministers Decree No. 491 dated 31.12.2001 “On Approval of the Regulation of the State Environmental Expertise.” Based on the expected impacts of the Project—such as forecast traffic volumes, types of vehicles, climatic conditions, existing pollution levels, and adjacent land use—the project roads are classified as local roads, and are assigned Category III to V under national regulations. These correspond approximately to ADB’s Category B or C. The classification is supported by the following design and usage characteristics:
- The roads are designed primarily to accommodate local traffic;
  - Operating speeds will remain low;
  - The roads will carry mixed traffic, including private vehicles, buses, wheeled tractors, and agricultural machinery;
  - They are intended to improve access to higher category roads and to connect rural settlements such as villages, kishlaks, auls, and farms

### C. Purpose of the IEE

15. The IEE has been used to assess the environmental and social consequences identified through the Inception/Scoping process in accordance with the ADB’s SPS and proposes relevant management actions to mitigate the identified adverse risks and effects. The objective of the IEE is to ensure that potential problems are addressed during planning of the project in advance of construction. This can improve the design, encourage efficient use of materials/resources, enhance social aspects and avoid irreversible damage to the environment.

16. The objectives and approach to the IEE are as follows:

- i. Set the legal framework;
- ii. Establish an assessment methodology for the IEE;
- iii. Define the Project Area of Influence (AoI) for the various disciplines;
- iv. Establish baseline environmental conditions at the Project and within the surrounding area;
- v. Identify, predict and assess the environmental effects associated with the Project: whether they are beneficial or adverse; significant or not significant;
- vi. Identify suitable mitigation measures to prevent, reduce or, if possible, offset likely significant adverse effects on the environment and identify the likely significant residual effects following the implementation of these measures;
- vii. Develop procedures and plans to ensure that the mitigation measures and monitoring requirements approved during the environmental compliance review will be carried out in subsequent stages of the project through the preparation of an Environment Management Plan (EMP).

17. A project specific EMP has been formulated with an aim to avoid, reduce, mitigate, or compensate for adverse environmental impacts/risks and propose measures. This includes (i) mitigation of potentially adverse impacts; (ii) monitoring of impacts and mitigation measures during project implementation and operation; (iii) institutional capacity building and training; (iii) compliance to statutory requirements; and (iv) integration of EMP with Project planning, design, construction and operation.

18. This Initial Environmental Examination (IEE) has been undertaken to assess the environmental and social implications identified during the inception and scoping phases, in accordance with the Asian Development Bank’s (ADB) Safeguard Policy Statement (SPS, 2009). The IEE proposes appropriate environmental management measures to mitigate the potential risks and adverse effects associated with the Project. The primary objective of the IEE is to proactively address potential environmental and social issues at the project planning stage—prior to the commencement of construction. By doing so, the assessment aims to optimize project design, promote efficient use of materials and resources, enhance social outcomes, and prevent irreversible environmental degradation.

19. The objectives and methodological approach of the IEE are as follows:
- i. To establish the applicable legal and institutional framework governing environmental safeguards;
  - ii. To define a robust assessment methodology for conducting the IEE;
  - iii. To delineate the Project Area of Influence (Aol) across relevant environmental and social disciplines;
  - iv. To establish the baseline environmental conditions at the project site and its surrounding areas;
  - v. To identify, predict, and evaluate potential environmental effects—both beneficial and adverse, as well as significant or non-significant;
  - vi. To propose suitable mitigation measures aimed at preventing, minimizing, or where possible, offsetting potentially significant adverse impacts, and to identify any residual impacts likely to remain after implementation of these measures;
  - vii. To develop appropriate procedures and implementation plans to ensure that mitigation and monitoring requirements are adhered to during subsequent phases of the project, through the preparation of a comprehensive Environmental Management Plan (EMP).
20. A project-specific Environmental Management Plan (EMP) has been formulated with the objective of avoiding, reducing, mitigating, or compensating for adverse environmental impacts and associated risks. The EMP outlines:
- i. mitigation measures to address potentially adverse environmental effects;
  - ii. monitoring protocols to track impacts and evaluate the effectiveness of mitigation measures during project implementation and operation;
  - iii. provisions for institutional capacity building and training;
  - iv. procedures to ensure compliance with applicable statutory and regulatory requirements; and
  - v. the integration of EMP components within the overall project planning, design, construction, and operational framework.

#### **D. Inception Report**

21. The inception phase facilitated an initial appraisal of the potential environmental and social impacts associated with the proposed Project, based on the preliminary design and construction data available during the early stages of the assessment. This phase involved a review of existing site-specific information and allowed for the characterization of the baseline environmental conditions within the Project's Area of Influence (Aol). Furthermore, a preliminary identification of potential environmental risks and interactions was conducted, and corresponding recommendations regarding the scope and focus of the subsequent Initial Environmental Examination (IEE) were formulated and endorsed in consultation with the Asian Development Bank (ADB).

22. The outcome of the scoping exercise was the preparation of a standalone Inception Report, which established the framework for environmental assessment activities. Within the report, a screening matrix was developed to record whether each identified potential impact was "scoped in" or "scoped out" of further IEE analysis. The table includes the rationale for inclusion, ensuring that those impacts deemed significant or sensitive are carried forward for detailed evaluation in accordance with ADB's safeguard requirements and Uzbekistan legislations. A summary of these scoping outcomes and corresponding analytical justifications is presented in the subsequent sections of this report

#### **E. Project Location**

23. The project is implemented under Batch 2 of the Rural Roads Resilience Sector Project and aims to undertake the rehabilitation and concreting of existing rural and inter-farm roads within the designated areas. As presented in the Figure 1 below, the project encompasses nine (9) rural roads within the Tashkent Region, with a total length of 61.3 km. The Figure 1 below provides a visual representation of the rural road sections covered under this project in the Tashkent Region.

24. The existing roads belong to category IV according to the national road classification. A typical cross section of this category is displayed below. Traffic lanes are 3.0 m wide with 0.50 m wide paved shoulders. The width of unpaved shoulders is 1.50 m. The road crown has an overall width of 10.00m.
25. The existing pavement layer has an average thickness of 7-10 cm. Generally, the roads are in poor condition with various types of defects like cracks, potholes, edge breaks, spalling etc. Many subsections are worn out to gravel standard.

### Location Map of Tashkent Region

The status of the selected rural roads by districts

Order Number	Name of District	Length, Km	Existing bridges, units	Number of bridges to be repaired, units
1	Qo'ni Chirchiq	16.5	3	3
2	Yuleni Chirchiq	6.4	1	1
3	Oqqoyun	22.1	2	2
4	Bekobod	16.3	2	1
Total for the Region		61.3	8	7

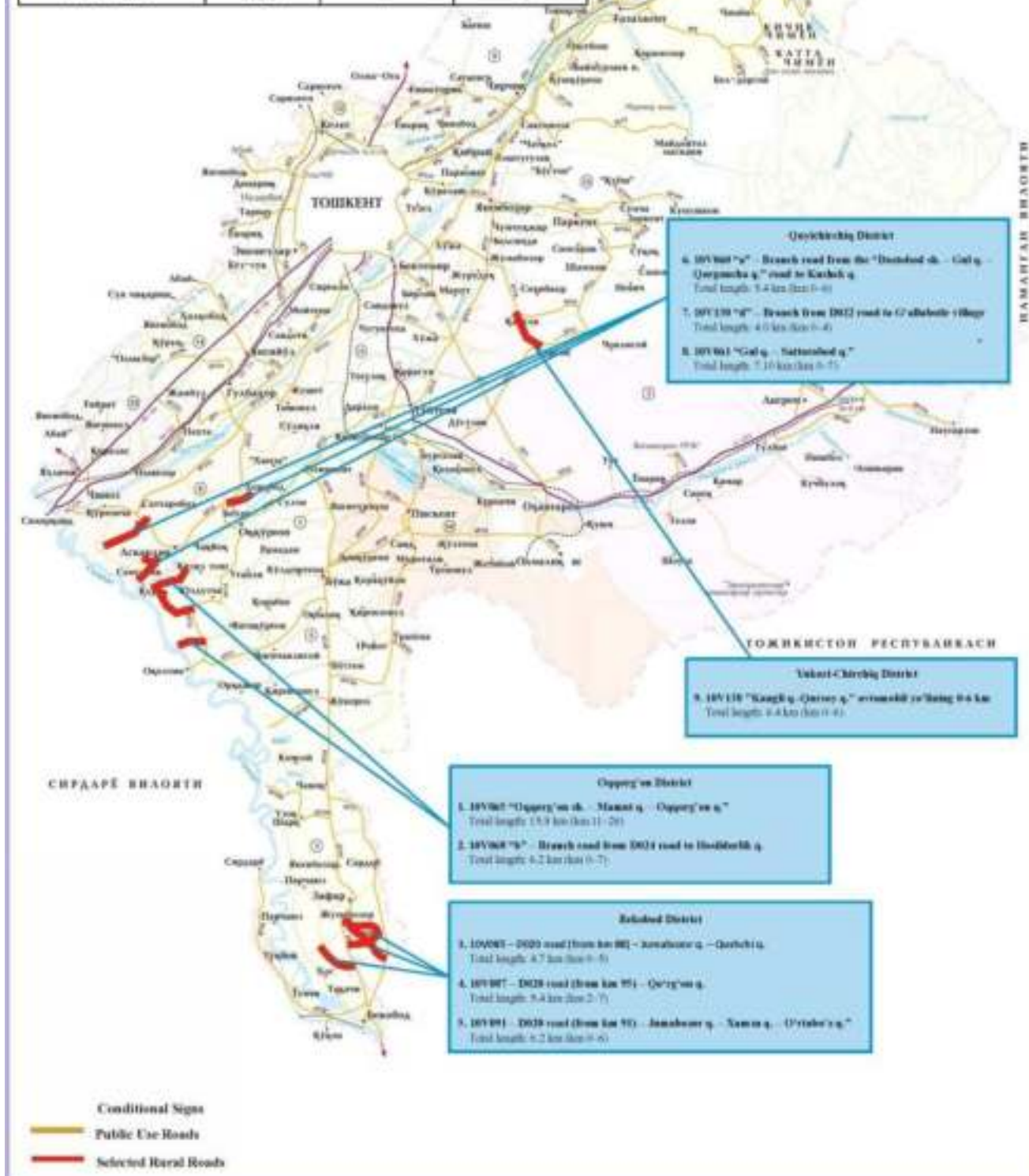


Figure 1. Tashkent Rural Roads Locations

26. The above map's legend depicts points which display the beginning and the end of a road, while the line displays the road length. The project road in general, has an undulating vertical alignment. The road section is in cultivated environment.

27. Road 10V065(4K-768)

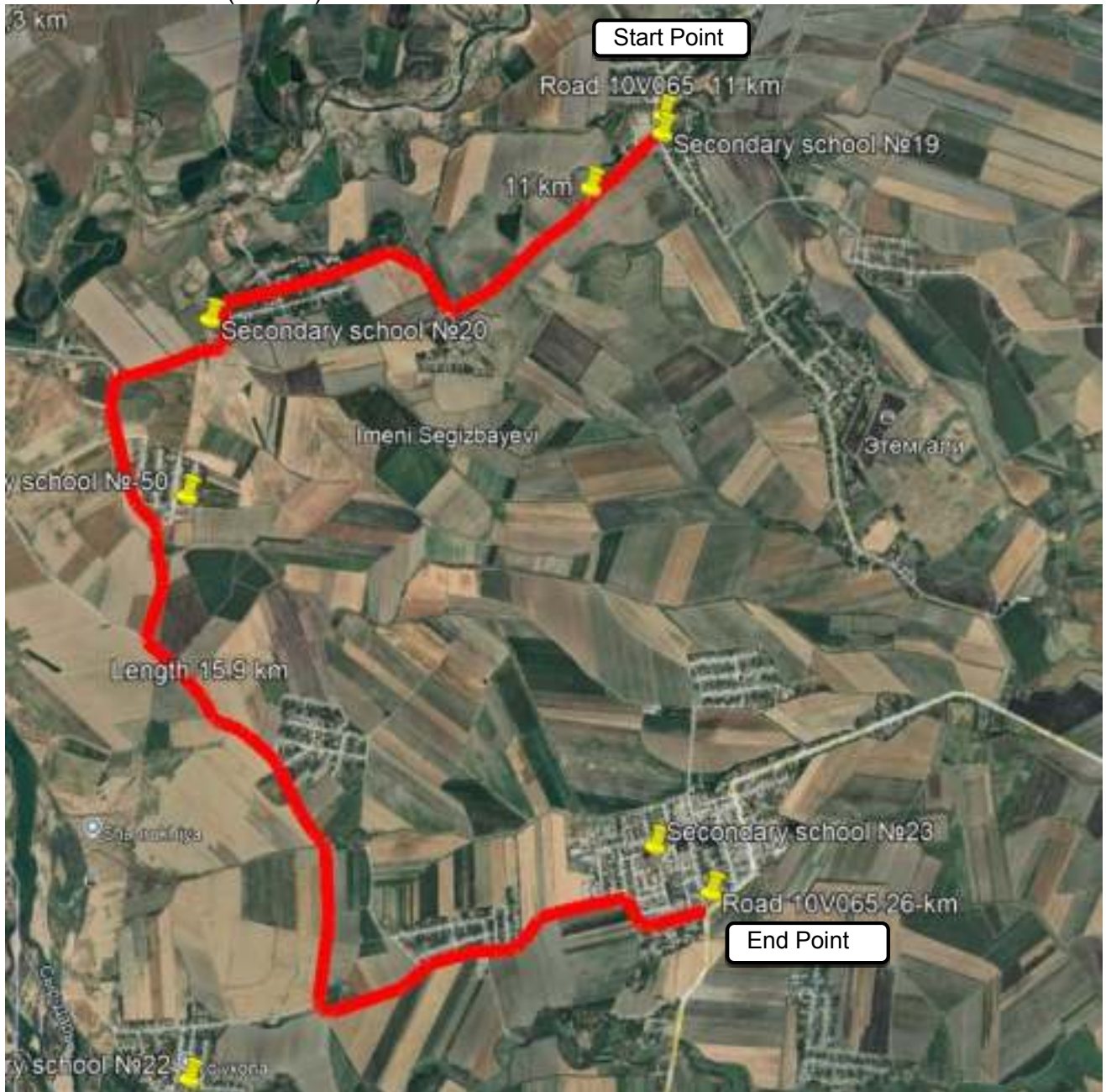


Figure 2. Location of project road 10V065(4K-768)



Figure 3. Photos of project road 10V065(4K-768)

28. Road 10V068b(4K-771b)



Figure 4. Location of project road 10V068b(4K-771b)



Figure 5. Photos of project road 10V068b(4K-771b)

29. Road 10V085(4K-781)



Figure 6. Location of project road 10V085(4K-781)



Figure 7. Photos of project road 10V085(4K-781)

30. Road 10V087(4K-783)

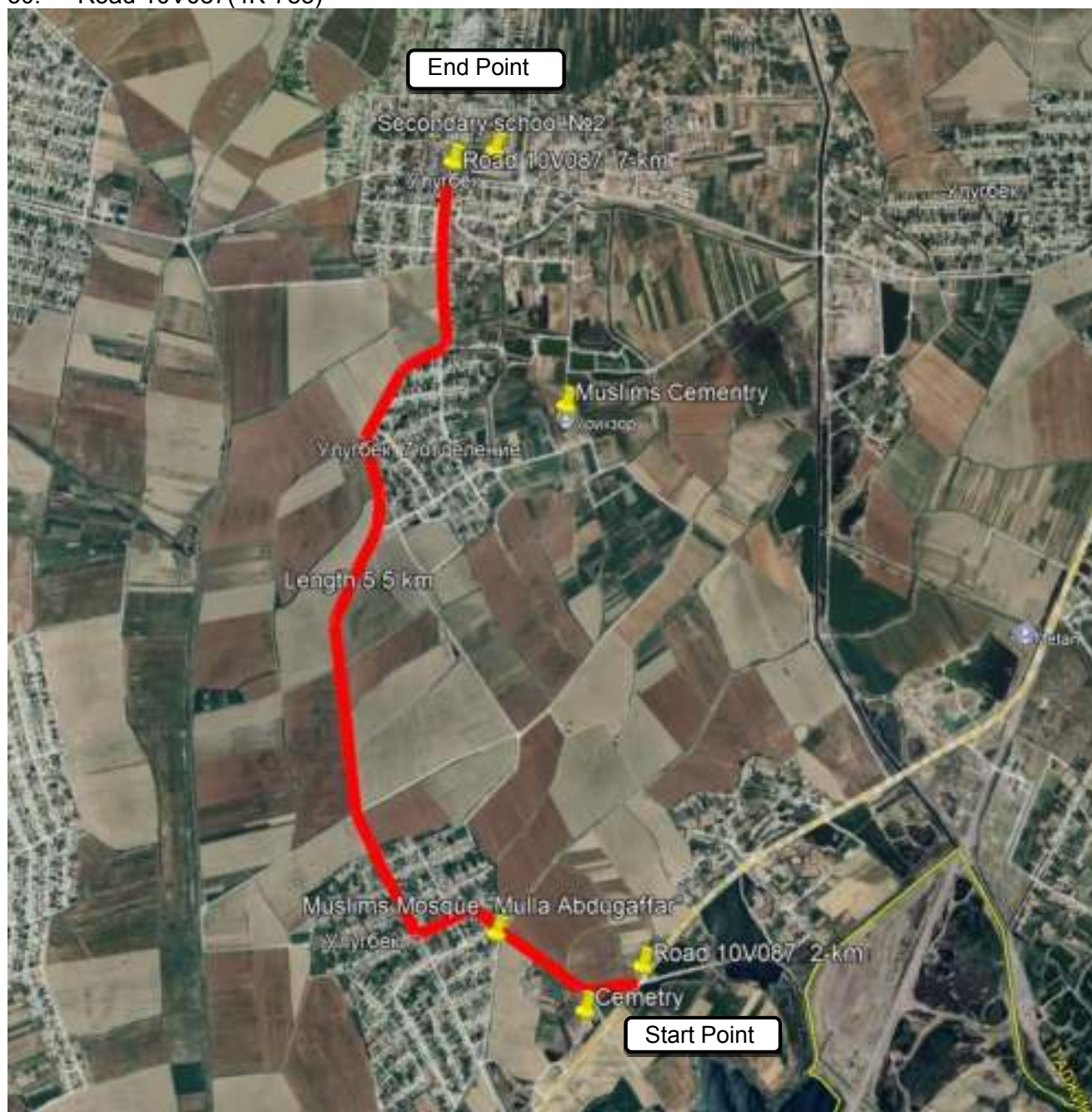


Figure 8. Location of project road 10V087(4K-783)



Figure 9. Photos of project road 10V087(4K-783)

31. Road 10V091(4H-731)



Figure 10. Location of project road 10V091(4H-731)



Figure 11. Photos of project road 10V091(4H-731)

32. Road 10V060a(4K-742a)



Figure 12. Location of project road 10V060a(4K-742a)



Figure 13. Photos of project road 10V060a(4K-742a)

33. Road 10V130d(4H-715d)



Figure 14. Location of project road 10V130d(4H-715d)



Figure 15. Photos of project road 10V130d(4H-715d)

34. Road 10V061(4H-716)



Figure 16. Location of project road 10V061(4H-716)



Figure 17. Photos of project road 10V061(4H-716)

35. Road 10V138(4K-721)



Figure 18. Location of project road 10V138(4K-721)



Figure 19. Photos of project road 10V138(4K-721)

36. The detailed breakdown of the project roads in the Tashkent Region is as follows;

**Table 1. Final Proposed Road Sections Tashkent Region**

Road Name	Road width (meters)	Traffic intensity in 2025 (No of vehicles per day)	Current Pavement	Province (or Region)	Names of settlements along the road section	Summary road length per district
10V065 (4K-768)	7	1,470	Bituminous pavement	Oqqorgon	Qizildehqon, Eltamgali, Bogishamol, Mitan, Do'stlik, Khamzaobod Bunyodkor MFY, Uzbekobod MFY, Qushchi MFYs	15.9 km
10V068b (4K-771b)	7	1,079	Bituminous pavement	Oqqorgon	Hosildor MFY, Shomilqoriavliyo pilgrimage site	6.2 km
10V085 (4K-781)	7	1,042	Bituminous pavement	Bekobod	Bunyodkor MFY, Uzbekobod MFY, Qushchi MFY	4.7 km
10V087 (4K-783)	7	926	Bituminous pavement	Bekobod	Isfara MFY, Urikzor MFY, Qurgon MFY	5.4 km
10V091 (4H-731)	7	961	Bituminous pavement	Bekobod	Hamza MFY, Uzbekobod MFY	6.2 km
10V060a (4K-742a)	7	543	Bituminous pavement	Quyichirchiq	Dustlik MFY, Kushek MFY	5.4 km
10V130d (4H-715d)	7	292	Bituminous pavement	Quyichirchiq	Mingchinor MFY, Ghallabotir MFY	4.0 km
10V061 (4H-716)	7	506	Bituminous pavement	Quyichirchiq	Gul MFY, Ujakent MFY	7.1 km
10V138 (4K-721)	7	2,833	Bituminous pavement	Yukori-Chirchiq	Kangli MFY, Kursay MFY	6.4 km
Total Length						61.3 km

## II. UZBEKISTAN ENVIRONMENTAL POLICY AND LEGISLATION

37. This section outlines the legislative, policy, and administrative framework governing the implementation of the proposed project, with specific reference to the environmental assessment procedures mandated by the Republic of Uzbekistan. It further identifies the applicable Safeguard Policies of the Asian Development Bank (ADB) that will guide environmental and social compliance throughout the project lifecycle, in accordance with international best practices and regulatory standards.

### A. National Regulatory Requirements

38. The Republic of Uzbekistan (RUz) has developed laws and regulations that have updated the previous Soviet legislation and policies to pursue sustainable social and economic development. RUz continually revises and updates the national environmental legislation, enacts new environmental laws and regulations and develops programs and action plans to address environmental issues. The RUz Constitution (April 30, 2023), under its nature protection and management framework defines the rights and responsibilities of its citizens to include:

- i. Everyone has the right to a favorable environment, reliable information about its condition.
- ii. The government creates conditions for the implementation of public control in the field of urban planning in order to ensure the environmental rights of citizens and prevent harmful effects on the environment.
- iii. Draft urban planning documents are subject to public discussion in the manner prescribed by law.
- iv. The state, in accordance with the principle of sustainable development, implements measures to improve, restore and protect the environment, maintain ecological balance (Article 49); Citizens are obliged to take care of the natural environment. (Article 62); and
- v. The land, its subsoil, water, flora and fauna and other natural resources are national wealth, are subject to rational use and are protected by the state.
- vi. Land may be privately owned on the terms and in the manner prescribed by law and ensuring its rational use and protection as a national wealth. (Article 68).

39. In Uzbekistan, environmental protection is the responsibility of the Ministry of Ecology, Environmental Protection and Climate Change (MinEcologiya). MinEcologiya is the primary environmental regulatory agency reporting directly to the Parliament and responsible for the implementation the Environmental Protection Law (1992). It also controls the use of natural resources at the central, regional and district levels.

40. The overarching legislative framework for environmental protection in the Republic of Uzbekistan is Law No.754-XII, 1992 on nature protection. The law states legal, economic, and organizational bases for the conservation of the environment and the rational use of natural resources. Its purpose is to ensure balanced relations between people and nature, to protect the environmental system and to guarantee the rights of the population to a clean environment. According to the legislation of the Republic of Uzbekistan, the Cabinet of Ministries of Republic of Uzbekistan, MinEcologiya and the local government bodies are responsible for implementing state laws on environmental protection and management of natural resources. Article 25 of this law requires the State Environmental Expertise (SEE) is a mandatory measure for environmental protection and must precede any decision-making process. In addition, Article 25 prohibits the implementation of any project without a positive conclusion of SEE.

### B. Administrative Framework

41. In accordance with UP-81 "On measures to transform the sphere of ecology and environmental protection and organize the activities of the authorized state body" dated May 31, 2023, the Ministry of Natural Resources (until 2023 - State Committee for Ecology) was renamed to the Ministry of Ecology, Environmental Protection and Climate Change.

42. The Ministry of Ecology, Environmental Protection and Climate Change (MinEcologiya) of the

RUz is the primary environmental regulator. The MinEcologiya reports directly to the Parliament and is responsible at national, regional (oblast) and local (rayon) levels for the development and enforcement of the national environmental and conservation policy, environmental compliance, integrated environmental management across various sectors, and securing healthy environment conditions across the country.

43. According to its structure, the MinEcologiya has a central body in Tashkent, and regional branches and agencies providing research and technical support. Regional environmental authorities are structured similarly to the MinEcologiya.

44. From July 1, 2023, the “Public Environmental Controller” system is being introduced in the Republic of Uzbekistan, in accordance with which the rights and obligations of controllers are defined as follows:

- i. Identification of environmental violations, execution and introduction of the relevant act into the Environmental Control Platform;
- ii. Obtaining free education and advanced training in order to acquire special knowledge and skills in the implementation of activities;
- iii. Obtaining information about the measures taken in relation to the identified offenses, participation in the processes related to the sentencing of the offender;
- iv. Receiving remuneration for effective activity in the manner and in the amount established by law.
- v. Public environmental controllers are required to ensure transparency, counteract corruption, as well as objectively prepare reliable data in the process of identifying and reporting offences.

45. The other state agencies involved in the regulation and protection of the environment include:

- i. Ministry of Agriculture;
- ii. Ministry of Water Resources;
- iii. Ministry of Mining Industry and Geology;
- iv. Agency of the Hydrometeorological Service under the Ministry of Ecology, Environmental Protection and Climate Change of the Republic of Uzbekistan;
- v. Ministry of Health (or MHRUZ);
- vi. Inspectorate for the Control of Mining, Geological and Industrial Safety under the Ministry of Mining Industry and Geology of the Republic of Uzbekistan;
- vii. Agency for Sanitary and Epidemiological Welfare and Public Health (ASEWPH);
- viii. Ministry of Mining Industry and Geology of the Republic of Uzbekistan
- ix. State Committee for Land Resources, Surveys, Cartography and the State Cadastre (or Goskomgeodezkadastr);
- x. Ministry of Transport;
- xi. Special Commission on Transport and Transport Communications under the Cabinet of Ministers of the Republic of Uzbekistan;
- xii. The Committee for Roads;
- xiii. Avtoyulinvest Agency; and
- xiv. State Inspectorate for Quality Control of Road Construction Works.

### **C. Environmental Legislation of Uzbekistan**

46. Uzbekistan has enacted the following natural resources and media-specific environmental management laws:

- i. Law “On Nature Protection” (1992, amended in 2021). This law defines the legal, economic, and organizational framework for the conservation of the environment and the rational use of natural resources. Its objective is to ensure a balanced relationship between humans and nature, safeguard the ecological system, and guarantee the population’s right to live in a safe and healthy environment. Article 25 stipulates that the State Environmental Expertise (SEE) is a mandatory requirement for environmental protection and must precede any project-related decision-making process. Moreover, the implementation of any project without a

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- Positive Conclusion from the SEE is strictly prohibited.
- ii. Law “On Ambient Air Protection” (1996, amended on 10 October 2006). This law establishes the regulatory framework and objectives for ambient air protection. It outlines air quality standards, permissible emission limits, and measures to mitigate negative environmental impacts. The law sets forth requirements related to fuels and lubricants, the manufacture and operation of vehicles and other machinery, and the protection of the ozone layer. It also defines the responsibilities of enterprises, institutions, and organizations in maintaining air quality and stipulates provisions for compensation for damage resulting from air pollution.
  - iii. Law of the RUz “On Water and Water Use” (originally enacted in 1993, amended in 2021). This law regulates water relations and promotes the efficient use of water resources by both the population and the economy. It also governs the protection of water bodies from pollution and depletion, the prevention and mitigation of harmful impacts on water, the rehabilitation and improvement of water bodies, and the protection of the rights of enterprises, institutions, organizations, dehqan farms, and individuals involved in water use.
  - iv. Land Code of the RUz (1998). The Land Code serves as the primary legal instrument for regulating land relations in Uzbekistan. Its objective is to ensure the evidence-based, sustainable use and conservation of land resources for both present and future generations. The Code promotes the improvement of soil fertility, environmental protection, and the creation of equitable conditions for the development of all forms of land management. It also safeguards the rights of individuals and legal entities to land use and ownership, while reinforcing the rule of law in land governance and administration.
  - v. Law on Wastes (2002, amended in 2011). This law governs the management of solid waste in the Republic of Uzbekistan, excluding emissions to air and water pollution, and grants the Ministry of Ecology, Environmental Protection and Climate Change (MinEcologiya) the authority to conduct inspections, coordinate activities, and provide environmental expertise. It also establishes guidelines for the designation of appropriate waste disposal sites. Under the law, enterprises are held responsible for the management of their own waste. However, entities engaged in recycling activities may be eligible for support from the state budget, the National Fund for Nature Protection, or through voluntary contributions. The principal objective of this law is to minimize the negative impact of solid waste on public health and the environment, reduce the generation of waste, and promote the adoption of efficient and sustainable household waste management practices.
  - vi. Law “On Protection of Flora” (1997, amended in 2016). This law establishes the legal and institutional framework for the protection, sustainable use, and conservation of plant species in Uzbekistan. It regulates the management of flora growing under natural conditions as well as wild plant species cultivated in artificial environments. The legislation aims to support the reproduction of plant species and the preservation of their genetic diversity, in alignment with national biodiversity conservation goals and international environmental commitments.
  - vii. Law “On Protection and Use of the Wildlife” (2016). This law defines the legal framework governing the protection, sustainable use, restoration, and reproduction of wildlife in Uzbekistan. It aims to ensure favorable conditions for the survival of wildlife species, preserve biological diversity, and maintain the integrity of natural ecosystems and habitats. The legislation establishes principles for managing wildlife resources responsibly, while safeguarding ecological balance and supporting environmental sustainability.
  - viii. Protected Natural Reserves (2004). This law mandates the preservation of unique and ecologically valuable natural features and complexes, including the genetic resources of plant and animal species. It aims to prevent the adverse impacts of human activities on the natural environment, support scientific study of natural processes, ensure continuous environmental monitoring, and enhance environmental education. The law establishes a legal basis for managing and protecting natural reserves to safeguard biodiversity and promote long-term ecological sustainability.
  - ix. Law “On Environmental Control” (2013, amended in 2021). This law establishes the regulatory framework for environmental control in Uzbekistan. It outlines the following key components: (i) Prevention, detection, and suppression of violations related to environmental protection and the rational use of natural resources; (ii) Continuous monitoring of the environmental condition to identify potential pollution, inefficient resource usage, and threats to public health and safety; (iii) Assessment of compliance with environmental requirements for proposed or ongoing economic and other activities; (iv) Protection of the rights and
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legitimate interests of legal entities and individuals, ensuring their responsibilities are fulfilled in accordance with national environmental legislation. The law serves as a comprehensive tool to enhance environmental governance, enforcement, and sustainability in development processes.

- x. Law “On Environmental Audit” (2021). This law was adopted to regulate environmental audits in the field of environmental protection and rational use of natural resources, including voluntary or mandatory environmental audits. The law states that ‘an environmental audit can be carried out on a voluntary form by businesses with low or insignificant (local) risk of environmental impact and on a mandatory form on an annual basis for businesses with high and medium risk of environmental impact.’
  - xi. The Red Data Book of Uzbekistan (UZrdB) is the main document containing the aggregate information on the state of rare, reducing in population size and endangered species of plants and animals in the territory of Uzbekistan. The first edition of the Red Data Book of the Republic of Uzbekistan (1984) included 163 species of plants; the second edition (1998), 301 species; the third edition (2006), 302 species of higher plants and 3 fungi species; the fourth edition (2009), 321 species of higher plants and 3 fungi species. The first edition of the UZrdB (1983) included 63 species; the second edition (2003), 184; the third edition (2006), 184; the fourth edition (2009), 184 animal species and subspecies. In the last 10-15 years, according to the International Union for the Conservation of Nature (IUCN), the threat of extinction of species in the wild has grown for several species and subspecies, which relates to the reduction of their habitats and decline in population size. This primarily concerns hoofed mammals as the most vulnerable and susceptible to anthropogenic influences of components of fauna. The latest version of the UZrdB was released in 2019 and included 202 species of fauna, and 314 species of flora, however it is understood it has not been completed in conjunction with the IUCN.
47. Other laws and standards applicable for the current project are:
- i. Decree of the President of the RUz # 5863 “On Approval of Concept of Environmental Protection of the Republic of Uzbekistan till 2030”;
  - ii. Decree of the President of the RUz #PP-436 “On measures to increase the efficiency of reforms aimed at the Republic of Uzbekistan's transition to a "green" economy until 2030” (2022);
  - iii. Decree of the Cabinet of Ministers of the RUz #PKM-343 “On further improvement of the environmental pollution assessment system” (2021);
  - iv. Decree of the Cabinet of Ministers of the RUz #PKM-169 “On approval of the list of public roads of the Republic of Uzbekistan” (2012);
  - v. Law of the RUz #ZRU-117 “On highways” (2007, amended in 2018);
  - vi. Decree of the President of the RUz PP-4545 “On measures for the further improvement of the road industry management system” (2019, amended in 2023);
  - vii. SanR&N No 0339-16 - Sanitary Rules and Norms for Planning and Development of Populated Areas of Uzbekistan;
  - viii. SanR&N No 0022-22 - Sanitation rules hygiene requirements for the organization of construction production and construction work;
  - ix. Law on Protection and Use of Archaeological Heritage (2009);
  - x. SanR&N No 0318-15 - Hygienic and anti-epidemic requirements for the protection of water in reservoirs on the territory of the Republic of Uzbekistan;
  - xi. SanR&N No 0255-08 - Main criteria for hygienic assessment of the water bodies contamination for assessing health risks for population in Uzbekistan;
  - xii. SanR&N 0202-06 - The procedure for issuing permits for special water use, development and approval of projects of maximum permissible discharges (MPD) of substances entering with wastewater into water bodies and on the terrain;
  - xiii. SanR&N 0293-11 - Hygienic standards list of maximum permissible concentrations (MPC) of pollutants in the atmospheric air of populated areas on the territory of the Republic of Uzbekistan;
  - xiv. KMK 3.01.02-00 - Construction safety;
  - xv. O’z DSt 1057:2004 - Vehicles. Safety requirements for technical conditions;
  - xvi. Decree of the Cabinet Ministries of RUz – “On the regulation of the use of biological resources

- and on the procedure of passing permissioning procedures in the sphere of nature use (# 290 as of 20.10.2014);
- xvii. Decree of the Cabinet of Ministries of the Republic of Uzbekistan – “On measures for ordering the use of underground water, enhancing their protection from pollution, and also preventing reduction” (#179 as of 08.04.1992);
- xviii. SanR&N No 0212-06 - Hygienic assessment of the degree of soil pollution of different types of land use under specific conditions of Uzbekistan;
- xix. SanR&N No 0183-05 - Hygienic requirements for the quality of the soil in settlements areas in specific natural and climatic conditions of Uzbekistan;
- xx. BR&N No 2.01.08-96 – Noise protection;
- xxi. BR&N No 3.01.02-00 - Construction Safety Standards

#### D. Air Quality Legislation

48. The key legislation relating to air emissions and ambient air quality in Uzbekistan applicable to the Project includes the following:

- i. Sanitary norms and requirements to protect ambient air in communities of the Republic of Uzbekistan SanR&N RUz No.0246-08; and
- ii. List of maximum permissible concentration (MPC)- microorganism-producers in the air of settlement areas SanR&N No 0147-04.

49. The following regulatory documents defines standards for the main pollutants in air in the living area: SanR&N 0293-11 Hygienic standards. The list of maximum permissible concentrations of pollutants in the ambient air of settlements in the territory of the RUz”.

**Table 2. Applicable Ambient Air Quality Standards and Guide Values**

Parameter	Unit	Averaging Period	Concentration	Source of Standard
Sulphur Dioxide (SO <sub>2</sub> )	µg/m <sup>3</sup>	1 year	50	Uzbekistan
		1 month	100	Uzbekistan
		24 hours	20	IFC
		10 minutes	500	IFC
		One time	500	Uzbekistan
Nitrogen Dioxide (NO <sub>2</sub> )	µg/m <sup>3</sup>	1 year	40	IFC/Uzbekistan
		1 month	50	Uzbekistan
		24 hours	60	Uzbekistan
		1 hour	200	IFC/Uzbekistan
		One time	85	Uzbekistan
Nitrous Oxide Nox	µg/m <sup>3</sup>	1 year	60	Uzbekistan
		1 month	120	Uzbekistan
		24 hours	250	Uzbekistan
		One time	600	Uzbekistan
Carbon Monoxide (CO)	µg/m <sup>3</sup>	1 year	3000	Uzbekistan
		1 month	3500	Uzbekistan
		24 hours	4000	Uzbekistan
		One time	5000	Uzbekistan
Hydrocarbons saturated C12- C19	µg/m <sup>3</sup>	One time	1000	Uzbekistan
Particulate matter PM <sub>10</sub>	µg/m <sup>3</sup>	1 year	20	IFC
		1 month	80	Uzbekistan
		24 hours	50	Uzbekistan
Particulate Matter PM <sub>2.5</sub>	µg/m <sup>3</sup>	1 year	10	IFC
		24 hours	25	IFC

#### E. Water Quality Legislation

50. There are different standards for various type of water bodies in Uzbekistan. Depending on the purpose of use, water bodies could be categorized as for domestic use (could be used as a source for potable water after treatment), fishery, municipal use, and irrigation purposes. Table 3

presents the national general effluent standards into the water bodies classified by type of use.

**Table 3. Applicable Water Quality Standards and Guide Values**

Indicators	Purpose of water use			
	Domestic use	Recreation and service	Fishery needs	
			Highest and first category	Second category
Suspended solids	Depending on natural conditions, the content of suspended solids in wastewater discharge shall not exceed			
	0.25 mg/dm <sup>3</sup>	0.75 mg/dm <sup>3</sup>	0.25 mg/dm <sup>3</sup>	0.75 mg/dm <sup>3</sup>
	For reservoirs and watercourses containing at low water above 30 mg/dm <sup>3</sup> of suspended solids, there may be an increase to 5%. Discharge of suspensions with fallout rate of more than 0.4 mm/s for watercourses and more than 0.2 mm/s in water reservoirs are prohibited			
Floating matter	There shall not be a film of oil products and concentrations of other contaminants on the water surface			
Color	Shall not be detected in the column of height		There shall be no adulterants	
	20 cm	10 cm		
Smell and test	Intensity of more than 1 point is not permitted		Water must not give extraneous odors and flavors to fish meat	
Temperature	Temperature of water at the discharge point shall not exceed 3°C as compared with average monthly temperature of the hottest month		Temperature of water at the discharge point shall not exceed 5°C as compared with average monthly temperature of the hottest month. Increasing of temperature more than 28°C in summer and till 8°C in winter is not allowed	
Hydrogen exponent (pH)	Shall not be beyond 6.5 - 8.5 pH		Shall not be beyond 6.5 - 8.5 pH	
Water salinity	Dry residue shall not exceed 1000 mg/dm <sup>3</sup> , including chlorides – 350 mg/dm <sup>3</sup> and sulphate - 500 mg/dm <sup>3</sup>		Rated according to water bodies intoxications	
Dissolved oxygen	No less than 4 mg/dm <sup>3</sup> in any period of the year in a sample taken by 12 a.m. on the same day		In winter shall be no less than	
			6 mg/dm <sup>3</sup>	
			No less than 6 mg/dm <sup>3</sup> in any period of the year in a sample taken by 12 a.m. on the same day	
BOD	At 20°C shall not exceed		At 20°C shall not exceed 3.0 mg/dm <sup>3</sup> if in winter the dissolved oxygen content in water of the first* category fishing water bodies falls to 6.0 mg/dm <sup>3</sup> , and in the second** – to 4 mg/dm <sup>3</sup> , then discharge is only permitted to wastewater that does not change the BOD	
	3.0 mg/dm <sup>3</sup>	6.0 mg/dm <sup>3</sup>		
COD	Shall not exceed			
	15.0 mg/dm <sup>3</sup>	30.0 mg/dm <sup>3</sup>	-	-
Causative agent (of a disease)	Not allowed			
Chemicals (pollutants)**	Shall not be contained in concentrations exceeding the MAC			

\* The first category includes water bodies, where valuable fish species highly sensitive to oxygen are kept and reproduced)

\*\* The second group includes water bodies used for other aquatic economy needs.

51. Maximum allowed concentrations of most spread chemical pollutants are presented in Table 4. As shown in the table, the national standards for irrigation water fully comply with the international

standards. Therefore, the national standards for fishery are taken as a basis for this IEE.

**Table 4. Maximum permissible concentration of pollutants in water bodies (mg/m<sup>3</sup>)**

Pollutants	Water use category (Handbook of environmentalist, Tashkent 2010)					
	Fishery	Municipal	Potable water		Irrigation water for direct use without blending	
			Nat	WHO <sup>1</sup>	Nat	FAO <sup>2</sup>
COD	15	30	30	-	40	-
BOD <sub>20</sub> , mgO <sub>2</sub> /L	3	3-6	3-6	-	10	-
pH	6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5
Water salinity	1,000	1,000	1,000-1,500	1,000	1,000	0-2,000
Including: sulphates	100	500	400-500	-	-	1,900
Chlorides	300	350	250-350	-	-	300
Ammonium nitrogen (ammonium salt) (NH <sub>4</sub> <sup>+</sup> )	0.5	2	0.5	-	1.5	0-5
Nitrogen	9.1	25	45	-	25	-
Nitrogen nitrite	0.02	0.5	3	-	0.5	0-10
Nitrite	0.08	3.3	3	3	-	-
Nitrate	40	45	45	50	-	-
Phosphate (PO <sub>4</sub> <sup>3-</sup> )	0.3	1	3.5	-	1	0-2
Ether soluble	0.05	0.8	0.8	-	0.8	-
Oil products	0.05	0.3	0.1	-	0.3	-
Sodium alkyl sulfates (SAS)	0.1	0.5	0.5	-	0.5	-
Phenol	0.001	0.001	0.001-0.1	-	0.001	-
Fluorine (F)	0.05	1.5	0.7	1.5	1	-
Arsenic (As)	0.05	0.05	0.05	0.01	0.1	-
Iron (Fe)	0.05	0.5	0.3-3	-	5	-
Chromium (Cr <sup>6+</sup> )	0,001	0.1	0.05	0.05	0.1	-
Copper (Cu)	0,001	1	1	2	1	-
Zinc (Zn)	0.01	1	3	-	5	-
Cyanides	0.05	0.1	0	0	-	-
Lead (Pb)	0.03	0.1	0.03	0.01	0.2	-
Nickel (Ni)	0.01	0.1	0.1	0.07	-	-
Cadmium (Cd)	0,005	0.01	-	0,003	-	-
Cobalt (Co)	0.1	1	-	-	-	-
Molybdenum (Mo)	0.0012	0.5	0.25	-	-	-
Strontium (Sr <sup>2+</sup> )		2	7	-	-	-
Selenium (Se)	0.001		0.01	0.04	-	-
Mercury (Hg)		0.005	0.0005	0.006	-	-
Boron (B)		0.53		2.4	0.53	0-7-3

## F. Health and Safety

### Occupational Health and Safety

52. Laws on occupational health and safety (OHS) in Uzbekistan are as follows:

- i. Law on Sanitary and Epidemiological Welfare of the Population
- ii. Law on Occupational Safety

<sup>1</sup> WHO, Guidelines for drinking water quality, Fourth Edition, 2017

<sup>2</sup> FAO Guidelines for interpretations of water quality for irrigation

- iii. Regulations on Investigation and Registration of Occupational Accidents and other Work-Related Impairment of the Health of Workers
- iii. Related Impairment of the Health of Workers
- iv. Law on Occupational Safety in Hazardous Production Facilities
- v. Law on Fire Safety
- vi. Decree on Further Perfection of Measures for the Occupational Safety of Workers.
- vii. Law on Sanitary and Epidemiological Welfare of the Population (2015). This law regulates relations in the field of sanitary and epidemiological welfare of the population
- viii. Law on Occupational Safety (2016). The law establishes a system of social, economic, organisational, technical, sanitary, and health as well as medical and preventive arrangements aimed at providing safety and health protection and capacity for persons at the workplace. Part II of the Law on Occupational Safety (Articles 8 through 14) establishes the norms for labour safety, including requirements in design, construction, and installation of production facilities, training in labour safety measures, financing of labour safety measures at the workplace, and ensuring safe and healthy working conditions. Part III of the Law on Occupational Safety (Articles 16 through 19) establishes procedures for guarantee of rights of workers to safety in the workplace, in particular ensuring access to medical examinations, measures of labour safety, and sanitary and healthy working conditions, training and information on labour safety procedures, and rights to information on working conditions and safety. Part IV and Part V of the Law on Occupational Safety deal with State and Public Supervision and Control and Liabilities, respectively.
- ix. Further Perfection of Measures for the Occupational Safety of Workers. Establishes, inter alia, a provision for the procedure of organising attestation of workplaces by working conditions and hazardousness of equipment, according to the attached appendix No.1; establishes the provision on the procedure of granting qualification certificates; and No.2 orders the Ministry of Higher and Secondary Professional Education to include in study courses, special sections on the occupational safety; also orders other state executive bodies to carry out certain activities for the perfection of measures for occupation safety. Introduces appendices No.1, 1a, 1b, 2, 3, 4, 5, 6, 7, 8 for the Provision on the procedure of organizing verification of workplaces by working conditions and hazard of equipment; appendices 1–4 for the Provision on procedure of granting qualification certificate to specialist of attestation.
- x. The Law on Occupational Safety in Hazardous Production Facilities, enacted on August 25, 2006 (last amended in 2018), stipulates the legal, economic and social terms of ensuring safe exploitation of hazardous production facilities, with the aim of building enterprise capacity and preventing accidents.
- xi. Regulations on Investigation and Registration of Occupational Accidents and other Work-Related Impairment of the Health of Workers (1997). An employee who has been fully or partially disabled through the fault of the management as a result of an occupational accident or disease is paid an allowance and compensated for damage to health by the enterprise in accordance with the “rules of compensating damage due to occupational injury, disease or other work-related impairment of health” approved by Decree of the Cabinet of Ministers of Uzbekistan of February 11, 2005 No. 60.
- xii. In addition to the main legislation, the Republic has national normative documents addressing the issues of occupational health and safety. They include the Sanitary Rules and Norms (SanPiN), State Occupational Safety Standards (GOST, SSBT), Construction Norms and Rules (SNiPs), standards of the content of harmful substances (maximum allowable concentrations and levels), normative methodological documents on individual issues setting forth concrete requirements to occupational safety in hazardous facilities, when manufacturing or applying various products, etc.

### **Community Health and Safety**

53. Law on Public Health (1996, amended in 2023). The main objectives of legislation on the protection of public health are guaranteeing the rights of citizens health care from the state; the formation of a healthy lifestyle of citizens; legal regulation of the activities of state bodies, enterprises, institutions, organizations, public associations in the field of public health.

### **G. Noise and Vibration Legislation**

54. The national and international noise standards are presented in the Table 5 below, and the national standards of Uzbekistan are consistent with the international standards.

**Table 5. Maximum allowable noise standards (dB): comparison of national and international maximum allowable noise standards (dB)**

Receiver	National <sup>3</sup>		General EHS Guidelines <sup>4</sup>	
	Daytime (7.00 am – 11pm)	Night-time (11.00 pm – 7.00 am)	Daytime (7.00 am – 10.00 pm)	Night-time (10.00 pm – 7.00 am)
Residential	55	45	55	45
Offices, commercial	60	-	70	70

55. There is some difference in defining a daytime and night-time between General EHS Guidelines and the national standards. General EHS Guidelines indicate as night-time period is from 10 pm to 7 am, while the national standards define this period between 11 pm and 7 am. On this aspect, more stringent standards (General EHS Guidelines) will be applied for this project.

56. The national standards for vibration levels in residential houses are provided in Sanitarian Norms and Rules (SanN&R) № 0331-16 “Residential house design in climatic conditions of Uzbekistan”. For residential houses the standard is 67 dB for night-time and 72 dB for daytime with a frequency of 37 and 61 Hz. For non-continuous vibration, the standards should be decreased by 10 dB. However, the standard does not provide any coefficient/allowance for non-frequent events such as passing trains. For the construction phase the vibration limit will be 72 dB.

**Table 6. National Vibration Standards**

Time	Permanent vibration, dB
Daytime	72
Night-time	67

57. The manual cites criteria developed by the United States Federal Transit Administration (FTA), which indicates vibration impact level on residences and building where people.

**Table 7. Federal Transit Administration (FTA) Vibration Impact Criteria**

Land Use Category	Vibration Impact Level for Frequent Events (VdB)	Vibration Impact Level Infrequent Events (VdB)
Category I: Buildings where low ambient vibration is essential for interior operations	65	65
Category II: Residences and buildings where people normally sleep	72	80
Category III: Institutional land uses with primarily daytime use	75	83

Note: “Frequent events” is defined as more than 70 events per day. “Infrequent events” is defined as fewer than 70 events per day.

58. For non-residential areas, standards for buildings integrity were accepted in accordance with Table 7 Maximum continuous vibration levels for preventing damage (mm/s).

59. The maximum continuous vibration levels for preventing damage to different types of buildings, as set by the American Association of State Highway and Transportation Officials (AASHTO) and the Swiss Association of Standardization (SAS), are presented in the Table 8 below. This data could be used as thresholds for both phases – construction and operation for structural

<sup>3</sup> Sanitarian Norms and Rules (SanR&N) # 0331 (2016) Admissible noise level into the living area, both inside and outside the buildings, Table 10.2.4.2

<sup>4</sup> World Bank Group, Environmental, Health, and Safety Guidelines, April 30, 2007, Washington, USA.

<https://www.ifc.org/wps/wcm/connect/29f5137d-6e17-4660-b1f9-02bf561935e5/Final%2B-%2BGeneral%2BEHS%2BGuidelines.pdf?MOD=AJPERES&CVID=nPtguVM> in English.

[https://www.ifc.org/wps/wcm/connect/be37221a-fc47-4379-b539-eca3fe72c3e6/General%2BEHS%2B-%2BRussian%2B-%2BFinal\\_.pdf?MOD=AJPERES&CVID=nPtgFKk&ContentCache=NONE&CACHE=NONE](https://www.ifc.org/wps/wcm/connect/be37221a-fc47-4379-b539-eca3fe72c3e6/General%2BEHS%2B-%2BRussian%2B-%2BFinal_.pdf?MOD=AJPERES&CVID=nPtgFKk&ContentCache=NONE&CACHE=NONE) in Russian

integrity of buildings/houses.

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**Table 8. Maximum continuous vibration levels for preventing damage (mm/s)**

Description of building type	AASHTO (1990)		SAS (1992)	
	mm/s	dB*	mm/s	dB*
Historic sites or other critical locations	2.5	94	2.5	94
Residential buildings with plastered walls / Building with foundation walls and floors in concrete, wooden ceilings, and walls in masonry	5.1-7.6	100-104	5.1	100
Residential buildings in good repair/ Building with foundation walls and floors in concrete, walls in concrete or masonry	10.2-12.7	106-108	7.6	100
Engineered structures without plaster / Buildings in steel or reinforced concrete	25.4-38.1	114-118	12.7	108

AASHTO = American Association of State Highway and Transportation Officials, SAS = Swiss Association of Standardization

Source: California Department of Transportation (2013), US Transportation Research Board (2012)

60. As international standards for vibration were used, the standards provided in general guidance on human response to building vibrations is given in: (i) AS 2670.2–1990 Evaluation of human exposure to whole-body vibration: continuous and shock-induced vibration in buildings” (1 to 80 Hz);(ii) ISO 2631–2:2003 Mechanical vibration and shock: evaluation of human exposure to whole body vibration, Part 2: Vibration in buildings (1 Hz to 80 Hz); (iii) BS 6472 –1:2008 Guide to evaluate human exposure to vibration in buildings. Vibration sources other than blasting. Based on these guidelines, the ground vibration limits are presented in the Table 9.

**Table 9. Ground vibration limits for human comfort**

Category	Period	Peak component particle velocity (mm/s)	Vibration, dB
Residential	Night-time	0.2 mm/s	72
	Daytime	0.3 mm/s	76
Offices	When occupied	0.6 mm/s	82
Occupied non-sensitive sites, such as factories and commercial premises	When occupied	2.5 mm/s	94

mm/s = millimetres per second

61. A sensitive site includes houses and individual residential buildings, theatres, schools, and other similar buildings occupied by people.

Therefore, because of the comparison of both national and international standards for vibration, it was accepted that national standards for vibration in residential areas are more stringent, and therefore will be applied for the project, i.e., 72 dB during daytime and 65 dB during night-time.

## H. Cultural Heritage

62. The Law on Protection and Use of Cultural Heritage Objects (2001, amended in 2022) regulates the protection and use of cultural and archaeological objects; but these relate more explicitly to State measures for preservation, excavation, and use of objects of cultural heritage. The Law on the Protection and Use of Cultural Heritage is directed primarily at preservation and management of important elements of the built environment, but also addresses protection of historical, archaeological, aesthetic, ethnological, or anthropological territories, as well as natural landscapes connected with historical event. The Laws establish procedures for use of surveys and qualified state agencies and expertise in the field, and the protection and use of archaeological heritage, conservation measures, and terms and conditions for cadastral surveys, excavations, supervision, etc.

## I. Waste Management

63. This section provides an overview of the key legislation concerning waste management and disposal in Uzbekistan. The Cabinet of Ministers of Uzbekistan sets and approves national policies,

strategies, programs and procedures relating to waste management including allocation of hazardous waste disposal sites and adjustment of waste disposal charge rates as set forth in Article

64. 5 of the Law on Wastes. Local governments are responsible for waste management policies, strategies and procedures at the local level.

**Table 10. Key environmental legislation of the RUz on waste management**

<b>National laws</b>
Constitution of the Republic of Uzbekistan (Article 55) “Land, depths, water, flora and fauna and other natural resources are national wealth, should be rationally used and are under state protection”.
Law on Wastes (#362-II of 05.04.2002 (as last amended on 11 October 2018) It addresses waste management, exclusive of emissions and air and water pollution, and confers authority to SCEEP concerning inspections, coordination, ecological expertise and establishing certain parameters with regard to the locations where waste may be processed.
Decrees
Decree of the Cabinet of Ministers of the Republic of Uzbekistan on Approval of the collection and disposal of used mercury-containing lamps (#266 of 21 September 2011, as last amended on 30 April 2019)
Decree of the Cabinet of Ministers of the Republic of Uzbekistan on Measures for the Further Improvement of Economic Mechanisms for Ensuring Nature Protection (#820 of 11 October 2018)
Decree of the Cabinet of Ministers of the Republic of Uzbekistan on Enhancing the Use and Recycling of Mercury Lamps and Devices (#405 of 23 October 2000)
Regulations
RD Oz RH 84.3.15.2005 - Regulation Document on the waste inventory procedure
RD Oz RH 84.3.16.2005 - Regulation Document on Guidelines for setting waste disposal limits
RD Oz RH 84.3.17.2005 - Regulation Document on Production and consumption waste. Procedure for developing the Waste Disposal Limit Document
RD Oz RH 84.3.22.2006 - Production and consumption waste. Waste inventory and waste disposal limits approval procedure (issued by the Goskomecologiya of Uzbekistan, 2006)
RD Oz RH 84.3.11.2004 - Requirements for handling mercury and its compounds, mercury-based waste, and mercury containing devices
RD Oz RH 84.3.10.2004 - Regulation on handling mercury-containing products in the Republic of Uzbekistan
RD Oz RH 84.3.8.2004 - Methodology for integrated waste hazard rating
KMK 201.12-96 - A Landfill for burial and land storage of industrial hazardous wastes
Provisional waste norms for cities and regions of Uzbekistan approved by khokimyats
Sanitarian Rules and Norms
SanR&N No. 0127-02 - Sanitarian Rules of inventory, classification, storage and disposal of industrial wastes
SanR&N No. 0128-02 - Hygienic classifier of toxic industrial wastes in the Republic of Uzbekistan
SanR&N No. 0157-04 - Sanitarian requirements on storage and disposal of solid waste in special landfills
SanR&N No. 0158-04 - Sanitarian Rules and Norms on collection, transportation and disposal of wastes contained asbestos in Uzbekistan
SanR&N No. 0168-04 - List of asbestos-cement materials and construction, allowed for using and field of its implementation
SanR&N No. 0068-96 - Sanitary regulations for collection, storage, transportation, disposal and recycling of municipal solid waste
Others
GOST 17.0.0.05-93 - Unified system of standards for environmental protection and rational use of resources. Waste Data Sheet. Composition, content, presentation and amendment procedures
GOST 17.9.0.2-99 Environment protection. Waste management. Waste Data Sheet. Composition, content, presentation and amendment procedures
GOST 17.9.1.1-99 Environment protection. Waste management. Waste classification. Waste definition by the genetic principle and categorization
GOST 30774-2001 Resources saving. Waste management. Waste Hazard Data Sheet. Main provisions
GOST 30775-2001 Resources saving. Waste management. Identification and coding. Main provisions

65. Permits for combined landfilling of industrial and municipal waste are granted by local Sanitarian Epidemiological station (SES)<sup>7</sup> based on results of analyses completed by accredited laboratories (SanR&N RUz - 0157-04).

66. Landfill owners are responsible for safe storage and disposal of waste to avoid potential

impacts to human health and the environment (SanR&N RUz 0157-04).

## J. Soil Quality Legislation

67. The soil quality standards are defined in the SanR&N # 0191-05 dated from 2005 “Sanitary maximum permitted concentrations (MPC) and tentatively acceptable concentration of exogenous pollutants in the soil”. The national standards have been compared with the international ones.

**Table 11. Key environmental legislation of the RUz on waste management**

Parameter	Unit	Uzbek Standard(1)	Dutch Intervention Values (2)	EHS Guidelines <sup>5</sup>
Antimony	mg/kg	4.5	22	There are no detailed numerical requirements to soil quality established by EHS Guidelines
Arsenic	mg/kg	2.0	76	
Cadmium	mg/kg		13	
Chromium	mg/kg	6.0		
Chromium VI	mg/kg		78	
Cobalt	mg/kg	5.0	190	
Copper	mg/kg	3.0	190	
Mercury (organic)	mg/kg	2.1	4	
Lead	mg/kg	32.0	530	
Molybdenum	mg/kg	10.0	190	
Nickel	mg/kg	4.0	100	
Selenium	mg/kg		100	
Zinc	mg/kg	23.0	720	
Cyanides	mg/kg		20 (free) 50 (complex)	
Benzene	mg/kg	0.3	1.1	
Ethylbenzene	mg/kg		110	
Toluene	mg/kg	0.3	32	
Xylenes (sum)	mg/kg		17	
Styrene (vinylbenzene)	mg/kg	0.1	86	
Phenol	mg/kg		14	
Vanadium	mg/kg	150.0	250	
Nitrates	mg/kg	130.0	-	
Sulphates (H <sub>2</sub> SO <sub>4</sub> )	mg/kg	160.0	-	
Total Petroleum Hydrocarbons (Mineral Oil)	mg/kg		5,000	
PAHs (total)	mg/kg		40	
Ammonia Nitrogen	mg/kg		1.5	
Notes: General EHS Guidelines, Wastewater and Ambient Water Quality SanN&R #0191-05. Sanitary Permissible Concentrations (MPC) and Indicative Acceptable Concentrations (IAC) of Exogenous Harmful Substances in the soil (November 5, 2005)				

## K. Environmental Impact Assessment

68. The national environmental assessment procedure is regulated by the Law "On State Environmental Expertise" (SEE) and the Regulation "On further improvement of the environmental impact assessment mechanism", approved by the Resolution of the Cabinet of Ministers No. 541 (2020). The Resolution specifies the legal requirements for environmental assessment documents in Uzbekistan. According to the Resolution, SEE is a type of environmental examination carried out by specialized expert bodies to ensure compliance of the planned activities with the environmental requirements and determine permissibility of the project implementation.

69. MinEcologiya is the authorized state body in the field of the SEE. The Centre of State Environmental Examination (CSEE) under MinEcologiya carries out the SEE for projects classified under categories I and II categories to assess their environmental impact (high and medium risk). The regulation sets out a procedure of arrangements and carries out the SEE. The environmental assessment stages and their required results are summarized as follows

- i. Stage I: A Preliminary Environmental Impact Statement (PEIS or PZVOS, see footnote 2) shall be prepared during preparation of a proposed project prior to any fund allocation for development.
- ii. Stage II: An Environmental Impact Statement (EIS or ZVOS) shall be carried out on a basis of a conclusion of the environmental expertise issued at the first stage of the assessment. The second stage of the assessment is also submitted to the CSEE, and the conclusion must be received before the start of construction.
- iii. Stage III: State Environmental Consequences (SEC) is the final stage of the SEE process and shall be carried out prior to the project start. The report describes in detail the changes to be made to the project design as a result of the CSEE review during the first two stages of the environmental assessment process, comments received during public consultations, environmental standards applicable to the project, and environmental monitoring requirements related to the project, as well as the key opinion.

70. All types of economic activities assessed by SEE are classified as one of four categories:

- i. Categories I and II are "high and medium risks of environmental impact" (all stages of environmental assessment are required);
- ii. Category III is "low risk of impact" (all stages of environmental assessment are required); and
- iii. Category IV - "local impact" (only the first stage of environmental assessment - PEIS is required).

71. The SEE opinion is valid for three years from the date of its issuance. If a project is not implemented within three years from the date of issuing the opinion, the environmental assessment reports (PEIS or EIS) need to be revised and re-submitted to the CSEE for revision and approval.

72. The opinion of the SEE shall be shared with the relevant regional (city) Control Environmental Inspectorates for their follow up and supervision. Such Inspectorates under the MinEcologiya supervise the compliance with the requirements and terms specified in the SEE's opinion.

## L. Approvals and Permissions

73. The Table 12 below presents a list of all the required approvals and permissions required before construction can take place. The permits required include the need to consider associated facilities, national impact assessment and no objection must be received from minister of environment, gravel pits must have permission, closing needs the geology committee and minister of environment to give no objection and actions to be undertaken by developers if problems arise.

**Table 12. List of Necessary Approvals and Permissions**

No.	Document Name	Time of Receiving Permission	Agency issuing permit	Responsible Entity	Relevant legislation
1	Environmental Appraisal (Positive Conclusion of Environmental Expertise – Stage 1 and Stage 2 <sup>1</sup> )	Prior to commencement of the construction works	The Ministry of Ecology, Environment Protection and Climate Change (MEEPCC), State Ecological Expertise Department	Implementation Agency (IA) – Road Fund/PMU	Law on Nature Protection (1992), Law on Environmental Expertise (2000)
2	Non-objection for reconstruction of roads/bridges crossing irrigation canals	At the project design stage	Ministry or Water resources, regional branches	Implementation Agency (IA) – Road Fund/PMU	Law on water and water use (1993, 2023)

No.	Document Name	Time of Receiving Permission	Agency issuing permit	Responsible Entity	Relevant legislation
2	Permits for opening new borrow pits	Prior to commencement of the construction works	The Ministry of Geology and mineral Resources	Contractor	Resolution of Cabinet Ministries (RCM) of RUz dated March 25, 2022 No. 133 “On measures to further improve the procedure for issuing permits for the right to use subsoil plots”
3	Agreement with the licensed company on using existing borrow pits	Prior to commencement of the construction works	Licensed company	Contractor	The same as above
4	Permission to transplant trees and shrubs	Prior to commencement of the construction works	Biological resources department under MEEPCC	Contractor	Law of RUz “On protection of plants” (1997) and Resolution of President of Uzbekistan #46 “On measures to accelerate planting work and further effective organization of tree protection in the Republic”
5	Permits on disposal of construction wastes from construction sites and domestic wastes from construction camps	Prior to commencement of the construction works and opening construction camps	Waste management company under MEEPCC	Contractor	RCM # 40 dated from 2021 “On measures for the further improving the procedure on construction waste handling”
6	Permits on water use from drinking water supply sources	Prior to commencement of the construction works	Regional Suvtaminot agency under the Ministry of Construction and Communal Services (MCCS)	Contractor	Law on Water and Water use (1993, 2003), Resolution of Cabinet Ministries # 255 (2018) “Administrative Order on issuing water use permits”

No.	Document Name	Time of Receiving Permission	Agency issuing permit	Responsible Entity	Relevant legislation
7	Permits on special water use from irrigation canals	Prior to commencement of the construction works	Regional branches of the Ministry of Water Resources Management (MWR)	Contractor	Law on Water and Water use (1993, 2003), Resolution of Cabinet Ministries # 255 (2018) "Administrative Order on issuing water use permits"
8	Permits on special water use from natural water sources (rivers, springs etc.)	Prior to commencement of the construction works	MEEPCC	Contractor	Law on Water and Water use (1993, 2003), Resolution of Cabinet Ministries # 255 (2018) "Administrative Order on issuing water use permits"
9	Agreement on disposal of sewage from	Prior to commencement of the construction works	Regional Oqovasuv agency under the Ministry of Construction and Communal Services (MCCS)	Contractor	Law on Water and Water Use (1993) RCM #95 dated from 2019 "Rules on disposal of solid wastes and sewage"
10	Non-objection from various utilities (gas supply, water supply, sewage network, communications cables and etc.) on conduction construction works	Prior construction	From relevant agencies: Suvtaminot, Regional electric grid agency, Ministry of communication and etc.	Contractor	Relevant Laws

74. In addition to the national environmental assessment process, an Initial Environmental Examination (IEE) must be prepared following SPS (2009) for all sub-project funded under this sector loan.

### M. International Agreements

75. The Government of Uzbekistan has ratified the following international conventions relevant to this IEE. These are shown in Table 13 below. Fulfillment of these commitments contributes to environmental sustainability, promotes external funding for stabilization and prevention of degradation of natural resources and cultural heritage, and enhances the country's capacity to use its natural and cultural resources as a basis for poverty reduction and socio-economic development.

**Table 13. Participation of Uzbekistan in International Conventions Relevant to the Project**

<b>International Conventions</b>	<b>Date of Ratification</b>	<b>Date of coming into force for Uzbekistan</b>	<b>Main Objectives</b>
United Nations Framework Convention on Climate Change (including Paris Agreement)	20 June 1993 (acceptance)	21 March 1994 (Paris Agreement - 2017)	Stabilizing greenhouse gas concentrations at a level that would prevent dangerous anthropogenic (human induced) interference with the climate system.
Kyoto Protocol	20 August 1999	16 February 2005	Setting internationally binding GHGs emission reduction targets.
United Nations Convention Combat Desertification	31 August 1995	29 January 1996	Reversing and preventing desertification and land degradation in affected areas to support poverty reduction and environmental sustainability.
United Nations Convention on Biological Diversity	6 May 1995 (accession)	17 October 1995	Conservation of biodiversity, sustainable use of its components, and equitable sharing of the benefits.
Convention on the Conservation of the World Cultural and Natural Habitats	22 December 1995	15 June 1996	Protection of natural and cultural heritage.
Convention for the Safeguarding of the Intangible Cultural Heritage. Paris	2003	2008	The Convention, building on the 1989 Recommendation on the Safeguarding of Traditional Culture and Folklore, establishes the necessary measures that States should take in the safeguarding of Intangible Cultural Heritage (ICH)
Convention on International Trade in Endangered Species of Wild Fauna and Flora	25 April 1997 (accession)	8 October 1997	Ensuring that international trade does not threaten wild animals and plants.
Convention on the Conservation of Migratory Species (Bonn convention)	1 May 1998 (accession)	1 September 1998	Global platform for the conservation and sustainable use of migratory animals and their habitats.
Ramsar Convention on Wetlands of International Importance Especially as Wildlife Habitat	30 August 2001 (accession)	8 February 2002	Conservation and wise use of all wetlands through local and national actions and international cooperation to achieve sustainable development.
Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal	22 December 1995 (accession)	7 May 1996	Regulation, reduction, and restriction of hazardous wastes transboundary movement.
Vienna Convention for the Protection of the Ozone Layer (1985).	1985		A framework agreement in which States agree to cooperate in relevant research and scientific assessments of the ozone problem, to exchange information, and to adopt “appropriate measures” to prevent activities that harm the ozone layer.
Montreal Protocol to Protect the Ozone Layer (including 1990 and 1999 amendments)	1990	1992	The Montreal Protocol on Substances that Deplete the Ozone Layer is the landmark multilateral environmental agreement that regulates the production and consumption of nearly 100 man-made chemicals referred to as ozone depleting substances (ODS).

International Conventions	Date of Ratification	Date of coming into force for Uzbekistan	Main Objectives
Stockholm Convention on Persistent Organic Pollutants	22 May 2001	8 May 2019	Convention is a global treaty to protect human health and the environment from chemicals that remain intact in the environment for long periods, become widely distributed geographically, accumulate in the fatty tissue of humans and wildlife, and have harmful impacts on human health or on the environment.
The Convention on the Protection and Use of Transboundary Watercourses and International Lakes	1992	2007	The convention is a unique international legal instrument and intergovernmental platform which aims to ensure the sustainable use of transboundary water resources by facilitating cooperation.

### International Labour Organisation

76. Uzbekistan ratified the following eight fundamental conventions of the International Labor Organization:

- i. Forced Labor Convention, 1930 (No.29), ratified by Uzbekistan in 1992 and Protocol of 2014 to the Forced Labor Convention (1930), ratified by Uzbekistan in 2019;
- ii. Freedom of Association and Protection of the Right to Organize Convention, 1948 (No.87), ratified by Uzbekistan in 2016;
- iii. Right to Organize and Collective Bargaining Convention, 1949 (No.98), ratified by Uzbekistan in 1992;
- iv. Equal Remuneration Convention, 1951 (No.100), ratified by Uzbekistan in 1992;
- v. Abolition of Forced Labor Convention, 1957 (No.105), ratified by Uzbekistan in 1997;
- vi. Discrimination (Employment and Occupation) Convention, 1958 (No.111), ratified by Uzbekistan in 1992;
- vii. Minimum Age Convention, 1973 (No.138), ratified by Uzbekistan in 2009; and
- viii. Worst Forms of Child Labor Convention, 1999 (No.182), ratified by Uzbekistan in 2008.

77. The other applicable ratified conventions of the International Labor Organization are:

- i. Forty-Hour Week Convention, 1935 (No.47), ratified by Uzbekistan in 1992;
- ii. Holidays with Pay Convention, 1936 (No.52), ratified by Uzbekistan in 1992;
- iii. Maternity Protection Convention (revised 1952) (No.103), ratified by Uzbekistan in 1992;
- iv. Employment Policy Convention, 1964 (No.122), ratified by Uzbekistan in 1992;
- v. Workers' Representatives Convention, 1971 (No.135), ratified by Uzbekistan in 1997;
- vi. Collective Bargaining Convention, 1981 (No.154), ratified by Uzbekistan in 1997;
- vii. Labor Inspection (Agriculture) Governance Convention 1962 (No.129), ratified by Uzbekistan in 2019; and
- viii. Tripartite Consultation (International Labor Standards) Convention 1976 (No.144), ratified by Uzbekistan in 2019 (not yet in force).

78. Uzbekistan acknowledges the issue of child and forced labor in the country. It is now implementing the Decent Work Country Program that has been established as the main vehicle for delivery of International Labor Organization support to the country in implementing its standards.

### III. PROJECT DESCRIPTION

#### A. Project Context

79. The Government of Uzbekistan has prioritized economic development under its Development Strategy for 2022–2026. Within this framework, the transport sector has been identified as a critical enabler of economic growth. Pursuant to Presidential Decree No. 249 dated 18 May 2022, titled “On Measures to Expand the Network of Roads with Cement Concrete Pavement”, the reconstruction of rural roads has been designated as a national priority. The decree also outlines provisions for mobilizing additional financial resources from international financial institutions (IFIs) to support the construction and improvement of rural road infrastructure. The proposed initiative, titled the Rural Roads Resilience Project (RRRSP), is aligned with the national rural road development objectives outlined in Uzbekistan’s Rural Road Strategy 2035. Furthermore, the project supports the implementation of the Central Asia Regional Economic Cooperation (CAREC) 2030 strategy, particularly Operational Cluster 3, which emphasizes infrastructure development and enhanced regional economic connectivity.

80. Uzbekistan, a doubly landlocked country with an estimated population of 37.5 million as of 2024, places significant importance on enhancing internal and cross-border connectivity as a critical enabler of its economic development. Approximately 50% of the population (2023) resides in rural areas where agriculture remains the predominant livelihood source. The agricultural sector accounts for approximately 26% of total employment (2022) and contributes nearly 21% to the national gross domestic product (GDP) based on 2023 data. As such, rural communities are heavily dependent on functional and reliable rural road infrastructure to access markets, social services, and economic opportunities.

81. Despite the existence of approximately 11,000 rural settlements across the country—home to more than 13 million people—nearly 80% of these communities lack adequate road infrastructure, relying instead on unpaved or poorly maintained rural roads. Furthermore, over 3,000 settlements, representing nearly 6 million people, are either connected via roads in severely deteriorated condition that require immediate capital repair or upgrading, or lack road access entirely. These deficiencies result in seasonal physical isolation and significantly impede access to essential services such as markets, education, healthcare, and administrative centers.

82. Uzbekistan’s National Rural Road Program seeks to enhance rural road infrastructure across the country’s twelve regions, the Republic of Karakalpakstan, and the City of Tashkent. This initiative is established under Presidential Decree No. 249, dated 18 May 2022, which designates the expansion of the rural road network as a national priority. The program aims to mobilize approximately USD 240 million in financing from international financial institutions (IFIs) to support the construction and rehabilitation of rural roads.

83. In a letter dated 9 November 2022, the Ministry of Investment and Foreign Trade (currently Ministry of Investment, Industry and Trade, MIIT) proposed the development of a rural road improvement program, in line with Presidential Decree No. 249. The proposal also included recommendations for corresponding revisions to the ADB’s Indicative Country Pipeline and Monitoring Report (ICP-MR), to be considered during the 2023 country programming exercise.

84. To establish a comprehensive and long-term framework for rural road development in Uzbekistan, the Rural Road Strategy 2035 (RRS) was formulated under the ADB’s Technical Assistance (TA 9987-UZB). This strategic document outlines development priorities and implementation pathways for rural roads through the year 2035. Following its finalization, the RRS received formal endorsement from the Committee for Roads (CR), the Ministry of Transport, and the Ministry of Investment, Industry, and Trade. The proposed project is fully aligned with ADB’s Country Partnership Strategy for Uzbekistan (2019–2023), particularly with Strategic Area 1 (Supporting Private Sector Development) and Strategic Area 2 (Reducing Economic and Social Disparities).

85. As part of the Rural Roads Resilience Sector Project, the reconstruction and concreting of existing rural and inter-farm roads are planned within the Tashkent Region of the Republic of

Uzbekistan. The project scope includes a total of nine (9) rural road sections, which are distributed across rural areas located in four (4) districts of the Tashkent Region.

86. The proposed project aims to enhance transport connectivity in rural areas, thereby improving access to essential local services and contributing to better livelihoods, particularly for women. The expected outcome of the project includes improved connectivity, operational efficiency, and road safety for rural roads throughout Uzbekistan.

87. The outputs of the Project will comprise the reconstruction and maintenance of 61.3 km of rural road sections within the Tashkent Region. In addition, the Project will support the enhancement of institutional capacity for road maintenance, improvement of road safety measures, and the integration of climate-resilient design capacity.

88. The Table 14 below presents the rural road sections in Tashkent Region:

**Table 14. Project Rural Roads Sections in the Tashkent Region**

Road Name	Road Length (km)	Road Width (m)	Current Pavement	Province (or Region)
10V065 (4K-768)	15.9	7	Bituminous pavement	Oqqorgon
10V068b (4K-771b)	6.2	7	Bituminous pavement	Oqqorgon
10V085 (4K-781)	4.7	7	Bituminous pavement	Bekobod
10V087 (4K-783)	5.4	7	Bituminous pavement	Bekobod
10V091 (4H-731)	6.2	7	Bituminous pavement	Bekobod
10V060a (4K-742a)	5.4	7	Bituminous pavement	Quyichirchiq
10V130d (4H-715d)	4.0	7	Bituminous pavement	Quyichirchiq
10V061 (4H-716)	7.1	7	Bituminous pavement	Quyichirchiq
10V138 (4K-721)	6.4	7	Bituminous pavement	Yukori-Chirchiq
Total Length	61.3 km			

## B. Rural Roads Overview

89. The rural road network in Uzbekistan comprises two main types of roads:

- i. Local roads, totaling over 24,000 km, of which approximately 93% are paved. However, more than 30% of these require capital repairs.
- ii. Inter-farm rural roads, which extend approximately 140,000 km. These roads represent the lowest technical class with the majority (over 65%) remaining unpaved.

90. Despite the extensive coverage of the rural road network in Uzbekistan, it remains insufficient to meet the growing transportation needs of rural communities due to its deteriorated condition and significant maintenance backlog. A large portion of these roads are incapable of supporting current traffic demands and require substantial rehabilitation. Furthermore, rural roads are often inadequately designed, maintained, and regulated, leading to safety concerns that disproportionately affect vulnerable groups such as children, women, and older people.

91. To address this, Uzbekistan has requested the Asian Development Bank (ADB) to finance the Rural Roads Resilient Sector Project, aiming to improve approximately 700 km of rural roads. These project roads are spread across twelve (12) regions and the Republic of Karakalpakstan. The total project cost is estimated at \$298.8 million, and ADB has approved a loan of \$240 million under a sector loan modality on 11 December 2023.

## C. Current Approach to Road Repair and Maintenance

92. Responsibility for repair and maintenance of rural roads is held at the regional and district

level and funded through Regional Trust Funds for Road Development from local government budgets. No road user charges are earmarked for road maintenance and repair for rural roads that can help prepare proper maintenance planning and implementation for long-term sustainability of rural roads. Several additional factors also contribute to the inadequate provision of road maintenance, including:

- i. Outsourcing. Resource constraints, weak planning and monitoring frameworks, and a lack of suitably qualified staff means that the local authorities have outsourced maintenance works to private contractors.
- ii. Standards: Current design standards for rural roads are also outdated and lack specific measures for road safety and climate resilience/ adaptation. Normative documents are used to help small local contractors conduct proper road maintenance but are not regularly updated.
- iii. Prioritization: Information on the current state of the rural road network, including its condition, connectivity, and usage patterns, is not readily available to help authorities prioritize the improvement and maintenance of rural roads.
- iv. Expertise: The skills and knowledge of road authorities and private contractors involved in rural road maintenance, including road condition assessment, routine and periodic maintenance, safety procedures, and the use of modern equipment and techniques are inadequate to conduct road maintenance effectively and efficiently.

#### **D. Executing Agency**

93. The executing agency (EA) for the project is the Committee for Roads (CR), which was established in February 2017. A Project Management Unit (PMU) was established as the implementing agency for the Rural Roads Resilience Sector Project (RRRSP).

94. The national Strategy for the Development of Roads in Rural Areas until 2035, or the Rural Road Strategy 2035 (RRS) was developed under ADB's Technical Assistance (TA 9987-UZB) to provide a systemic and long-term framework for rural road development in Uzbekistan and has been approved by the CR, Ministry of Transport, and Ministry of Investment, Industry, and Trade. The strategy proposes to strengthen connectivity in rural areas by assisting the CR to improve approximately 1,200 km of all-weather, efficient, and safe rural roads in Uzbekistan.

95. Further information regarding the operational mechanisms of the executing agency will be provided in the supporting documentation of this IEE.

#### **E. Need for the Project**

96. The proposed project aims to strengthen transport connectivity in rural areas, enhance access to essential local facilities, and contribute to improved livelihoods, particularly for women. The expected outcome of the project is improved connectivity, efficiency, and safety of rural road transport across Uzbekistan.

97. The outputs of the project will include the reconstruction and maintenance of nine rural road sections with a total length of 61.3 km in the Tashkent Region, along with enhanced institutional capacity for road maintenance, improved road safety, and strengthened climate-resilient design capacity. In addition, gender equity will be addressed through skills training for women, potential improvements to community infrastructure, and support for women's employment.

#### **F. Road Selection**

98. The rural road sections were selected through a systematic prioritization process utilizing a multi-criteria analysis as per Minimum Requirement and Prioritization of Project Administration Manual. The criteria considered in the analysis included:

- i. current and projected traffic volumes,
- ii. existing pavement conditions,
- iii. population size of the settlements served,

- iv. road with existing ROW, road with no land acquisition, roads with no resettlement impact
- v. road with no significant adverse environmental impact
- vi. vulnerability to climate change impacts, and
- vii. connectivity to social and economic destinations such as schools, hospitals, markets, and agricultural facilities.

99. A draft Rural Road Strategy 2035 (RRS) has been developed under the ADB's Technical Assistance (TA) for Road Subsector Development Strategy and Action Plan<sup>5</sup>. It has been submitted to all relevant IFIs and Government agencies for review, comments, and concurrence prior to the finalization and acceptance of the document as the government's official rural road strategy. During the donor coordination meeting held on 15 November 2022, the Government agreed that after the draft Rural Road Strategy 2035 is finalized, it will be approved along with the Road Subsector Strategy through a government's resolution, which has been reconfirmed in the donor coordination meeting held on 15 March 2023.

100. As a pre-requisite to ADB financing consideration, the Mission underscored that the road selection criteria for the Phase II program will need to be in line with the recommendations of the RRS as well as the minimum requirements and prioritization criteria specified in the Aide Memoire for the Rural Road Consultation Mission in November 2022.

101. The CR acknowledged the need to align the road selection with the RRS and the minimum requirements in the Aide Memoire. It further affirmed its intention to follow the same principles applied to the rural road financing with loan savings under L4174-UZB, with no environmental impact of Category A and no land acquisition and resettlement impacts for the selected roads. It was noted that acquiring agricultural lands in the rural communities is challenging and entails prolonged administrative processes, hence the principle of the national policy for rural roads improvement requires no land acquisition and resettlement impacts.

## **G. Project Alternatives**

102. As the design of the project is simply resurfacing roads rather than new road construction, there was no need to consider alternative route alignment for the development location. Any alternative alignments would require additional land take and associated impacts on communities, their activities and biodiversity. Alternative alignments were therefore not considered appropriate as the proposed reconstruction activities will utilize the existing road alignment, thus minimizing additional impacts.

### **The “No Action” Alternative**

103. The “No Action” Alternative in this instance is defined as a decision not to undertake the proposed rehabilitation of the Project Road.

104. The following conditions are likely to remain or occur if the Project were not to proceed:

- i. The upgrade of the rural roads would remain incomplete and would fail to meet all the objectives of the upgrade;
- ii. Transport and infrastructure baseline conditions would remain unchanged;
- iii. Road traffic capacity, travel times and frequency would remain unchanged and be unable to meet the increasing demands of population growth, economic growth and improved socio-economic integration;
- iv. Some environmental parameters such as dust impacts from the damaged roads would be likely to remain the same; and
- v. Accident risk on highways would remain unaltered, with increased demand and traffic under future growth scenarios likely resulting in a future increased accident risk.

105. In summary, the current road network does not have the capacity to deal with the increased demands from a growing population and economy. Without implementation, the objectives of the

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<sup>5</sup> TA 9987-UZB: Road Subsector Development Strategy and Action Plan (KSTA)

Project could not be achieved.

106. The road pavement design alternatives investigated two options: asphalt versus concrete. Concrete has several advantages over asphalt that includes durability that may outlast asphalt lifetime by 2-4 times, less prone to dips and ruts and therefore more suitable to handle higher truck traffic, and more resistant to freeze-thaw cycle damages.

107. Concrete is considered a greener material than asphalt, as less pollution is produced in its production and vehicles achieve better fuel efficiency running on concrete pavement. Concrete is also produced from limestone, which is widely available. Perhaps the biggest disadvantage of concrete is high initial cost and repairs are more tedious and expensive. Asphalt, on the other hand, is less costly and being black in color allows it to trap heat from the sun which assists in the quicker snow melt and moisture evaporation. The preference to use concrete was mainly based on durability, the ability to handle heavier loads that characterize the existing and projected traffic and being more resistant to freeze-thaw cycles which is the typical climate in the project area.

108. As Uzbekistan regulations require the use of concrete, no alternatives were considered.

#### **H. Typical Road Characteristics**

109. On the Project's Road sections, technical facilities of traffic engineering include carriageway marking, road signs, safety barriers and retroreflective road signs. Carriageway marking will be made on some sections. In other sections there is no carriageway marking, at a minimum, there is only line marking at the road edges. There is no road illumination at populated localities.

110. Road facilities are in accordance with the requirements Uzbekistan road traffic regulations. To regulate road traffic, it is envisaged to install road signs, guard rails and carriageway marking. The allocation of the signs is done based on the condition that the signs must be visible, that the possibility to damage them with vehicles must be excluded, in accordance with "technical means of traffic management", and in combination with road signs, the road will have carriageway marking in accordance with national regulations.

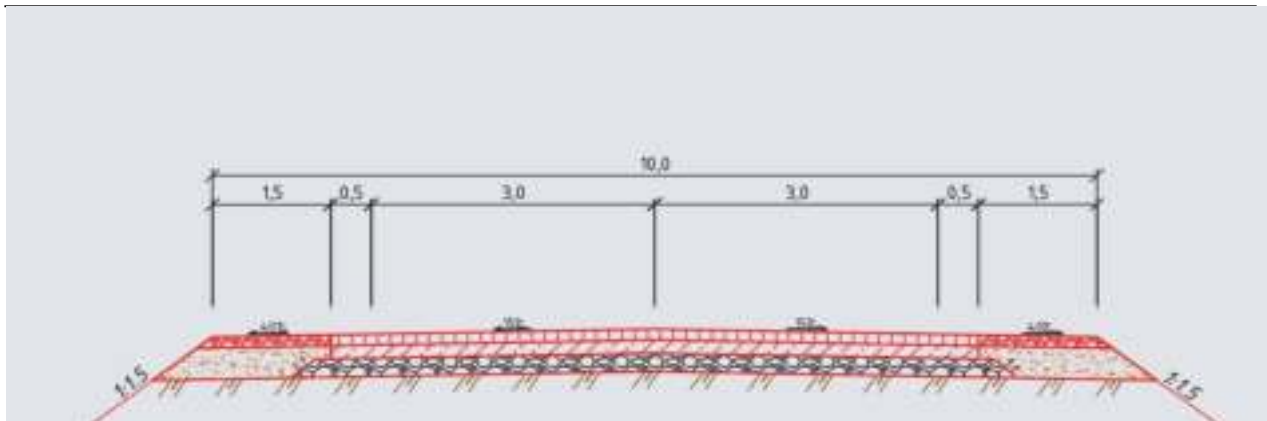
111. The typical design characteristics for the roads are as follows:

- i. Width – 10.0 m
- ii. Carriageway width - 7.0 m
- iii. Cross slope of carriageway - 1.5%
- iv. Cross slope of unpaved shoulder - 4.0%
- v. Width of margin strips – 0.5 m
- vi. Fill slope ratio – 1:1.5
- vii. Cut slope ratio - 1:1.5

112. The design requirements for the pavement are as follows:

- i. Cement concrete pavement of varying thickness, e.g. 20 cm
- ii. Geotextile
- iii. Cement treated base from recycled top layer of existing pavement, 20 cm
- iv. Existing granular base layer

113. The typical cross section of the road is shown in the Figure 20 below.



**Figure 20. Typical Cross Section for Road Category IV**

114. Pavements will be upgraded to cement concrete pavement. The road surface will consist of a single-layer cement concrete pavement constructed using a 20 cm thick concrete slab of grade B-27.5 (M-350), Btb-3.6, F2 100, in accordance with GOST 26633-15. A layer of non-woven geotextile made of polypropylene fiber with a minimum density of 450 g/m<sup>3</sup> (PP) will be placed beneath the concrete layer. The pavement base will be formed by recycling the existing road base with the addition of a GPS stabilizer, upgraded to concrete grade M75. In cases where soil aggressiveness is identified, sulfate-resistant cement will be used. The base layer will have a thickness of 20 cm, as determined by GPS design calculations. Road shoulders will be reinforced with a 12 cm thick gravel-sand mixture, incorporating milled material from the existing asphalt concrete pavement.

115. Road furniture and markings – Road furniture (e.g. traffic signs, crash barriers, reflective road markers, fencing, and lighting) and markings will conform to national standards for a Category IV (local roads standard) road.

116. The reconstruction works involve all above works explained in detailed above, which include recycling of the existing road surface layer, construction of a new cement concrete layer on top, and re/-construction of culverts, bridges, drainage facilities and road accessories.

117. Specific details of proposed engineering works for phase of detail design and construction are included in the Table 15 below.

**Table 15. Proposed Engineering Works**

Works	Description
Sources for aggregate	<p>In accordance with the developed ADB recommendation for the construction of rural roads, the design of the pavement was chosen in such a way as to ensure maximum use of the material of the existing pavement.</p> <p>At the same time, according to the “Law on Subsoil” of the Republic of Uzbekistan, to develop quarries of inert materials, it is necessary to obtain an appropriate license. In this regard, within the framework of the project, inert materials will be obtained from suppliers who have licenses and permits from the Ministry of Ecology, Environmental Protection and Climate Change.</p>
Sources for water	<p>In the Tashkent region, the primary sources of water are the Syrdarya and Chirchik Rivers. Depending on the location of the rural roads, water for construction may be sourced from various main and inter-farm irrigation canals. In cases where the quality of canal water is found to be unsuitable for concrete preparation, water may be obtained from municipal pipelines, subject to agreement with the relevant water supply authority.</p> <p>As part of the project, all water intake activities will be conducted in strict compliance with applicable environmental regulations and permit requirements.</p> <p>Based on calculations, the water required for the preparation of 1 cubic meter of concrete is estimated at 155–160 liters. The construction of 1 km of rural roads will require approximately 144 tons of water. This volume is considered negligible and is not expected to have any significant impact on the overall availability of water resources.</p>

Works	Description
Concrete plants	In the Tashkent region, concrete plants will be used at two places., The choice of installation of plants will be made based on the distance of transportation of concrete at a distance of no more than 30 km
Drainage	If, at any point along the road, there is a potential risk of contaminated water entering water sources used by the local population, appropriate protective measures will be implemented. These may include the construction of sedimentation tanks, additional drainage systems, and culverts to prevent contamination.
Worker Camps	Assuming that one construction lot comprises approximately 20–25 km of roads, it is anticipated that four construction camps will be established in the Tashkent region. Water and power supply for these camps will be arranged through connections to the existing public utility networks. All necessary provisions to ensure compliance with environmental safeguard requirements will be incorporated into the Contract Specifications.
Construction contractors' commitments to reinstatement of temporary installations, camps, batching plants, access roads, borrow pits.	No contractors are yet awarded. Such commitment will be part of the contract. Hence, reconsider if this is necessary at this stage.
Details of contractor oversight provisions (Project Management Unit) And supervision requirements.	The oversight provisions can be found in the preliminary draft TORs for the SPC, the PMC and the CSC.
Preliminary site investigation and survey verification by Contractor before detail design	Preliminary site investigation and survey verification including condition of existing ground base must be conducted to create the detail design drawings—such as boundaries, profiles, and structure locations—accurately reflect on-site conditions, thereby preventing construction errors and design mismatches. This includes verifying administrative boundaries against actual land use, assessing terrain changes, confirming structure locations, and recording GPS data and benchmarks to ensure consistency throughout construction
Traffic Control Plan during the construction	In the Rural Road Resilience Project, traffic control is crucial to ensure safety and minimize disruptions in areas where roads serve as key access routes for rural communities. Measures such as temporary signage, detours, phased closures, and coordination with local authorities are essential to maintain accessibility while facilitating construction activities.
Post construction inspection and monitoring regime	The civil works contracts will be based on the yellow book with inclusion of ADB SPS 2009.
	Within the framework of the project, it is mainly planned to carry out work on the construction of the road base with a thickness of 20 cm using the method of cold recycling of existing pavement with the addition of stabilizing additives, which avoids the supply of new inert materials. The road surface is planned to be built from a cement- concrete mixture with a thickness of at least 20 cm.
	The specifications of the contract will indicate the climatic features of the regions. The estimated construction period is 18 months. The optimal construction season for concrete laying is the spring and autumn season, when the air temperature ranges from +10°C to +30°C

#### IV. SIZE AND MAGNITUDE OF OPERATION

##### A. Specific Project Details

118. The proposed project will improve 61.3 km of existing rural roads in the Tashkent region, that are in poor condition, which will enhance road capacity, quality, connectivity, and service life while reducing future maintenance needs.

Pre-construction activities are likely to include:

- i. Undertake the detail design through Preliminary site investigation and survey verification by Contractor before detail design
- ii. Master scheduling of construction and planning the traffic control and Environment Monitoring and Management Plan, etc.
- iii. Establishment of Contractor's yard and work sites;
- iv. Site clearing will be very minimal, demolition of some cross drainage structures and bridges will need to be done. Removal of vegetation (in general bushes) and topsoil will also very minimal because neither realignments nor widening will take place. Thus, road works will be limited to the existing RoW.

119. The road repair work will include a foundation using recycling of the existing road foundation with the addition of GSM to the appropriate grade of concrete M75 (sulfate-resistant cement when soil aggressiveness is detected) with a thickness of 20 cm (with the addition of GSM calculations), the installation of cement concrete pavement, repair of culverts and installation of road accessories. On all proposed road sections, all existing road surfaces will be repaired by on-site recycling and equipped with new road surfaces and verges. All projected road sections will require repairs to the existing road without changing the original route and width, as well as improvements to other road infrastructure such as culverts, etc. Repair work does not involve deviations from the center line of the road and turns along the roads. On some sections of the road, a gas pipeline and power poles mark the boundary of the right-of-way (RoW).

120. Materials for the new pavement of project sections, e.g., gravel, will be obtained from licensed stone quarries and pits. Cement-concrete mixes will be used for the top layer of the road pavement. Capacities for production of cement-concrete mixes by ancillary support productions of road enterprises taking into account complexes to be procured will be sufficient for meeting the demand for the road construction.

##### B. Proposed Works

121. Specific works will vary by section, but is generally expected to include the following activities:

- i. pavement construction,
- ii. milling of existing pavement,
- iii. shoulder improvements,
- iv. drainage improvement,
- v. replacement and repair of bridges and large culverts
- vi. placement of road markings,
- vii. installation of road signs and crash barriers, and
- viii. other related road work.
- ix. traffic control and construction safety work.

122. Road shoulders and embankments will be strengthened to enhance climate and disaster resilience and safety. Bridges and culverts will be repaired or replaced on a case-by-case basis to improve sustainability. In a few cases, re-alignments may also be required.

Pre-construction activities are likely to include:

##### **Establishment of Contractor's yard and work sites**

123. Site clearing will be very minimal, demolition of some cross drainage structures and bridges

will need to be done. Removal of vegetation (in general bushes) and topsoil will also very minimal because neither realignments nor widening will take place. Thus, road works will be limited to the existing RoW.

124. The road repair work will include a foundation using recycling of the existing road foundation with the addition of GSM to the appropriate grade of concrete M75 (sulfate-resistant cement when soil aggressiveness is detected) with a thickness of 20 cm (with the addition of GSM calculations), the installation of cement concrete pavement, repair of culverts and installation of road accessories. On all proposed road sections, all existing road surfaces will be repaired by on-site recycling and equipped with new road surfaces and verges. All projected road sections will require repairs to the existing road without changing the original route and width, as well as improvements to other road infrastructure such as culverts, etc. Repair work does not involve deviations from the center line of the road and turns along the roads. On some sections of the road, a gas pipeline and power poles mark the boundary of the right-of-way (RoW).

### **Resources required for the project implementation**

125. There are a range of resources that will be required for the rehabilitation of the roads and access roads. The extraction, processing and transport of these resources to the sites can have impacts on the project area and can affect its regional availability depending on the scarcity of the resource.

126. Requirements for material resources under the project is determined based on existing norms. During rehabilitation there will be used developed, operational quarries of calcareous rocks, and crushed rocks and sand produced out of them at rock-crushing and screening plants. Materials from licensed local reserves and quarries will be used for strengthening of road shoulders. The project roads are closely located to several local construction material sites and quarries which will ease supply and transportation of gravel and crushed-stone materials. Use of local supply materials as much as possible for the project purposes are supported and appraised by stakeholders and local businesses and keenly anticipated for improved cooperation.

127. Cement. Cement-concrete mixes will be used for the top layer of the new pavement. Capacities for production of cement-concrete mixes by ancillary support productions of road enterprises taking into account complexes to be procured will be sufficient for meeting the demand for the road construction. Cement will be transported to the site in bulk by heavy vehicles. Therefore, impacts would mostly be associated with transportation.

128. Water. Project implementation will require significant quantities of water. The main water uses include:

- i. Manufacturing of concrete;
- ii. Curing of concrete;
- iii. Compaction of the road layers;
- iv. Suppression of the dust;
- v. Sanitary and hygiene;
- vi. Drinking and cooking of food.

129. It is expected that the Contractor will obtain water supplies from the side rivers and irrigation channels. Drinking water to the construction workers and cooking will be provided regularly. The drinking water will be transported by water truck to fill water tanks. Water tanks & containers used as storage of water should be properly cleaned on a regular basis. It is considered unlikely that rates of uptake affect the flow rates of the rivers. However, the contractor should take care not to gain water from tributaries or rivers with low flows. The contractor will need to ensure that no adverse impacts are imposed on village water supplies, or other water users.

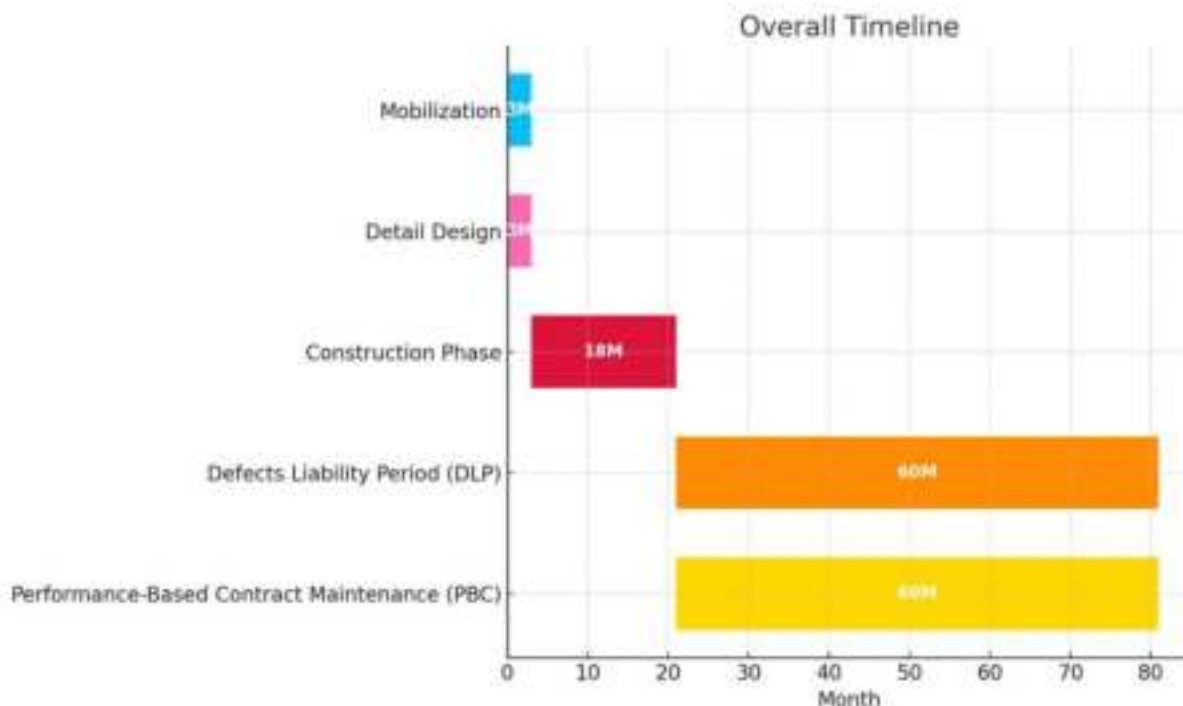
130. The project will also provide universal access and safety features, including speed bumps (as needed), LED streetlights, CCTV, pedestrian footpaths, ramps for wheelchairs and prams, to facilitate safe mobility of elderly, women, children, and persons with disabilities. Given anticipated improvements in access to markets and economic opportunities, the project will provide skills training

for the communities and women in viable economic activities.

131. Following initial improvement measures, project roads will be maintained through performance-based contracts (either as part of the rehabilitation contracts or through standalone contracts) to ensure sustained levels of service with quality.

**C. Proposed Schedule for Implementation**

132. The total implementation schedule for the Contractor is estimated about 21 months, which includes a 3-month period for the preparation of the detailed design, as specified in the AA’s bidding documents. The Contractor is expected to commence the detailed design phase concurrently with mobilization for construction. To adhere to the target schedule, a fast-track approach is required. Assuming that the detailed design is completed within the initial 3 months, construction works are anticipated to commence immediately thereafter. Consequently, the completion of construction works is expected within 21 months from the start of mobilization. It is important to note that the optimal periods for road concreting works in Uzbekistan are during the spring and autumn seasons, as ambient air temperatures during these times are most suitable for concrete placement. In addition, when the provision titled “Technical Specification and Performance Requirements for Road Maintenance,” Sub-section 6.7 of Contract No. RRRSP/CW01/Lot 1 for the Rehabilitation and Maintenance of Rural Roads in Jizzakh Region, is taken into account, the Operations and Maintenance (O&M) plan has been confirmed to follow the same contractual approach—namely, a retention-based mechanism integrated with a traditional performance-based maintenance contract. This mechanism links the release of retention money to the contractor’s satisfactory fulfillment of long-term maintenance obligations, thereby enhancing accountability and ensuring consistency with the overall implementation strategy for subsequent subprojects under the program over a 60-month (5-year).



**Figure 21. Project Implementation Timeline**

## V. ASSESSMENT METHODOLOGY

133. This section describes the Impact Assessment methodology, steps and procedure. These methods are relevant to all environmental topics unless the specific chapter confirms otherwise. If an environmental topic does not adopt these methods, an alternative is provided. Impact identification and assessment starts with scoping and continues through the remainder of the impact assessment process. The principal impact assessment steps are summarized in Figure 22 and comprise:

- i. Impact prediction: determining what possible impacts to receptors as a consequence of the Project and its associated activities.
- ii. Impact evaluation: evaluating the significance of the predicted impacts by considering their magnitude and likelihood of occurrence, and the sensitivity, value and/or importance of the affected resource/receptor.
- iii. Mitigation and enhancement: identifying appropriate and justified measures to mitigate negative impacts and/or enhance positive impacts.
- iv. Residual impact evaluation: evaluating the significance of impacts assuming effective implementation of the mitigation/enhancement measures.

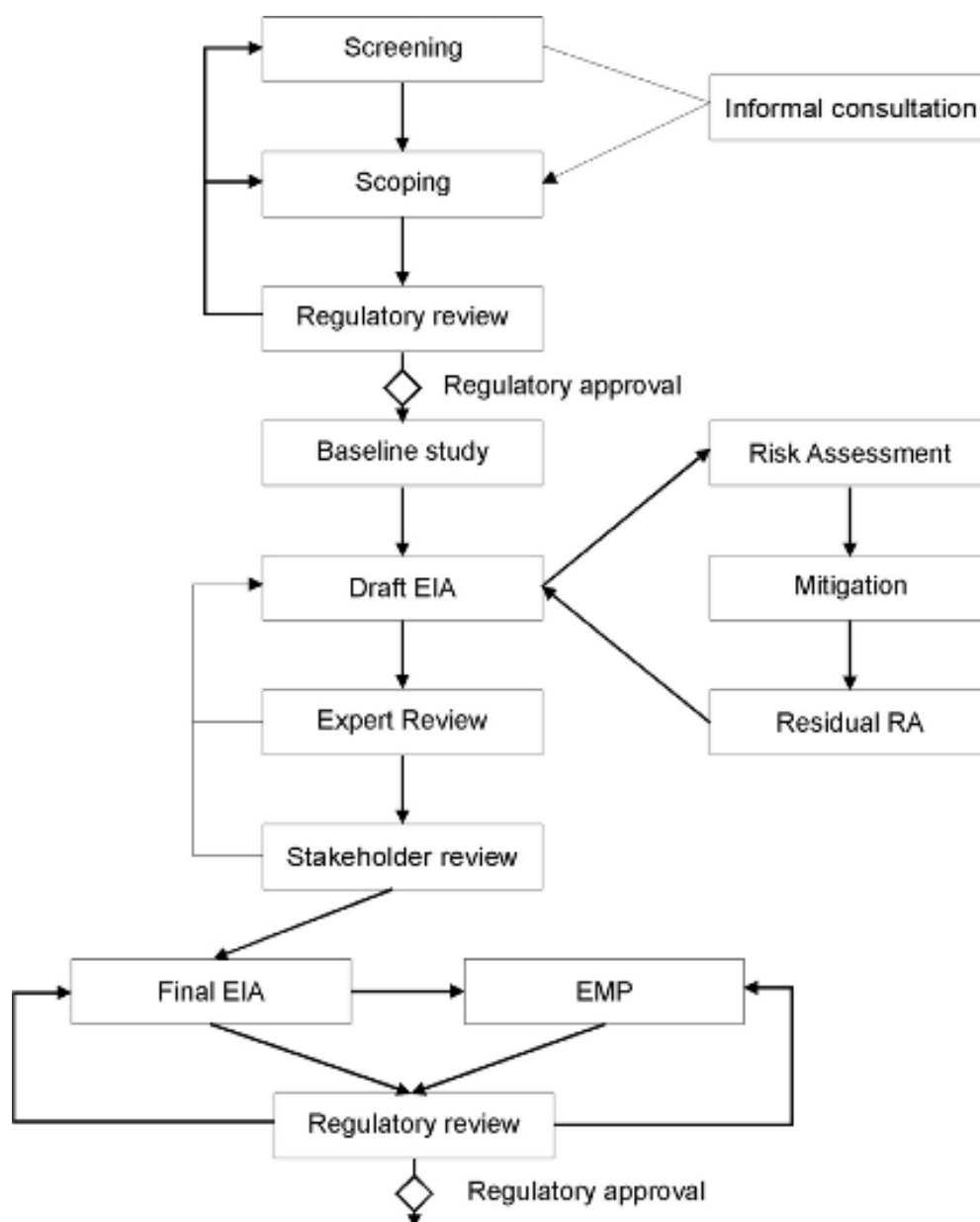


Figure 22. Impact Assessment Process

## A. Prediction of Impacts

134. Impact prediction constitutes the analytical process of determining potential effects on scoped-in receptors resulting from the Project and its associated activities. Prediction techniques vary depending on receptor type, given the diverse nature of possible project impacts; thus, different chapters may apply distinct prediction methodologies. This stage incorporates consideration of embedded mitigation or control measures inherent in the Project's design. Where appropriate or necessary, additional mitigation measures are proposed to further minimize predicted impacts.

135. The types of potential impacts that will be assessed are as follows:

- i. Direct impacts – potential impacts that result from a direct interaction between the Project and a receptor (e.g., loss of habitat due to construction work).
- ii. Indirect impacts – potential impacts that follow on from direct interactions between the Project and its environment as a result of interactions between different aspects of the environment (e.g., viability of a species population resulting from loss of part of a habitat).
- iii. Induced impacts – potential impacts that result from other activities (which are not part of the Project) that may be related to the Project (e.g. an increase in stress and reduced wellbeing in the community caused by perceived loss of livelihood impacts).
- iv. Cumulative impacts - an additive potential impact that arises because of an impact from the Project interacting with an impact from another activity to create an additional impact on the same receptor. For example, cumulative impacts to receptors from the Project and other ongoing exploration activities.
- v. Trans-boundary impacts – a potential impact which extends across international boundaries, but which is not global in nature.
- vi. Unplanned events - a reasonably foreseeable potential event that is not planned to occur as part of the Project, but which may conceivably occur as a result of Project activities (e.g. spill of hazardous materials), even those with a low probability.

## B. Evaluation of Impacts

136. Once the prediction of impacts is complete, each impact is described in terms of its various relevant characteristics (e.g., type, scale, duration, frequency, extent). The terminology used to describe impact characteristics is shown in Table 16.

**Table 16. Impact Characteristic Terminology**

Characteristic	Definition	Designations
Type	The relationship of the impact to the Project (in terms of cause and effect).	Direct Indirect Induced
Extent	The "reach" of the impact (e.g., confined to a small area around the Project footprint, spreads over several kilometres, etc.)	Local Regional International
Duration	The time-period over which a resource / receptor is affected.	Temporary Short-term Long-term Permanent
Scale	The size of the impact (e.g., the size of the area affected, number of people or proportion of a species' population effected, etc.)	Small Medium Large
Frequency	A measure of the constancy or periodicity of the impact	Infrequent Frequent Continuous

137. Definitions for the type designations are presented in Table 17. Definitions for other designations are specific to individual resources or receptors and are detailed in the corresponding resource- or receptor-specific chapters.

**Table 17. Impact Type Definitions**

<b>Designation (Type)</b>	<b>Definition</b>
Direct	Impacts that result from a direct interaction between the Project and a resource/receptor (e.g., loss of habitat because of construction)
Indirect	Impacts that follow on from the direct interactions between the Project and its environment because of subsequent interactions within the environment (e.g., loss of habitat resulting in species population declines)
Induced	Impacts that result from other activities (which are not part of the Project) that happen because of the Project (e.g., increased poaching of wild animals because of improved access to a project area).

### **C. Impact Magnitude, Receptor/Resource Sensitivity and Impact Significance**

138. Once impact characteristics have been defined, the subsequent step in the impact assessment process involves assigning a magnitude to each impact. Magnitude is determined as a function of a combination—depending on the receptor—of the following impact characteristics:

- i. Extent
- ii. Duration
- iii. Scale
- iv. Frequency

139. Additionally, for unplanned events, magnitude incorporates the “likelihood” factor discussed previously.

140. Magnitude describes the intensity of the predicted change in the receptor resulting from the impact. While the magnitude designations themselves remain fixed, their definitions are tailored on a receptor-by-receptor basis. These definitions are provided in context within the respective chapters and are derived from the characteristic outcomes discussed above, combined with professional judgement. Examples of magnitude designations are outlined below:

- i. Positive: Improvement to, or addition of, one or more key characteristic, feature or element; improvement to attribute quality (beneficial).
- ii. Negligible: Temporary or intermittent very minor loss of, or alteration to, one or more characteristic, feature or element; possible changes in attributes, quality of vulnerability (adverse).
- iii. Small: Very minor loss of, or alteration to, one or more key characteristics, features of elements; noticeable change in attributes, quality or vulnerability (adverse). Short-term, intermittent and reversible change, which is unlikely to occur.
- iv. Medium: Minor loss of, or alteration to, one or more key characteristics, features of elements, measurable change in attributes, quality or vulnerability (adverse). Long-term though reversible change, which is likely to occur.
- v. Large: Loss of resource and/or integrity of the resource, partial loss of or damage to key characteristics, features or elements (adverse). Permanent / irreplaceable change, which is likely to occur.

141. In the case of positive impacts, no specific magnitude designation (other than “positive”) is assigned. It is deemed sufficient to categorize such impacts simply as positive rather than quantifying the degree of beneficial change anticipated. Alongside the characterization of magnitude, the other key component of impact evaluation is the determination of receptor sensitivity. Depending on the receptor in question, this may alternatively be termed ‘vulnerability’ or ‘importance’. Sensitivity assessment considers multiple factors—physical, biological, cultural, or human—as well as other considerations such as legal status, government policy, stakeholder perspectives, and economic value.

142. As with magnitude, the sensitivity/vulnerability/importance designations themselves remain fixed; however, their definitions may differ depending on the receptor. The standardized designations

and the associated general guidance for defining receptor sensitivity, vulnerability, or importance are presented below:

- i. Low: Receptor has a moderate capacity to physical, biological, chemical or social changes or influences and good recoverability potential. The parameter / receptor possesses characteristics which are locally distinctive only, are of low to medium importance and rarity that is local in scale, and potentially can be substituted / replaced;
- ii. Medium: Receptor has a limited capacity to accommodate physical, biological, chemical or social changes or influences but moderate potential to recover from effects. Parameter / receptor possesses key characteristics which contribute to the distinctiveness and character of the resource, is of medium importance and rarity that is regional in scale (e.g., designated sites of species), and has limited potential for substitution / replacement; and
- iii. High: Receptor has a limited capacity or no capacity to accommodate physical, biological, chemical or social changes or influences and limited or low capacity to recover from effects. Parameter/receptor possess key characteristics which contribute significantly to the distinctiveness, rarity and character of the resource, is of high importance and rarity that is national and/or international in scale and has limited potential for substitution / replacement.

143. Once the magnitude of impact and the sensitivity/vulnerability/importance of the resource or receptor have been defined, the significance of each impact can be determined. Impact significance is assigned using the matrix presented in Table 18.

**Table 18. Impact Significance**

		Sensitivity/Vulnerability/Importance of Resource/Receptor		
		Low	Medium	High
Magnitude of Impact	Positive	Positive	Positive	Positive
	Negligible	Negligible	Negligible	Negligible
	Small	Negligible	Minor	Moderate
	Medium	Minor	Moderate	Major
	Large	Moderate	Major	Major

144. The matrix applies universally across all receptors and associated impacts, as receptor-specific considerations are already integrated into the magnitude and sensitivity / vulnerability / importance designations. The information box below provides additional context on interpreting impact significances.

**Information Box**

*An impact of **negligible significance** refers to a situation in which a resource or receptor (including people) is essentially unaffected by a specific activity, or where the predicted effect is imperceptible or indistinguishable from natural background variation.*

*An impact of **minor significance** is characterized by a small-scale effect on a resource or receptor that results in a slight deterioration of existing environmental conditions. Such impacts are generally undesirable but remain acceptable, falling within applicable regulatory limits, and do not necessitate further mitigation or control measures.*

*An impact of **moderate significance** arises when the magnitude of impact remains within legal or regulatory standards, yet exceeds the threshold of a minor effect. These impacts warrant demonstration that they have been reduced to a level that is as low as reasonably practicable (ALARP). While reduction to minor levels is not mandatory, effective and efficient management must be ensured.*

*An impact of **major significance** occurs when established limits or standards are likely to be exceeded, or when high-magnitude impacts affect highly sensitive or valued receptors. A key objective of impact assessment is to avoid residual major impacts, particularly those with long-term or wide-ranging effects. However, in certain cases, major residual impacts may remain even after all feasible mitigation measures have been implemented.*

**D. Mitigation Approach**

145. The ADB SPS (2009) requires that all potential environmental impacts and risks of a project

be assessed and, where necessary, effectively managed. Mitigation measures developed for the project adhere to the mitigation hierarchy, which consists of four sequential levels: avoidance, minimization, restoration/rehabilitation, and offset/compensation as follows:

**Table 19. Mitigation Measures and Levels**

<b>Avoid</b>	<b>Minimise</b>	<b>Restore</b>	<b>Offset</b>
As a matter of priority, negative impacts upon receptors should be avoided as far as possible, through changes to project location, design or implementation.	When avoidance of impacts is not possible, measures to minimise impacts to receptors should be taken.	When avoidance and minimisation of impacts is not possible, restoration activities can be made to restore the condition of the receptor to pre-project levels.	Offsets should be considered only after appropriate avoidance, minimisation and restoration have been applied, and residual impacts remain. Offsetting actions provide additional benefits to receptors, in order to compensate for residual impacts.

### **E. Project Area of Influence**

146. The ‘spatial scope’, ‘study area’, or ‘area of influence (Aol)’ of the Project defines the geographic extent within which Project impacts are anticipated. The Aol varies depending on the type of impact being assessed and the characteristics of potentially affected receptors. In all cases, however, the Aol encompasses areas where significant impacts are reasonably expected, considering:

- i. The physical extent of the proposed works and associated facilities, defined by the limits of land to be acquired or used (temporarily or permanently) by the Project; and
- ii. The nature of the baseline environment, and the way impacts are likely to be propagated beyond the Project boundary.

147. The Project Aol encompasses, but is not limited to, the footprint of all Project activities and the adjacent areas along either side of the road alignment. This includes zones where direct or indirect impacts on the physical, biological, social, or cultural environment could occur. The Aol differs among disciplines, and the respective Aol spatial scopes are detailed in the relevant sections of the Inception Report and this IEE.

148. Given that the Project involves maintenance and reconstruction of existing road infrastructure, construction impacts are anticipated to be temporary and constrained within a narrow easement adjacent to each road alignment. It is expected that Project operation will resume with existing road usage patterns, with no substantial traffic increases or road widening. Based on professional judgement and understanding of the Project and surrounding landscape, all assessments are proposed to be limited to a corridor extending 500 meters on either side of each road alignment (1 km total width).

### **F. Approach to IEE (scope and methodology)**

149. This IEE follows the completion of an Inception Report that was submitted to the ADB in May 2025, with initial findings and scope.

#### **Site Visits**

150. A number of site visits have been completed in the Tashkent region within April to June 2025. Information collated during these site visits is incorporated in this IEE.

#### **On-site visit**

151. The consulting team, comprising Dong Sung Engineering Co. Ltd. and its local partner, conducted a reconnaissance visit and field inspection encompassing all proposed rural road alignments within the Tashkent Region. As part of the site reconnaissance, the team engaged with local communities and authorities, and identified environmentally and socially sensitive receptors through direct visits to public facilities such as hospitals, schools, kindergartens, and cultural

monuments located in proximity to the proposed road corridors. The environmental specialists also carried out a preliminary assessment of local flora and fauna and prepared an initial inventory of tree species present within the project areas.

152. During these engagements, the consulting team discussed the project scope and proposed activities with local stakeholders to gather baseline information and address initial concerns relevant to environmental and social impacts.

### **Baseline data collection visit**

153. Baseline data has been collected based on desktop research of available data. Secondary data was collected from various government agencies. Climatic data on temperature, wind and extremal weather conditions was obtained from the Centre of Hydrometeorological Service (Uzhydromet) under Ministry of Ecology, Environment protection and climate change. Socio-economic data was obtained from the regional administration - khokimiyats and makhalla committees.

154. The consulting team initiated the data collection process to establish a baseline. Subsequently, an assessment of this data was formulated to guide the preparation of the two regional IEEs. Monitoring against the established baseline will be carried out to facilitate the identification of potential risks or significant impacts that could arise from the project's construction. For analysis of key samples, a certified laboratory in Uzbekistan has been engaged.

155. The data collection activities undertaken by the consulting team were conducted in accordance with the requirements set forth in the Terms of Reference (TOR) and further refined through subsequent consultations with the ADB Safeguards Team. Customized data collection proformas were developed to ensure consistency with TOR specifications. These proformas were designed to capture key environmental and social parameters, and encompass the following components as outlined in the TOR:

- i. Environmental Baseline
- ii. Specialist Studies
- iii. Impact Studies for noise, air and traffic
- iv. Appropriate documentation
- v. Air quality at 8 points, one-time measurement at Tashkent region
- vi. Noise level measurement at 8 points, one-time measurement at Tashkent regions
- vii. Water quality at 4 points in Tashkent region.

### **Critical Habitat Assessment**

156. A critical habitat assessment has been undertaken to meet the requirements of the ADB SPS (2009 and 2016).

157. It should be noted that the 2009 SPS does not define quantitative thresholds or guidance when interpreting the seven Criterion for Critical Habitat, whereas the International Finance Corporation (IFC) Guidance Note 6 (GN6) does. It is acknowledged that the IFC's criteria for Critical Habitat and the ADB Criterion differ, but they are based on the same principles. To help determine if Critical Habitat is present therefore, the IFC GN6 has been adopted throughout the process, where relevant.

158. The first stage of assessment involves researching and identifying species and protected sites within 50 km of the Project area. The Integrated Biodiversity Assessment Tool (IBAT) provides an extensive preliminary dataset. An assessment is made to determine whether each species or protected site regularly occurs (as per IFC GN6) in the Project Aol. The likelihood of regular occurrence is informed by a species' characteristics, such as the geographical range, habitat requirements, movement patterns, migratory routes, breeding sites and population distribution.

159. The species that are deemed likely to regularly occur in the Project Aol are further assessed to determine the potential to meet the ADB SPS criteria for Critical Habitat. All species that are likely to regularly occur in the Aol and that have the potential to meet ADB SPS Critical Habitat criteria are

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subject to further analysis to determine whether they trigger Critical Habitat.

**Consultation visit**

160. In compliance with the Asian Development Bank (ADB) Safeguard Policy Statement (SPS, 2009), a structured stakeholder engagement process was conducted to ensure that the views, concerns, and recommendations of affected persons (APs), local government representatives, civil society organizations (CSOs), and non-governmental organizations (NGOs) were adequately considered and integrated into the environmental assessment. During the consultation sessions, verbal presentations were delivered in local languages to clearly convey essential information regarding the project scope, potential environmental and social impacts, and the proposed mitigation measures. Furthermore, information disclosure materials—including leaflets and posters—were distributed to participants summarizing the anticipated environmental impacts, land acquisition and resettlement implications, grievance redress mechanisms, and institutional responsibilities. Public consultation result shows in Appendix 4.

## VI. DESCRIPTION OF ENVIRONMENT

162. This section of the report discusses the existing environmental and social conditions within the Project area including:

- i. Physical resources (geological resources, hydrology, air quality, etc.);
- ii. Ecological resources (flora, fauna, protected areas)

### A. Physical Environment

#### Geology and Soils Condition

##### Aol

163. Regarding the geological settings, the Aol will be confined to the footprint of the works which includes the construction sites, stockpiles of soil and subsoil, and borrow pit areas.

#### Geography and Topography

164. The physical environment of Uzbekistan is diverse, ranging from the flat, desert topography that comprises almost 80% of the country's territory, to mountain peaks in the east reaching about 4,500 m ASL. The north-eastern portion of Uzbekistan is characterized by the foothills of the Tian Shan mountains, which rise higher in neighboring Kyrgyzstan and Tajikistan, and form a natural border between Central Asia and China.

165. The Tashkent region is located in the northeastern part of Uzbekistan, between the Syrdarya River and the Tien Shan Mountains, and shares borders with Kyrgyzstan, Tajikistan, Syrdarya region, and Namangan region. It also borders the administratively independent city of Tashkent, which forms an enclave completely surrounded by the territory of Tashkent region. The total area of Tashkent region is 15,250 km<sup>2</sup>, and the population is estimated at approximately 2,975,900 people (as of 2021). The administrative center is Nurafshon, and the location of the Tashkent region is shown in the Figure 23 below.

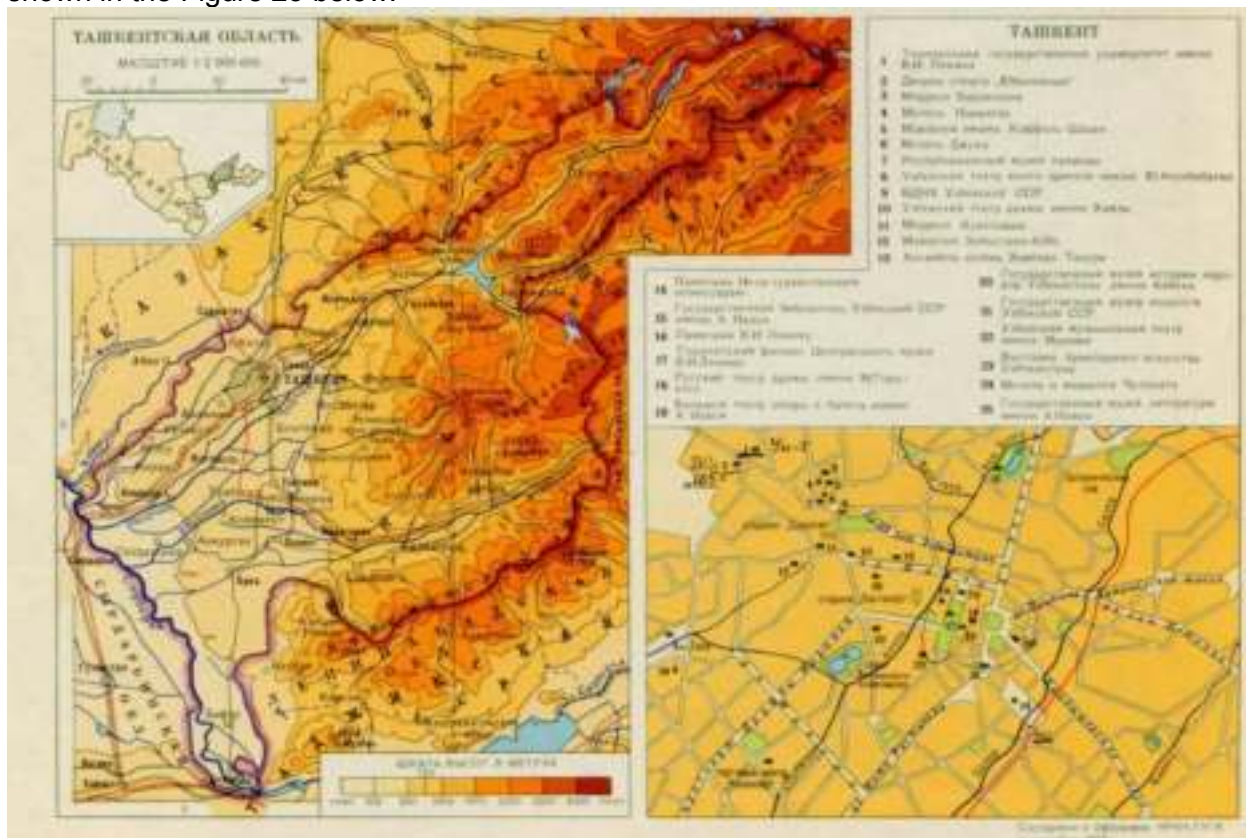


Figure 23. Location of Tashkent province

## Natural Resources

166. Natural resources found in the country include natural gas, petroleum, coal, gold, uranium, silver, copper, lead and zinc, tungsten and molybdenum.

### Soil Baseline Information

167. In the Tashkent region, light gray desert lands predominate, in places salty. In the peripheral part of the depression, typical gray soils are common. Meadow and meadow-marsh lands developed during the time of the Syrdarya River. Loamy light gray conditions of the borders are irrigated and used in agriculture. Cartilaginous eroded light gray soils, clayey and loamy, gradually on forests, are mainly irrigated or can be used for irrigation. Their forest part uses foothill lands and pastures. Meadow lands have long been used in agriculture. The soil map of the Tashkent region is shown in the Figure 24 below.

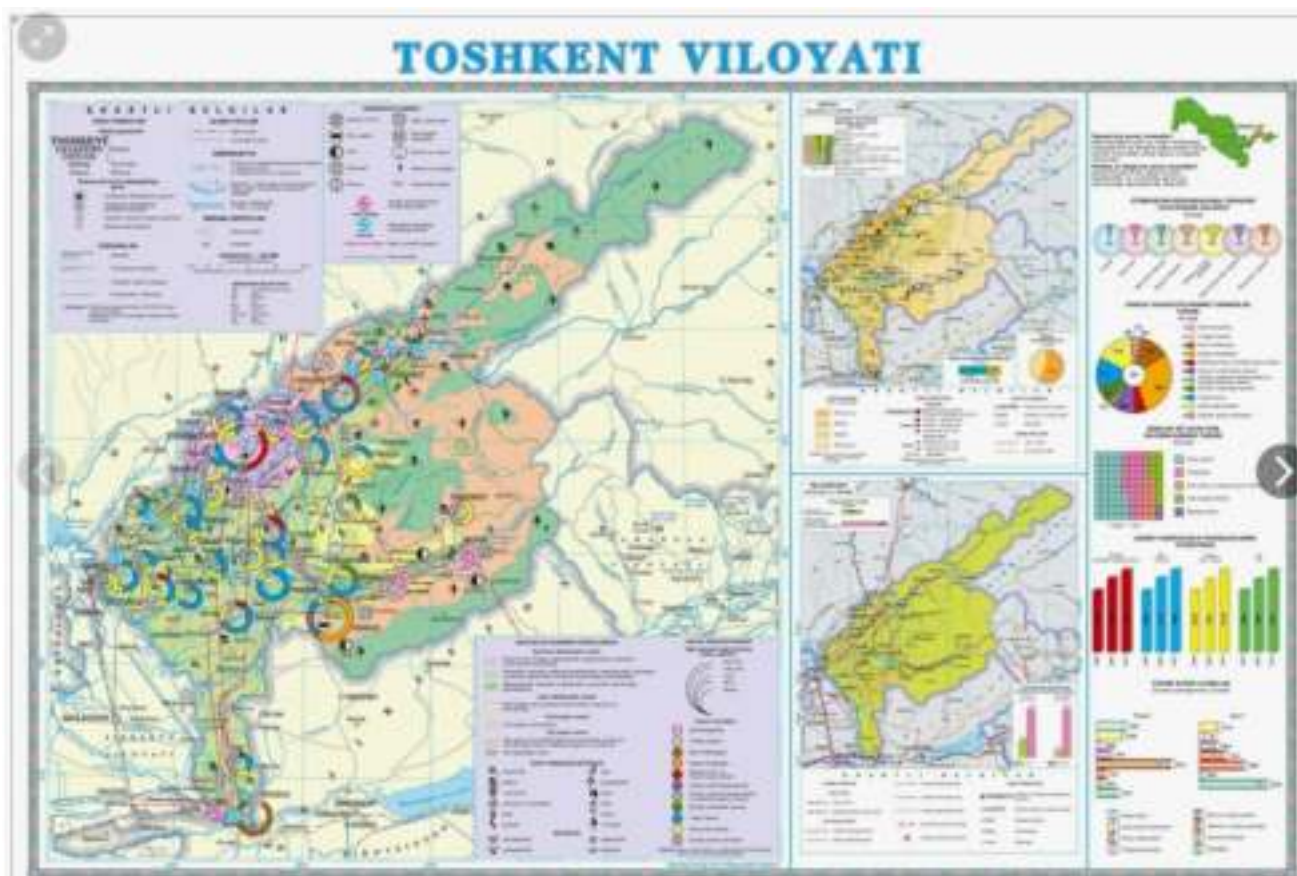


Figure 24. Soil map of Tashkent region

### Soil Contamination

168. There are no known existing major areas of natural/artificial soil contamination or sensitive features in the Aol. Potential soil contamination was not identified in the site visits, and no previous studies or available documentation of the project have identified any significant areas of contamination.

### Water

#### Aol

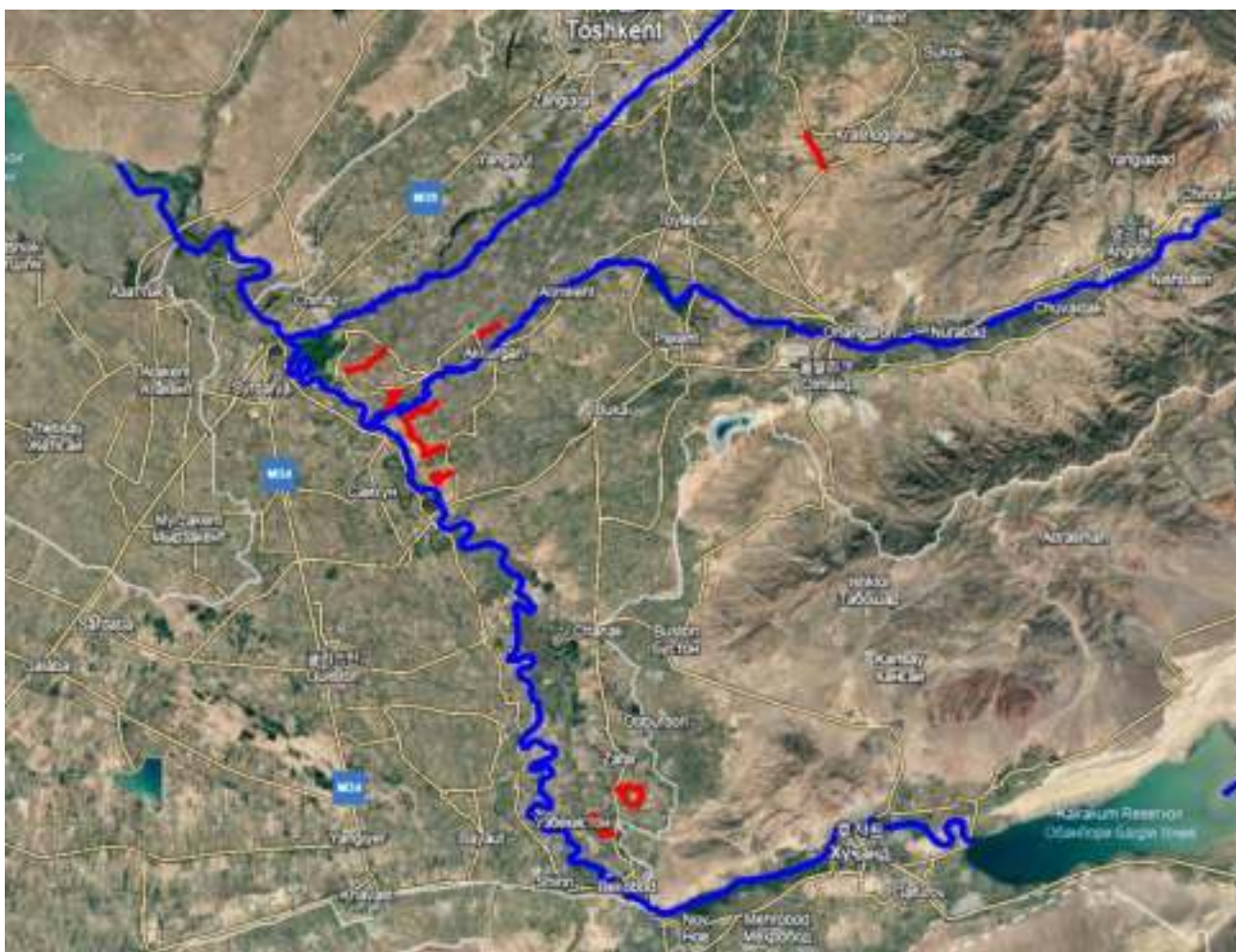
169. The Aol for water covers surface water and groundwater resources that are in the direct facility of the Project roads.

### Surface Water Baseline Information

170. The main water resources of the Tashkent region are the Chirchik River, 225 km long, and the Angren River, 233 km long, which are formed from mountain springs in the Chatkal and Kurama Mountains. There are also reservoirs in the region: Charvak, Gazalkent and Khodjикent on the Chirchik River, Angren and Tuyabuguz on the Angren River.

171. The South Golodnostepsky canal begins from the Farhad hydroelectric complex. The length is 2212 km, from the sources of the Naryn - 3019 km. On the territory of the Syrdarya river basin there are 3 regions of Kyrgyzstan: Naryn, Jalalabad and Osh, Sughd regions of Tajikistan, 6 regions of Uzbekistan: Andijan, Namangan, Fergana, Tashkent, Djizzak and Syrdarya and two regions of Kazakhstan: South Kazakhstan and Kyzylorda. The area of the Syrdarya basin is 219,000 km<sup>2</sup>.

172. In the lower reaches, the Syrdarya flows along the eastern and northern margins of the Kyzylkum sands; the riverbed here is meandering and unstable, floods are not uncommon in the winter-spring period. The last tributary is the Arys. In the lower reaches of the river, in the section from the city of Turkestan to the regional center of Josaly, there is an extensive floodplain (10-50 km wide, about 400 km long), penetrated by many channels, in places overgrown with reeds and tugai, widely used for agriculture (rice growing, melon growing, vegetable growing, in some places gardening). At the mouth of the Syrdarya, it forms a delta (near the city of Kazalinsk) with numerous channels, lakes and swamps, used for melon growing.



**Figure 25. The main rivers and lakes in the project area within the Tashkent region**

173. The remoteness of water objects (Syrdarya river, Angren river and Qizilsay) from the project roads are shown in the figures below.



Figure 26. The distance between the road 10V068 and Syrdarya river

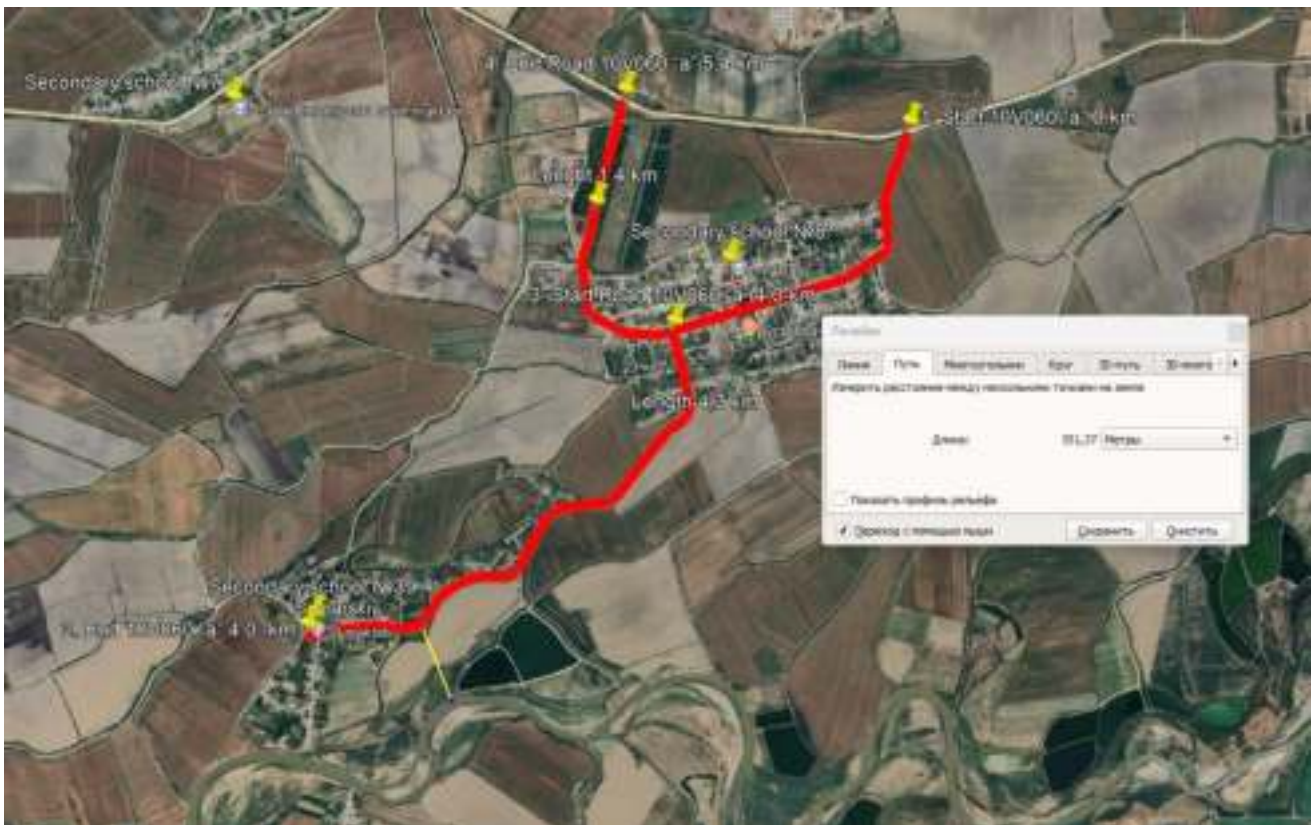


Figure 27. The distance between the road 10V060 a and Angren river



Figure 28. The distance between the road 10V065 and Syrdarya river



Figure 29. The distance between the road 10V065 a and Angren river



Figure 30. The distance between the road 10V060 and Angren river



Figure 31. The distance between the road 10V130 d and Angren river



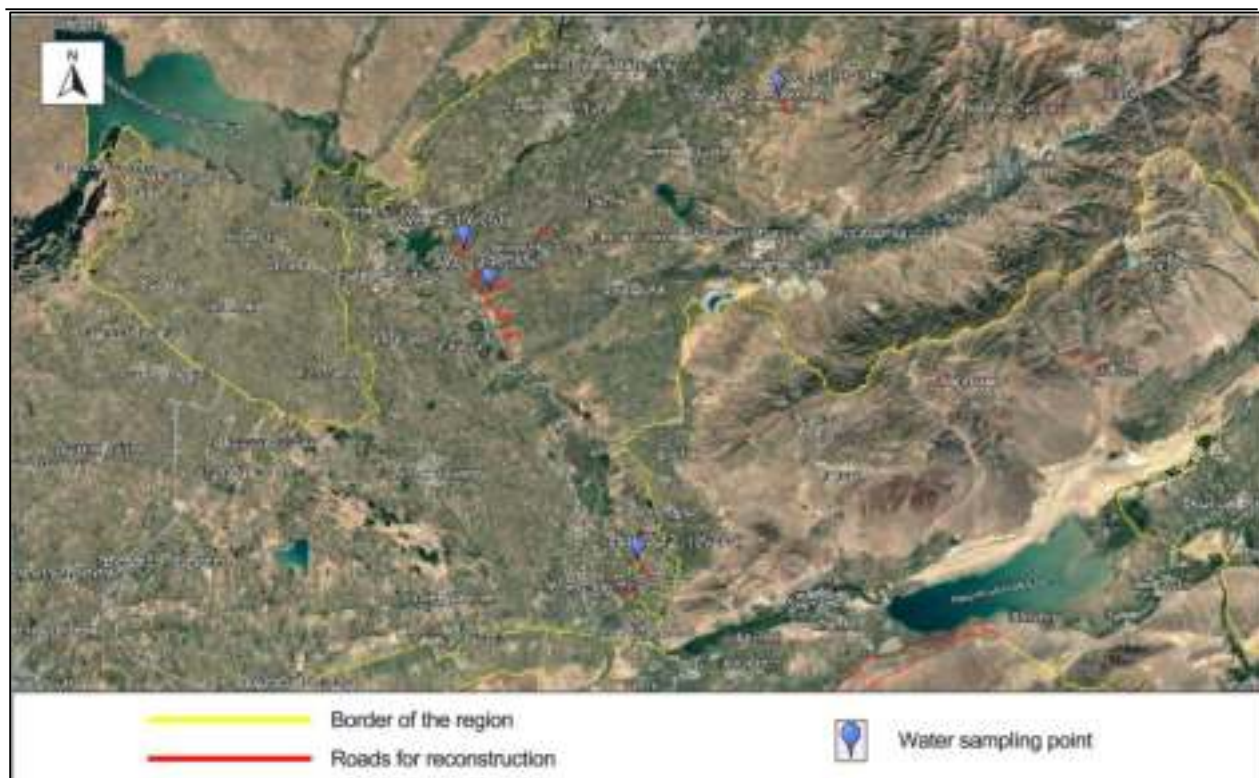
**Figure 32. The distance between the road 10V138 and Qizilsay river**

174. Surface water sampling was carried out at four points within the Project area between 7th – 10th July 2025. Analysis of surface water parameters included:

- i. pH
- ii. Chlorides mg/dm<sup>3</sup>
- iii. Sulphates mg/dm<sup>3</sup>
- iv. Ammonia nitrogen mg/dm<sup>3</sup>
- v. Nitrogen nitrite mg/dm<sup>3</sup>
- vi. Nitrogen nitrate mg/dm<sup>3</sup>
- vii. Due to the similar environmental characteristics in the Project area, it was decided to combine the road routes by districts in Tashkent province and to conduct measurements in each district. Sampling locations were at the closest sensitive receptors to the Project roads to determine baseline data.

175. The following guidance is used to inform the survey methodology:

- i. Water quality – GOST 4245-72, 4389-72, 33045-2014, SanR&N 0318-15



**Figure 33. Water sampling locations within the Tashkent region**

176. Three of the four water sampling points were located at irrigation canals and one in the Kyzylchai River within the Project area. Surface water parameter testing was conducted in one round by collecting a sample directly from the irrigation canals and Kyzylchai River. The sampling locations and their coordinates are presented below table.

**Table 20. Measurements location**

No.	Measurement Location	Coordinates	Physical component
	Tahskent province		
WQ1	4K-768, Oqqorgon district.	40.80556, 68.90917	Surface water
WQ2	4K-781, Bekobod, district	40.34500, 69.24583	Surface water
WQ3	4K-721, Yukori-Chirchiq, district, Korovultepa reservoir	41.14028, 69.56417	Surface water
WQ4	4H-716, Quyichirchiq, district	40.87750, 68.85056	Surface water

177. Results from the surface water sample analysis are in below table. Results were compared with the Uzbekistan National Standard:

- i Water quality – GOST 4245-72, 4389-72, 33045-2014, SanR&N 0318-15.

**Table 21. Results of surface water quality analysis**

NO.	Name water course	pH		Chlorides mg/dm <sup>3</sup>		Sulphates mg/dm <sup>3</sup>		Ammonia nitrogen mg/dm <sup>3</sup>		Nitrogen nitrite mg/dm <sup>3</sup>		Nitrogen nitrate mg/dm <sup>3</sup>	
		Actual	Standard	Actual	Standard	Actual	Standard	Actual	Standard	Actual	Standard	Actual	Standard
Tashkent province													
WQ 1	4K-768, (Oqqorgon district) 40.80556, 68.90917	8.08	6.5-8.5	40.0	350	115.3	500	0.016	0.5	0.03	3.3	1.67	45
WQ 2	4K-781, (Bekobod, district) 40.34500, 69.24583	7.56	6.5-8.5	50.0	350	131.56	500	0.034	0.5	0.062	3.3	3.72	45
WQ 3	4K-721, (Yukori-Chirchiq, district, Korovultepapa reservoir) 41.14028, 69.56417	6.88	6.5-8.5	75.0	350	107.16	500	0.017	0.5	0.014	3.3	0.72	45
WQ 4	4K-716, Quyichirchiq, district 40.87750, 68.85056	7.29	6.5-8.5	52.0	350	137.5	500	0.036	0.5	0.018	3.3	0.073	45
	Standard – water quality for drinking purposes	6.5-8.5	6.5-8.5	350	350	500	500	0.5	0.5	3.3	3.3	45	45

178. The results of the water quality analysis showed a slight excess of pH indicators in two of the canal locations 4K-768, 4k-781 and 4K-716 with value of 8.08, 7.56 and 7.29, respectively.

179. When compared against the Uzbekistan National Standard, the current water quality of samples taken from the locations are within the safe limits set by Water quality – GOST 4245-72, 4389-72, 33045-2014, SanR&N 0318-15.

### Groundwater Baseline Information

180. In the Tashkent region, groundwater levels in lowland and alluvial plain areas are relatively shallow, generally found at depths of 2–5 meters below the surface. In these zones, groundwater is often mineralised and contributes to localized soil salinisation, especially where irrigation return flows are significant. As the elevation increases toward the foothill zones of the Chatkal and Pskem mountain ranges, the depth of groundwater occurrence also increases, ranging from 10 to 30 meters, with a noticeable reduction in salinity levels.

181. Groundwater in mountainous and foothill areas of the Tashkent region is primarily associated with river valleys and fractured aquifers, where springs and shallow wells are common. These groundwaters are typically fresh, with good taste and low mineral content, and are widely used for

drinking purposes by rural populations. Springs in the region, especially those around Bostanlyk and Parkent districts, are part of the Tashkent hydrogeological massif, with several cold-water sources discharging naturally throughout the year.

182. As part of Uzbekistan's total estimated groundwater reserves of 18,455 million m<sup>3</sup>/year, approximately 25.7% is concentrated in the Tashkent region, making it the second most significant region for fresh groundwater availability after the Fergana Valley. Groundwater extraction is mainly for domestic supply, irrigation, and industrial use, supporting both urban and rural settlements. Despite the abundance of fresh groundwater in some areas, small, shallow aquifers are vulnerable to seasonal fluctuations and over-abstraction.

183. There is still a lack of comprehensive hydrogeological data in some districts of Tashkent. During baseline assessments, no large aquifers were identified in the immediate project footprint, though localized lenses of usable groundwater exist, recharged by irrigation infiltration and precipitation runoff in permeable zones.

## **Waste**

### **Aol**

184. The Aol applicable to waste for this Project includes the:

- i. Development Study Area: the extent of works within the Project footprint, including areas required for temporary access, site compounds, working platforms, and other enabling activities.
- ii. Expansive Study Area: extends the availability of construction materials and the capacity of waste management facilities within Uzbekistan and the region where the Project is located.

### **Waste Baseline Information**

185. During the April and June 2025 site visits, no waste disposal places/dumpsites, illegal, or hazardous wastes were observed.

186. The reconstruction of the road will produce different types of waste which could impact on the local environment. The types of waste to be expected from Project implementation includes:

- i. Domestic solid waste: Domestic solid waste will be generated by construction accommodation camps and operational facilities (laydown areas, workshops etc).
- ii. Food waste: This type of waste will be generated at canteens and dining areas at construction sites.
- iii. Construction and demolition waste: This includes construction debris, stripped asphalt and waste generated at asphalt plants, glass, concrete, broken brick, sand, wood, cladding tiles, unnecessary soil, etc. Construction waste often contains silicon oxides, impurities of cement and lime.
- iv. Liquid chemical: Solvents, paints, sealants and glue are generated during painting activities.
- v. Electrode residue: This is generally generated from welding work on site.
- vi. Paint and varnish tins: This type of non-flammable and chemically inactive waste is generated from painting work.
- vii. Waste oil and oil contaminated waste: This is generated from construction machinery and vehicles. Oiled rags are used for cleaning equipment and machines are contaminated with oil.
- viii. Waste bitumen: Waste bitumen generated because of roadbed construction.
- ix. Construction vehicle and plant maintenance waste: This type of waste will be generated at construction sites, vehicle repair stations and plant maintenance facilities.
- x. Further information on waste facilities will be covered in the contractor Waste Management Plan.

## **Cultural Heritage**

**AOI**

187. The Aoi will include the direct Project footprint, plus any land outside that footprint which includes heritage assets which could be physically affected by the Project activities.

188. The Aoi will include the settings of any designated or other cultural heritage resource in the direct Project footprint or within the area of visual influence and/or potentially affected by noise and vibration.

**Cultural Heritage Baseline Information**

189. Tashkent region, located in the north-eastern part of the country, between the Syrdarya River and the Tien Shan Mountains, borders Kyrgyzstan, Tajikistan, Syrdarya and Namangan regions. And also, with the city of Tashkent, which is independent, forming an enclave completely surrounded by the territory of Tashkent region.

190. Among the cultural heritage sites located on the territory of the project districts of Tashkent region are mosques and cemeteries.

191. The Project Aoi has no cultural heritage points or areas protected due to any cultural heritage, referring to both physical cultural resources, and traditions and customs passed down through the generations. This refers to the official list of heritages which is under Government protection. However, there are some places, which have value for local population.

192. Some monuments (potentially sensitive receptors) have been sighted along several road segments.

193. The distances between the rehabilitating rural roads and cultural heritage objects (mosques and cemeteries) are presented in figures below.



Figure 34. The distance between Cemetery and the project road 10V06



Figure 35. The distance between Cemetery and the project road 10V065



Figure 36. The distance between Cemetery and the project road 10V065



Figure 37. The distance between Mosque and the project road 10V065



Figure 38. The distance between Cemetery and the project road 10V138



Figure 39. The distance between Mosque and the project road 10V138



Figure 40. The distance between Cemetery and the project road 10V068 b



Figure 41. The distance between Buzuruk ota and the project road 10V091



Figure 42. The distance between Ayrchoqot cemetery and the project road 10V061

194. There is always a risk that earth works may encounter or damage existing structures of cultural, historical or archaeological value. In such cases the Contractor needs immediately inform the Engineer respectively representatives of the Archaeological Expertise Institute of Uzbekistan who then will advise on further and appropriate actions. Vibrations should be minimized in the area by means of traffic calming measures (e.g., speed control, signage) and incorporation of landscape screening into the design near culturally sensitive areas. Reconstruction works are to be resumed only after written approval from this agency.

## **Traffic and Transport**

### **Aol**

195. The Aol for the assessment of Traffic and Transport covers the current road network covered in the Project.

### **Traffic and Transport Baseline Information Traffic Flows**

196. Baseline traffic flows, confirmed using traffic counts conducted in May 2025, were obtained from the Feasibility Study prepared for the Project, which sets out average annual daily traffic figures (AADT) from 2025 to 2050 for the Tashkent road.

197. The traffic data and projections used for this IEE is provided is contained within Appendix 5.

198. It should be noted that the predicted increase in AADT flows have not considered any generated or diverted traffic because of the Project or a growth rate for a 'without project' scenario. This is due to the consideration that road users within the region have no viable alternative routes and that traffic counts are predicted to increase regardless of the Project. All traffic growth rates that were applied to predict future traffic flows of the rural roads is based on GDP growth and account for the exponential increase throughout Project operation. It should be noted that growth rates applied have varied in order to account for the different characteristics of each road.

199. It is therefore assumed that the Project will not directly cause an increase in AADT traffic flows during operation. Therefore, the traffic flow increases are predicted to increase to similar levels without the road upgrade or Project.

200. Traffic speed data was not available as part of the Feasibility Study and traffic counts undertaken. However, based on rapid field assessments and multiple site visits, it was confirmed that the existing roads, which connect settlements and farmlands, are not operated at high speeds. Typical travel maximum speeds are observed to be around 50 to 60 km/h.

### **Air Quality**

#### **Aol**

201. For the construction phase, 'human/high sensitivity receptors' within 350 m of the Project site footprint boundary will be considered as the Aol. It is within these distances that the impacts of dust soiling and increased particulate matter in the ambient air will have the greatest impact on local air quality at sensitive receptors.

202. For the operation phase, 'human/high sensitivity receptors' within 200 m of the Project site footprint have been identified as the most susceptible to adverse air quality impacts as a direct result of the Project. This Aol will represent locations where people are likely to be exposed to elevated pollution levels for the appropriate length of time during operation.

### **Air Quality Baseline Information**

203. In connection with recent environmental conditions, within the framework of the project implementation, it was decided to use road routes in the districts of Tashkent region and conduct measurements in each district.

204. Air quality monitoring was conducted using a gas analyzer and an aspirator. The results of the air quality monitoring are shown in Table 22 below. The current pollutant levels within these areas are well within limits set by GoU.

**Table 22. Results of baseline air quality measurements**

#	Measurement Location	Name	Actual	Standard
<b>Tashkent province</b>				
1	10V065 (4K768) (Okkurgan district) (Mosque Namozboy) 40.46004° 68.57252°	NO <sub>2</sub>	0.0012	0.6
		SO <sub>2</sub>	0.0000	0.5
		CO	0.6601	5
2	10V068 “b” (4K771 б) (Okkurgan district) (School #34) 40.43548° 68.56428°	NO <sub>2</sub>	0.0066	0.6
		SO <sub>2</sub>	0.0000	0.5
		CO	1.4516	5
3	10V087(4K783) (Bekabad district) (Mosque) 40.17167° 69.13483°	NO <sub>2</sub>	0,0087	0.6
		SO <sub>2</sub>	0,0000	0.5
		CO	0,0000	5
4	10V130d (4K715 r) (Quichirchiq district) (School №31) 40.54119° 69.05086°	NO <sub>2</sub>	0,0000	0.6
		SO <sub>2</sub>	0,0000	0.5
		CO	0,0000	5
5	10V061 (4H716) (Quichirchiq district) (School №15) 40.52304° 68.50433°	NO <sub>2</sub>	0.0157	0.6
		SO <sub>2</sub>	0,0000	0.5
		CO	0,0000	5
6	10V060 “a” (4K742a) (Quichirchiq district) (Courthouse) 40.49524° 68.52559°	NO <sub>2</sub>	0,0000	0.6
		SO <sub>2</sub>	0,0000	0.5
		CO	0,0000	5
7	10V085 (4K781) (Bekabad district) (School №29, Market local) 40.20422° 69.14242°	NO <sub>2</sub>	0,0000	0.6
		SO <sub>2</sub>	0,0000	0.5
		CO	0,0000	5
8	10V091 (4H731) (Bekabad district) (Buzuruk ota mausoleum) 40.19568° 69.16533°	NO <sub>2</sub>	0,0000	0.6
		SO <sub>2</sub>	0,0000	0.5
		CO	0,2733	5

## Noise and Vibration

### Aol

205. During construction, an Aol of 300 m from the closest construction activity is sufficient to encompass noise and vibration sensitive receptors.

206. An operational study area, defined as 600 m of road links physically changed, can be sufficient, but it can be reduced or extended to ensure it is proportionate to the risk of likely significant effects.

### Noise Baseline Information

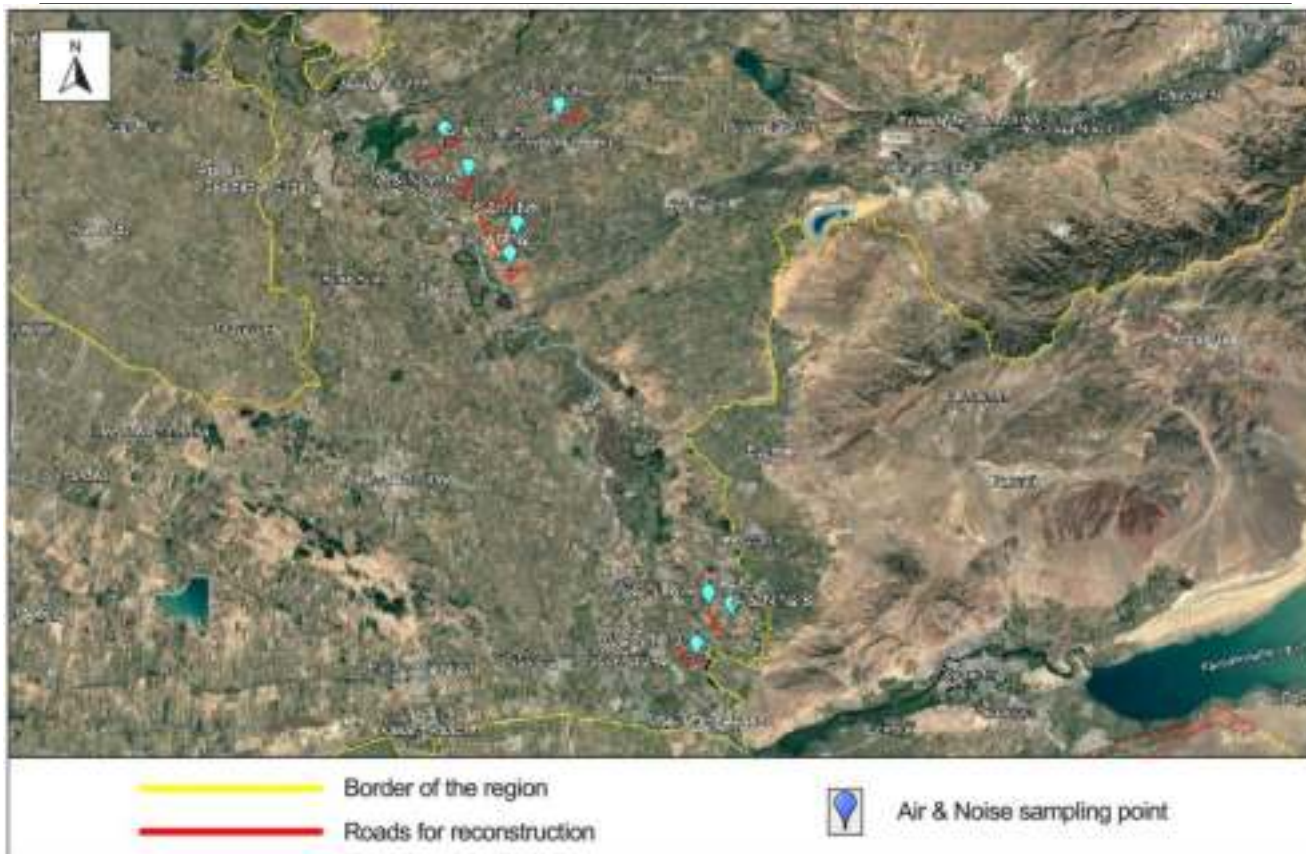
207. Due to similar environmental characteristics in the project implementation area, it was decided to combine road routes across the districts of the Tashkent region and conduct measurements in each district. Accordingly, noise and air quality measurements were conducted in the same location

as shown in the map below.

208. The Table 23 below presents the equivalent continuous sound level (L<sub>aeq</sub>) values recorded at each measurement location. The current noise levels at the eight locations are within the daytime limits set by the U.S. Government and IFC standards.

**Table 23. Results of baseline noise level measurements**

#	Measurement Location	Average, dB (A)	Max. dB (A)	Min. dB (A)	Standard (day time 07:00 – 23:00)
1	10V065 (4K768) (Okkurgan district) (Mosque Namozboy) 40.46004° 68.57252°	55.5	58	53	55
2	10V068 "b" (4K771 6) (Okkurgan district) (School #34) 40.43548° 68.56428°	61.5	65	58	55
3	10V087(4K783) (Bekabad district) (Mosque) 40.17167° 69.13483°	45.5	48	43	55
4	10V130d (4K715 r) (Quichirchiq district) (School №31) 40.54119° 69.05086°	38,5	41	36	55
5	10V061 (4H716) (Quichirchiq district) (School №15) 40.52304° 68.50433°	49,5	53	46	55
6	10V060 "a" (4K742a) (Quichirchiq district) (Courthouse) 40.49524° 68.52559°	50	52	48	55
7	10V085 (4K781) (Bekabad district) (School №29, Market local) 40.20422° 69.14242°	57,5	61	54	55
8	10V091 (4H731) (Bekabad district) (Buzuruk ota mausoleum) 40.19568° 69.16533°	57,5	61	54	55



**Figure 43. Map of Air Quality and Noise Measurement Locations**

**Vibration Baseline Information**

209. There are three primary types of receivers that can be adversely affected by ground vibration: people, structures, and equipment.

210. Uzbekistan does not have specific standards for allowed vibration levels in the residential areas. The Sanitary Standard of Uzbekistan SanPiN No.0326-16 “Sanitary norms for the general and local vibration at the working places” provides the Uzbekistan’s occupational vibration tolerance limits measured in m/s and decibels (dB). Table 24 determines the occupational tolerance limits of vibration velocity and acceleration for various frequencies.

211. It has been agreed with ADB that vibration measurement will not be completed due to the low intensity of traffic. It is additionally, not anticipated that heavy vibration will occur during construction.

**Table 24. Tolerance limits for local vibration in Uzbekistan**

Geometric Mean Frequency (Hz)	Maximum allowed values for vibration acceleration and speed on the axis Z <sub>0</sub> , X <sub>0</sub> and Y <sub>0</sub>			
	Vibration acceleration		Vibration speed	
	m/s/s <sub>2</sub>	dB	m/s <sup>2</sup> x10 <sup>-2</sup>	dB
8	1.1	70	2.0	112
16	1.4	73	1.4	109
31.5	2.7	79	1.4	109
63	5.4	85	1.4	109
125	10.7	91	1.4	109
250	21.3	97	1.4	109
500	42.5	103	1.4	109
1000	85.0	109	2.0	112

## Climate

### Climate Baseline Information

212. Climate data on temperature, wind and extreme weather conditions were obtained from the Hydrometeorological Service Center (Uzhydromet). The data is collected for the period 2018-2023 from the weather station. Since the collected data was collected over a short period of time (6 years), the development of the baseline report was supplemented by climate-sensitive data from the World Bank, which contains data since 1991 for the Tashkent region and the country of Uzbekistan.

### Gathered Survey Data

213. The Tashkent Region exhibits a sharply continental climate with hot, dry summers and relatively cold winters. The average annual air temperature is around +16°C, with July being the hottest month (average daily maximum: +31°C) and January the coldest (average minimum: +2°C). Prevailing winds blow primarily from the southeast and east, consistent with topographic channeling effects across the region's open plains and valley corridors

214. Final wind and precipitation characteristics

- i. Average monthly wind speeds range from 2.2 to 3.6 m/s, peaking in June (3.6 m/s). Wind speeds gradually decrease from late summer into autumn. These figures are derived from long-term meteorological observations collected at Tashkent International Airport, located in a relatively open and exposed area outside the city core.
- ii. Maximum instantaneous wind speeds (gusts) reach up to 20 m/s, particularly during spring and summer months (notably February, May, and July). These gusts are associated with thermal convection and pressure differentials in the region. While such strong winds are relatively infrequent, they are recorded at least 2–3 times per year based on recent data (e.g., February 2023: 74.1 km/h = 20.6 m/s).
- iii. Note: These represent extreme short-duration gusts and do not reflect monthly or daily averages.
- iv. Annual precipitation averages around 480 mm, with 80% occurring between January and April. The wettest month is typically February (~77 mm), while July and August are the driest, each with only ~1 mm of rainfall.
- v. Average number of days with precipitation varies between 1–13 days/month, and the frost-free period extends approximately 260 days, generally from early March through late November

Climatic Conditions of Tashkent Region (2023–2025, Final Regional Update)

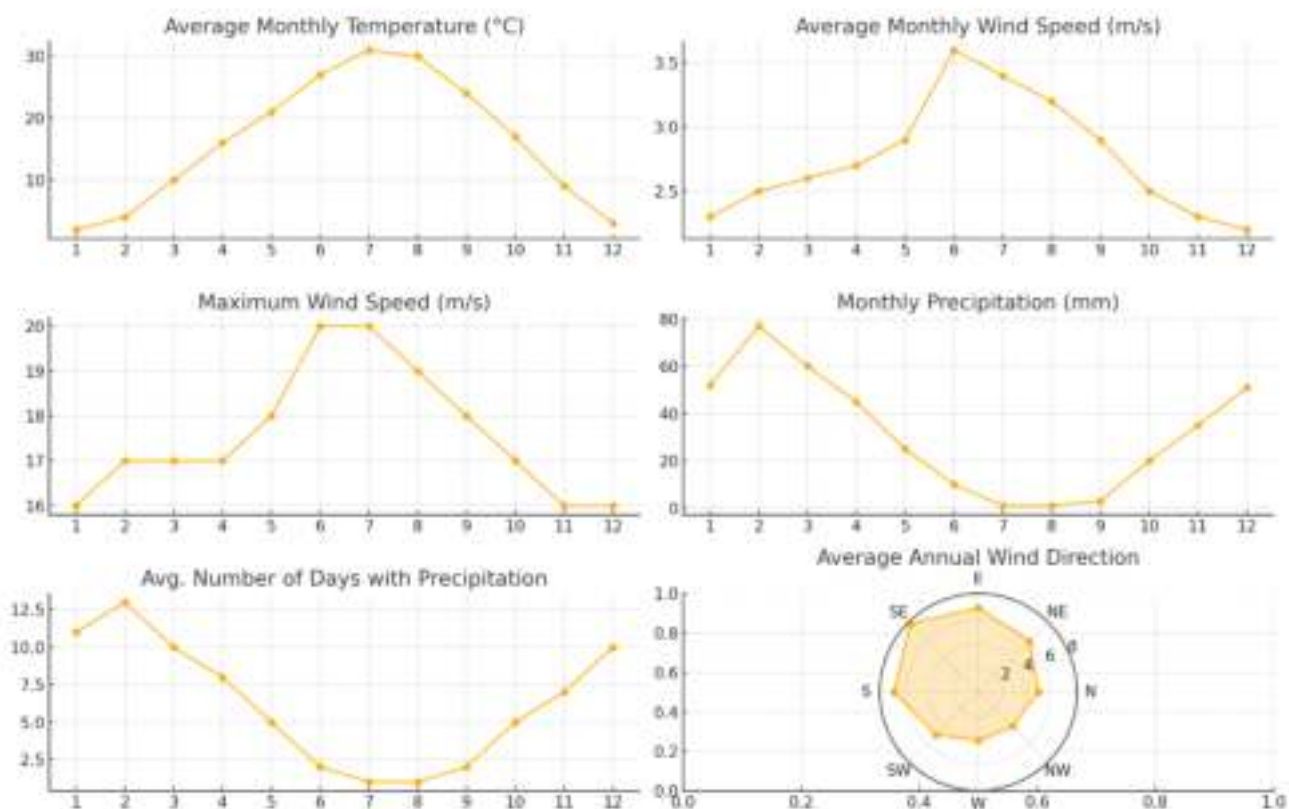


Figure 44. Gathered surveyed climatic conditions (2023-2025)

### General Climatology

215. The baseline climate variables for the Tashkent Region have been established using datasets and visualization tools from the World Bank Climate Change Knowledge Portal (World Bank Group, 2023). The baseline period spans from 1991 to 2020 and includes key climate indicators such as:

- i. Monthly minimum, mean, and maximum temperatures,
- ii. Extreme heat events,
- iii. Average and extreme precipitation, and
- iv. Frequency of droughts and other extreme events.
- v. These variables provide a robust foundation for understanding the region's historical climate and are used for climate risk screening and project vulnerability assessments

216. The project area falls within the Cold Semi-Arid (BSk) climate zone under the Köppen–Geiger classification system (1991–2020 baseline). This climate type is characterized by hot and dry summers and cold winters, often reaching subzero temperatures.

217. According to the World Bank climate baseline for Tashkent:

- i. Monthly average temperatures range from  $-2.5^{\circ}\text{C}$  in January (min) to  $+36.0^{\circ}\text{C}$  in July (max), showing sharp seasonal variability.
- ii. Monthly precipitation peaks at 60 mm in March, and drops to 1–4 mm during July–August, reflecting a distinct dry season.

These patterns are typical of the sharply continental conditions across the Central Asian interior and confirm the region's vulnerability to seasonal droughts and temperature extremes



Figure 45. Updated Köppen–Geiger Climate Classification Map (1991–2020)(World Bank Group, 2023)

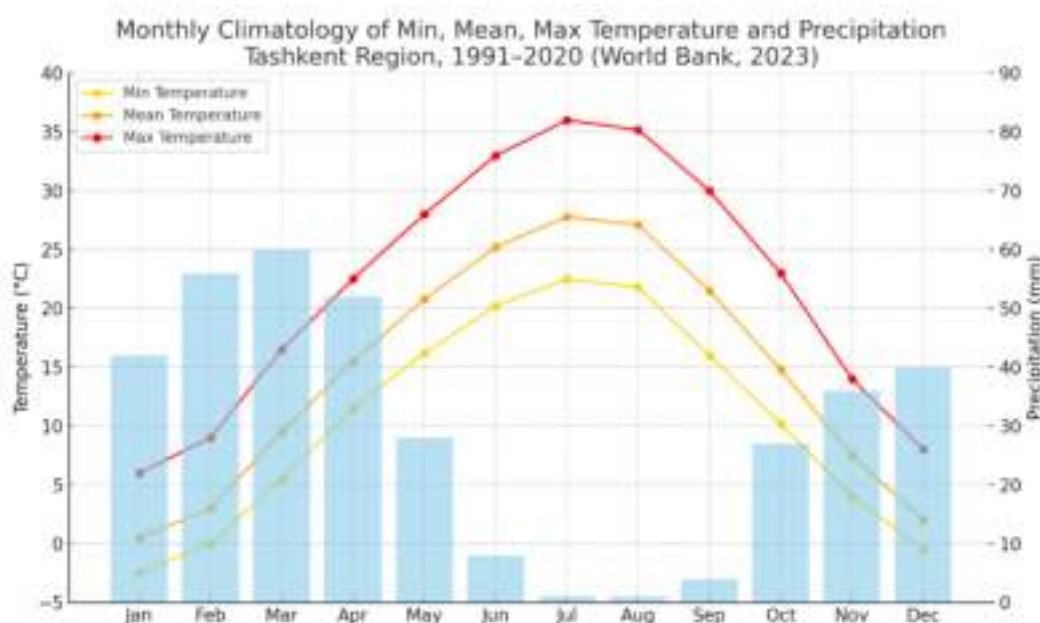


Figure 46. Tashkent Region Monthly Climatology (1991–2020)(World Bank Group, 2023)

**Temperature**

- 218. The Tashkent Region experiences distinct seasonal temperature variation.
  - i. During the winter months (December, January, February), temperatures are lower, with monthly minimums averaging  $-2.5^{\circ}\text{C}$  to  $0.0^{\circ}\text{C}$ , and maximums ranging from  $6.0^{\circ}\text{C}$  to  $9.0^{\circ}\text{C}$ .
  - ii. In the summer period (June, July, August), temperatures rise significantly, with minimums between  $20.2^{\circ}\text{C}$  and  $22.5^{\circ}\text{C}$ , and maximums reaching up to  $36.0^{\circ}\text{C}$  in July.
 These seasonal extremes highlight the sharply continental nature of the local climate.

219. Long-term temperature records for the Tashkent Region (1901–2021) indicate a steady warming trend of approximately  $+2.5^{\circ}\text{C}$  over the past 120 years. This long-term warming is consistent with global climate change patterns and has implications for future project resilience, particularly in relation to heat stress, water availability, and changing seasonal cycles

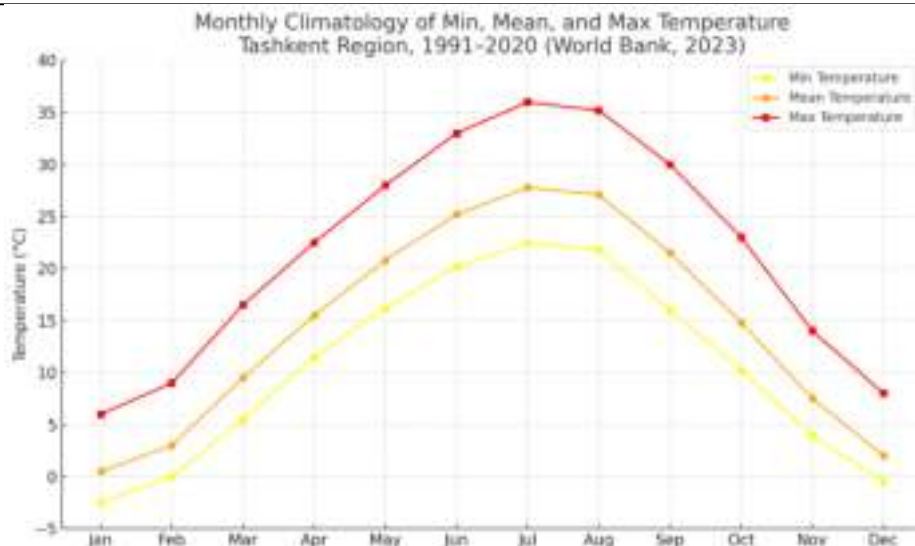


Figure 47. Tashkent Region Temperature Profile (1991–2020)(World Bank, 2023)

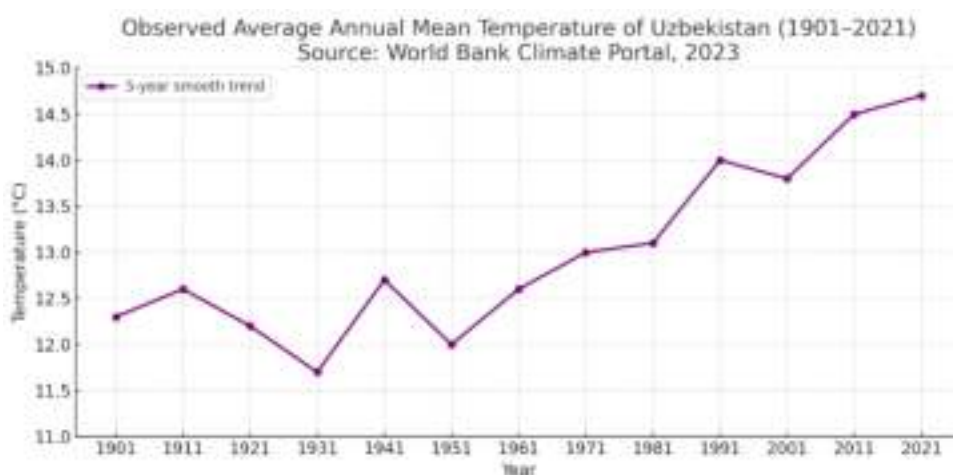


Figure 48. Observed Average Annual Mean Temperature of Uzbekistan (1901–2021) (World Bank, 2023)

**Precipitation**

220. The precipitation profile of the Tashkent Region demonstrates a strong seasonal pattern.

- i. Peak precipitation occurs during the winter and spring months (February to April), with values ranging from 52 to 60 mm/month, and March being the wettest month.
- ii. During the summer season (June to August), precipitation significantly decreases to as low as 1–8 mm/month, indicating a pronounced dry period.
- iii. A secondary increase is observed during October–December, when rainfall reaches 27–40 mm/month.

221. This seasonal variability is typical of cold semi-arid climates (BSk) and must be considered in drainage and water resource planning for the Project.

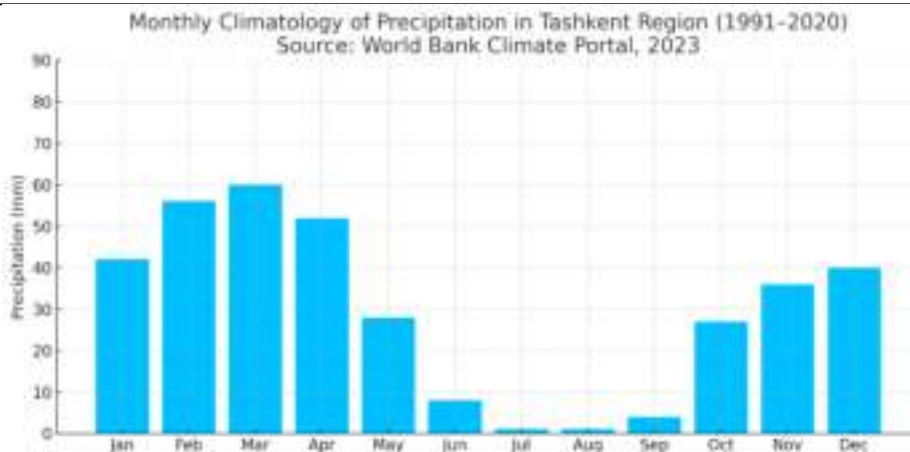


Figure 49. Monthly Climatology of Precipitation in Tashkent Region (1991–2020) (World Bank, 2023)

**Extreme Events**

222. Climate-related natural hazards in Uzbekistan have historically centered around floods and droughts. In recent decades, these have posed the most significant threats to human populations and livelihoods. A severe drought event in the early 2000s is estimated to have affected nearly 900,000 people, making it one of the most impactful climate-related events recorded in the country. More recently, flood events during the 2020s have impacted approximately 72,000 people.

223. Other recorded events include earthquakes, dry mass movements, and epidemics, which primarily occurred in the 1990s and affected comparatively smaller populations. While less frequent, these events remain relevant in the broader hazard profile of Uzbekistan.

224. This trend highlights a growing exposure to hydrometeorological risks, particularly floods, and confirms the need for their integration into risk assessments, infrastructure planning, and climate resilience strategies for development projects

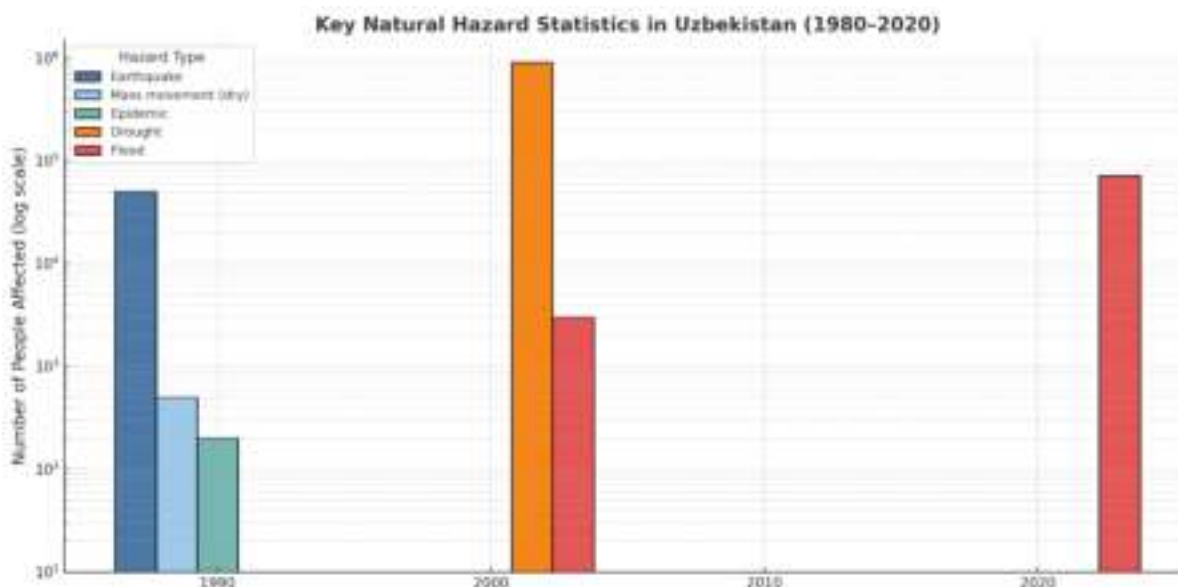


Figure 50. Key natural hazards statistics in Uzbekistan (World Bank Group, 2023)

**Flooding**

225. The hydrographical system of the Tashkent region is shaped by the presence of the Syrdarya River, which runs adjacent to the region’s southeastern boundary—from the vicinity of Bekabad City downstream toward the inflow point of the Main Flood Collector (MFC). This system is further supported by a network of irrigation canals and collectors, which play a critical role in water regulation and agricultural supply.

226. The Syrdarya originates from the confluence of the Naryn and Karadarya rivers in the eastern part of the Ferghana Valley. Its discharge is primarily fed by snowmelt, with glacial and rainfall contributions being secondary. In its lower stretches, the river skirts the eastern and northern edges of the Kyzylkum Desert, flowing through a meandering and unstable riverbed, which leads to frequent seasonal flooding, especially during the winter–spring period. The final major tributary joining the Syrdarya is the Arys River.

227. According to the World Resources Institute’s (WRI) Aqueduct Floods Tool (2023), the Tashkent region is classified as being at high risk for riverine flooding, based on historical flood data and modeled scenarios. This risk must be factored into project planning, particularly with regard to infrastructure resilience, flood mitigation, and land use management.

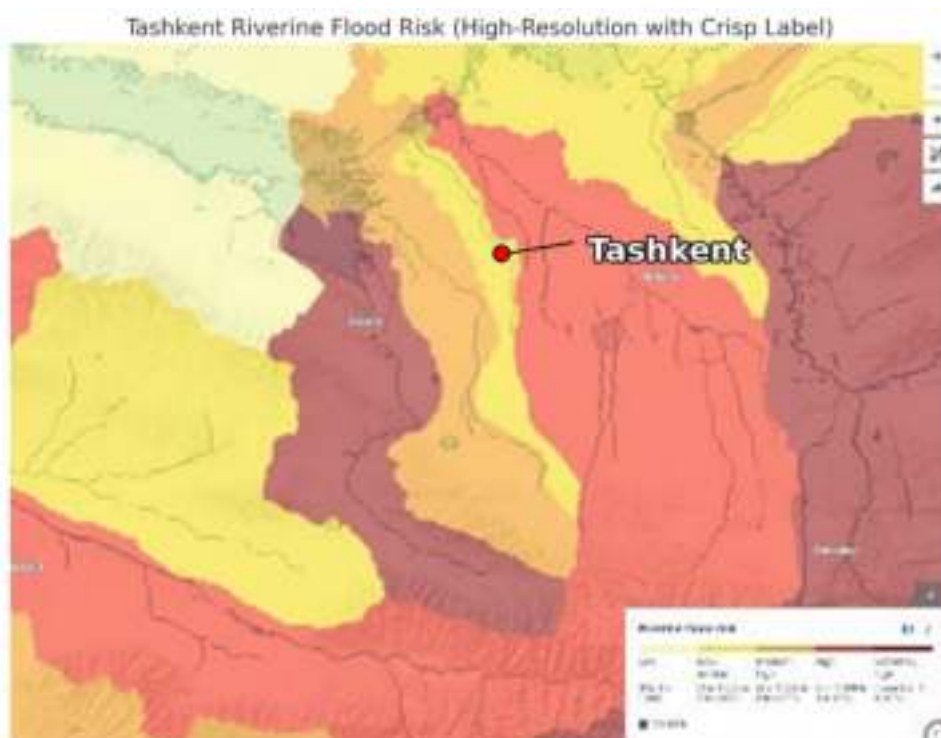


Figure 51. Tashkent Riverine Flood Risk (WRI Aqueduct Floods Tool (2023))

## Climate Projections

### Climate model, scenario, and temporal scope

228. This chapter includes projected climate change effects based on the Shared Socio-economic Pathways (SSPs) informing the 6th assessment report (AR) of the Intergovernmental Panel on Climate Change (IPCC, 2021) and supported by data and tools of the World Bank Climate Change Knowledge Portal (World Bank Group, 2023) and the WRI Aqueduct tool for flood and drought risk (WRI, 2019).

229. The assessment will focus on projected climate change for the SSPs of SSP1-2.6, SSP2-4.5 and SSP3-7.0 refraining from identifying trends for the best and worst-case scenarios as these are considered less likely. The assessment considers a temporal scope of 50 years, resulting in the assessment of projected climate change effects of the period 2060-2079 as these effects should be included in design considerations.

### Projections

230. To understand which climate change impacts are most likely on the road development, projections for the temporal scope of 50-years will have to be analyzed, in order to understand which of the anticipated climate change effects are likely to become relevant. The following paragraph will go into more detail on relevant climate projections.

231. It is important to understand that projections made considering the SSPs have an inherent uncertainty in them. Each of the SP projections has a potential range of outcomes, between the 10th and 90th percentile (representing a 10% probability that it happens) where the 50th percentile (the average range depicted by a line) is the most probable outcome of the SSP climate scenario. Therefore, outliers should not be disregarded even though they are less likely, design considerations should still take them into account to avoid future climate risk manifesting on the Project. The graphs show the upper and lower limits of the projections (10th and 90th percentile range) with a shaded area and the average projections (50th percentile) are shown with the graph line. The 50th percentile results inform the summary of the projections in the following sections.

## Temperature

232. Projected climate outcomes based on CMIP6 multi-model ensembles (SSP1 2.6, SSP2 4.5, SSP3 7.0) indicate significant warming for the Tashkent region by 2060–2079 relative to the baseline period (1995–2014):

- i. Maximum temperatures (Tmax):
  - Under SSP3 7.0, summer Tmax (June–August) is projected to reach approximately 35–38 °C, a rise of +4 to +5 °C compared to current peak values (~33 °C).
  - Winter Tmax (December–February) is expected to increase to around 6–9 °C, representing an uplift of +2 to +3 °C above existing averages (~4–6 °C).
- ii. Minimum temperatures (Tmin):
  - January Tmin under SSP3 7.0 is projected at around –3 °C, up ~3 °C from the baseline (~–6 °C).
  - December and February Tmin rise to approx –1.5 to –0.5 °C, further indicating winter warming.
- iii. Heat-wave days (Tmax > 35 °C):
  - The frequency of days exceeding 35 °C notably increases in summer: e.g., in July, heat-wave days rise from ~16 (baseline) to ~27 days under SSP3 7.0.
- iv. General warming trend:
  - By mid-century, average temperatures are projected to increase by +2 to +2.5 °C under SSP1 2.6/SSP2 4.5 and +3 to +4 °C under SSP3 7.0. By late century (2080–2099), summer warming may escalate to +4–6 °C in high-end scenarios.

These consistent warming patterns across scenarios—especially under SSP3 7.0—point to intensifying thermal stress, more frequent and prolonged heat waves, milder winters, and overall higher climate variability. These findings underline the imperative to integrate climate resilience and adaptation into urban planning, water management, and infrastructure design in the region.

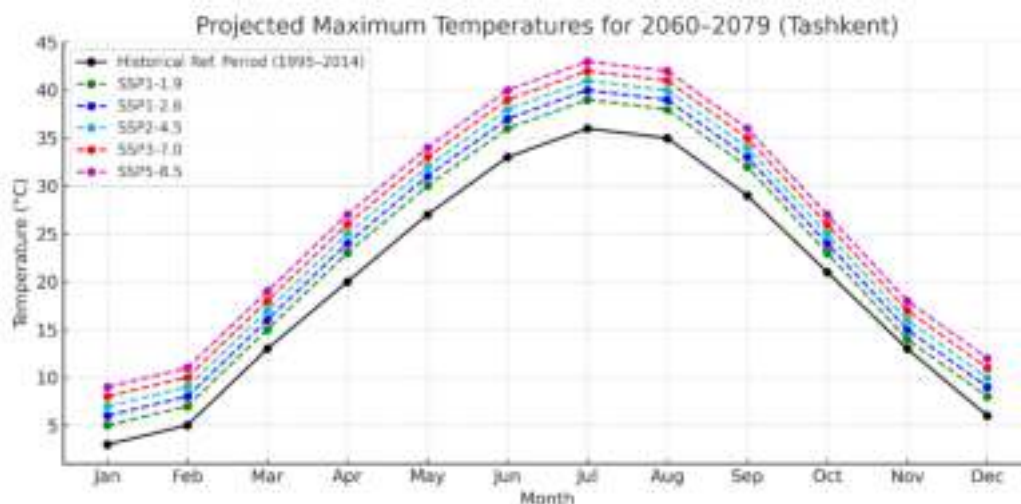


Figure 52. Tashkent Maximum Temperature Projections (World Bank, 2023)

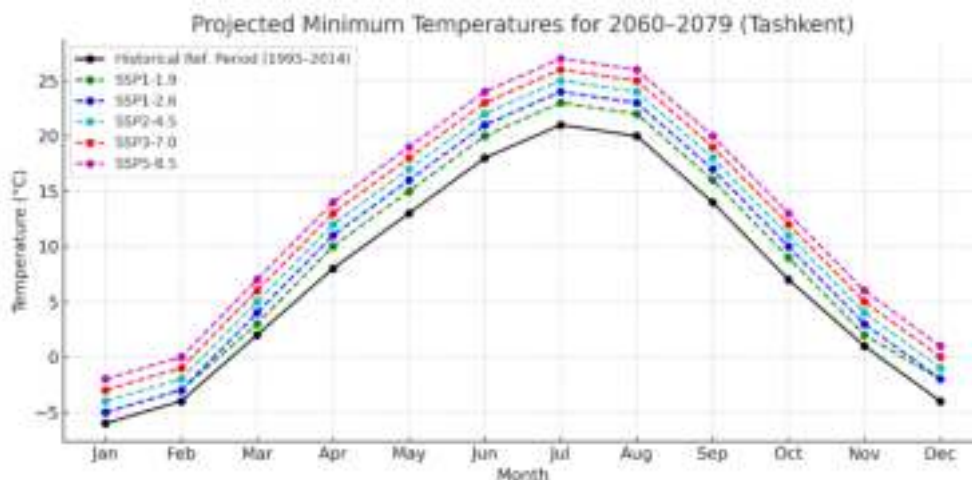


Figure 53. Tashkent Minimum Temperature Projections (World Bank, 2023)

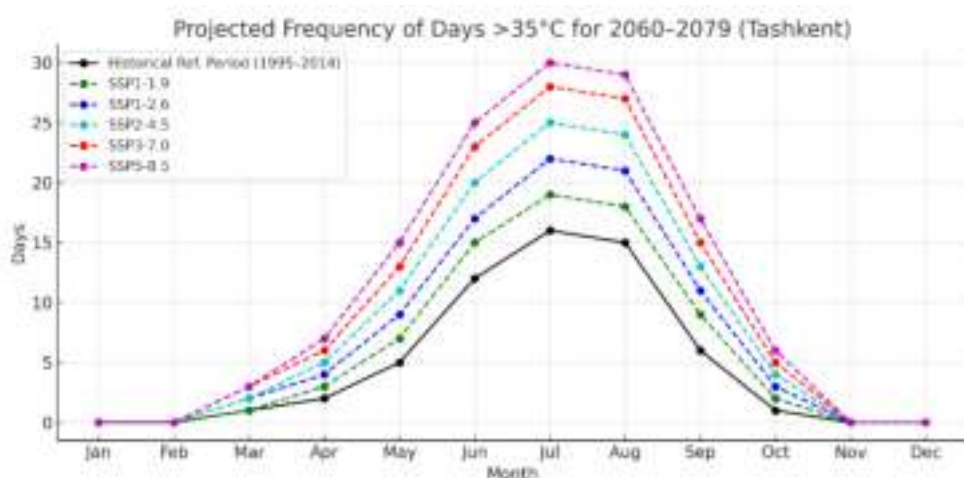


Figure 54. Tashkent frequency of projected hot days (World Bank, 2023)

**Precipitation**

233. Projected precipitation levels in the Tashkent region under different SSP scenarios (SSP1-1.9, SSP1-2.6, SSP2-4.5, SSP3-7.0, SSP5-8.5) indicate moderate increases during the winter and spring months. For instance, March is projected to experience an average precipitation of 81 mm under SSP3-7.0, representing an increase of approximately 7 mm compared to the baseline period (1995–2014). In contrast, summer months remain relatively dry with minor reductions in precipitation levels. For example, under SSP3-7.0, August shows a projected mean precipitation of 0.8 mm, slightly lower than the historical average by about 0.45 mm. Overall, while the seasonal distribution of rainfall remains similar, there is a notable amplification of peak rainfall events in early spring.

- i. Data Source:
- ii. World Bank Climate Change Knowledge Portal
- iii. Projection Period: 2060–2079
- iv. Baseline Reference: 1995–2014
- v. Multi-Model Ensemble (CMIP6)

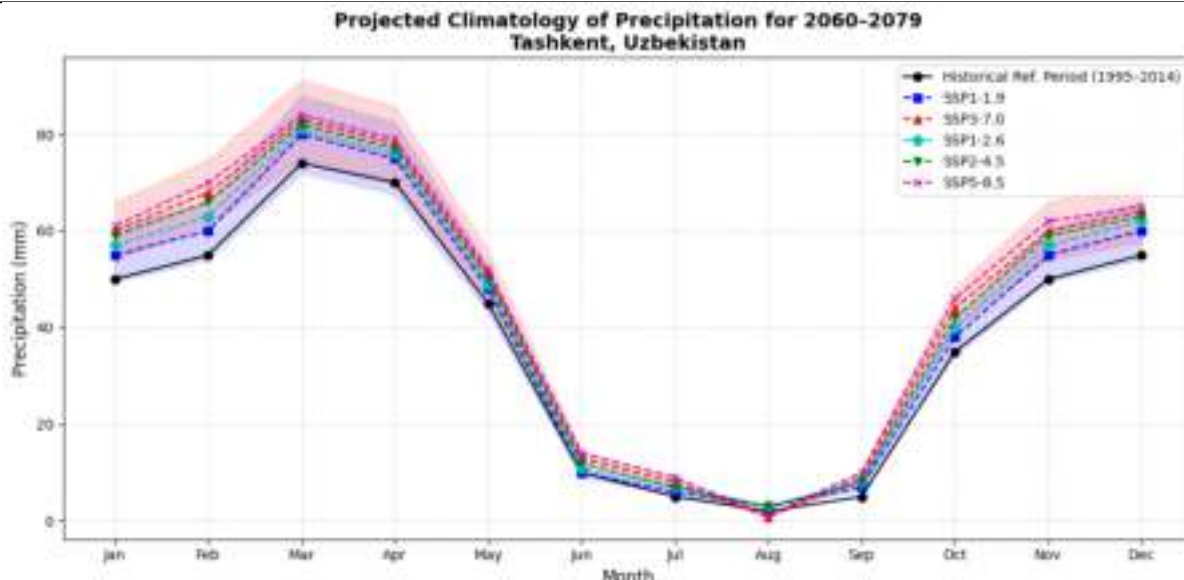


Figure 55. Projected Climatology of Precipitation For 2060–2079 Tashkent (World Bank, 2023)

**Flooding**

234. Projected average 5-day cumulative extreme precipitation in the Tashkent region shows a slight increase in magnitude under different SSP scenarios. For example, in February, the 5-day rainfall event is projected to increase by approximately 12 mm (22%) compared to the historical baseline period (1995–2014). Extreme precipitation events during summer months are projected to remain largely unchanged, reflecting the already minimal historical summer rainfall.

235. This increase in extreme precipitation suggests a heightened risk of surface water flooding and increased frequency and magnitude of riverine flooding. Additionally, projected rises in annual and seasonal temperatures increase the likelihood of flooding due to snow and glacial melt contributing to larger river discharges. The existing irrigation and canal systems in the floodplain areas may help mitigate these risks. However, the baseline riverine flood risk is expected to either remain high or worsen in the future.

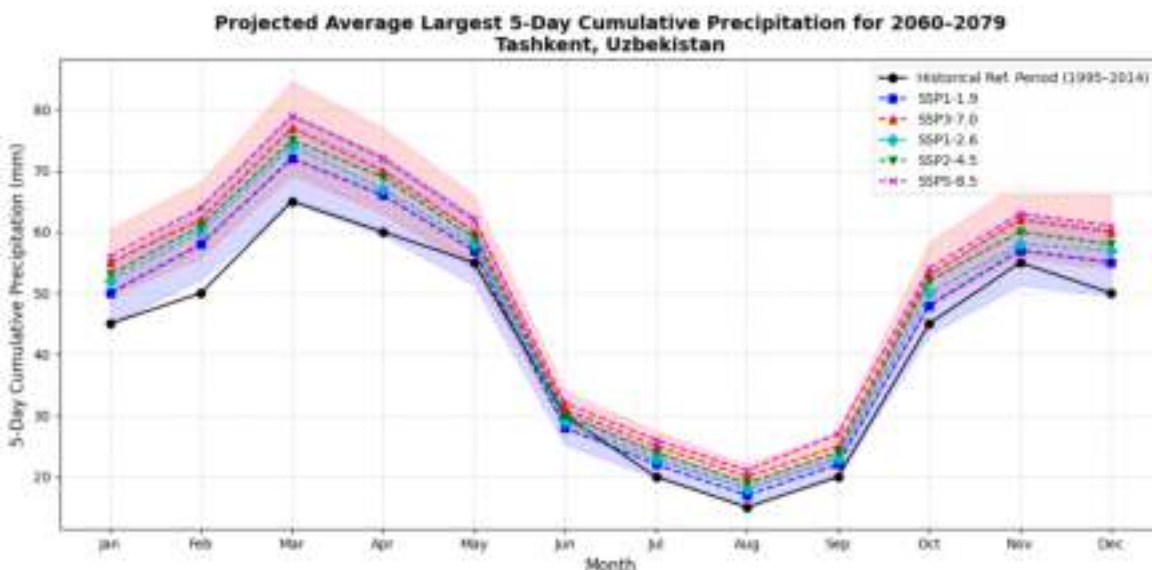


Figure 56. Projected Average Largest 5-Day Cumulative Precipitation For 2060–2079 Tashkent, (World Bank, 2023)

**Droughts**

236. Drought projections are expressed using the Standardized Precipitation Evapotranspiration

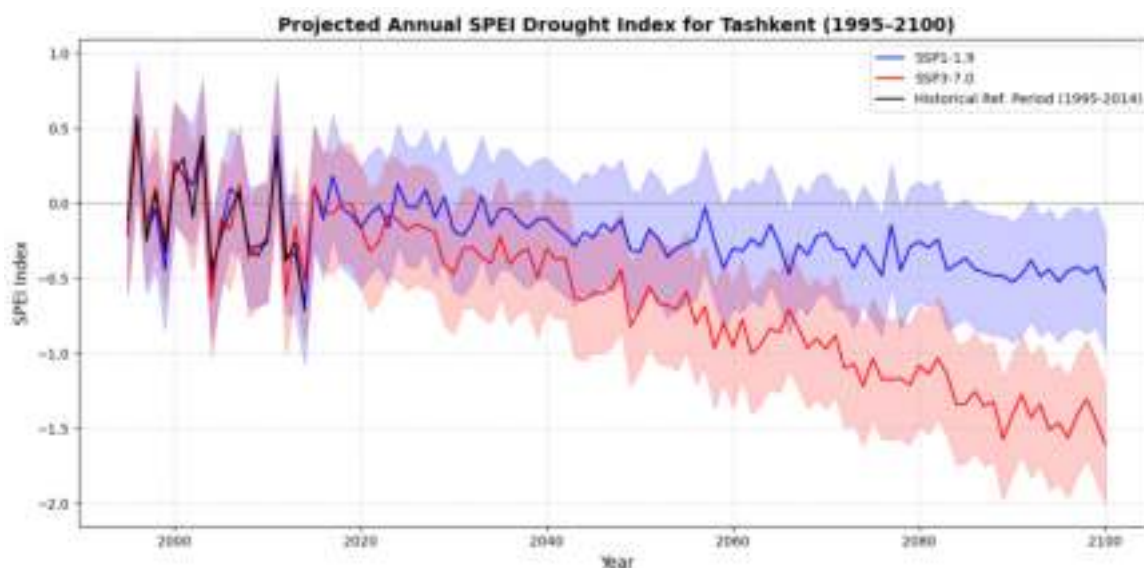
Index (SPEI), which is also referred to as the drought index in the World Bank Climate Change Knowledge Portal. The SPEI values range from positive to negative, representing wet and dry periods, respectively. A detailed classification of drought severity levels is provided in the accompanying Table 25.

237. The SPEI is a multi-scalar drought index derived from climatic data. It was developed by integrating the sensitivity of the Palmer Drought Severity Index (PDSI) to changes in evaporation demand with the multi-temporal robustness of the Standardized Precipitation Index (SPI). SPEI extends the SPI by incorporating potential evapotranspiration (PET), thereby capturing both precipitation and atmospheric evaporative demand to better reflect the water balance.

238. The index is calculated based on water balance (precipitation minus PET) using parameterizations such as the Penman-Monteith and Thornthwaite equations. These parameterizations rely on physical principles including changes in available energy, humidity, wind speed, and air temperature (Paulo, Rosa, & Pereira, 2012).

**Table 25. SPEI drought index classification (Paulo, Rosa, & Pereira, 2012)**

Drought classification	SPEI index
Non-drought	Above -0.5
Mild	Between -0.5 and -1.0
Moderate	Between -1 and -1.5
Severe	Between -1.5 and -2
Extreme	Below -2



**Figure 57. Projected Annual SPEI Drought Index for Tashkent (1995–2100) (World Bank, 2023)**

239. Recent projections for the Tashkent region indicate that up to approximately 2080, the average SPEI values under various SSP scenarios range between -0.2 and -0.4, corresponding to mild drought conditions being most likely. However, examining the lower 10th percentile reveals that SPEI values could fall below -2, indicating that extreme droughts cannot be entirely ruled out in the future.

**Summary**

240. In summary the following projections can be highlighted.

- i. Temperature will increase, with more hot days and fewer cold days expected.
- ii. Precipitation is expected to slightly increase in winter and spring periods but remain the

- same or slightly decrease in the summer months. More extreme precipitation events are expected to occur.
- iii. Drought probability is expected to increase and become more severe.
  - iv. Flood risk is most likely to increase due to the increased meltdown of snow and glaciers attributing to discharges in the local rivers. There is also an increase in the magnitude of extreme rainfall events, which may lead to further increase in surface and river flood risk. There is a potentially earlier onset in freeze thaw conditions, resulting in higher flood risk earlier on in the year.

## **B. Ecological Resources**

### **Aol**

241. The Aol for the Project's ecological assessment is greater compared to other technical components of the IEE due to the increased spatial extent of both potential direct impacts (i.e. disturbance from noise) and indirect impacts (i.e. land use change facilitated by encroachment) impacts to ecological receptors. The exact spatial extent of indirect impacts can be difficult to quantify. However, given that the Project activities will only involve the maintenance and reconstruction of existing road infrastructure, impacts will be temporary in nature and limited to the construction period. From professional experience, impacts from construction on ecological receptors such as noise disturbance and air quality will occur up to 350 m from the road. Taking a precautionary approach and based on the ecological sensitivity of the surrounding landscape, the Aol for the Project's impact assessment will extend 500 m from either side of the road (1 km corridor).

### **Ecological Baseline Information Field Surveys**

242. The SPC has carried out continuous ecological field assessments to support the IEE of the Project. Data collection was undertaken through a combination of field surveys to assess site topography and habitat distribution, literature review, and stakeholder interviews. All findings include documented records of native species based on direct observations and verifiable evidence.

### **Flora**

243. The majority of Tashkent province is occupied by agricultural land. Arable lands occupy 150,068.0 ha, predominantly consisting of crops such as cotton, grain and legumes – 70,161 ha and 67,000 ha accordingly. Forest zone consists of field-protective plantings along the roads and between the fields, plantings in parks and populated areas: black poplar (*Populus nigra*) – the most wide-spread species in forest shelter belts. Planted trees and bushes in parks and dwelling settlements differ by their diversity and include among others the following: maples (*Acer*), planes (*Platanus*), elms (*Ulmus*), willows (*Salix*), mulberry plantations gardens and vineyards. The vegetation map of Tashkent province is presented in Figure 58 below.



**Figure 58. Map of vegetation of Tashkent province**

244. Green plantings along the roads are represented by ornamental and garden trees, along the roads there are rows of poplars (*Populus*), mulberries (*Morus*), plane trees (*Platanus orientalis*), elms (*Ulmus parvifolia*), ailanthus (*Ailanthus*), existing plum, apricot and apple orchards, vineyards. Near the fields there are many mulberries. In populated areas there is an increase in woody vegetation mixed with garden and ornamental trees; in the main mass mulberry, poplar groves, willow (*Salix*), osier, apple trees, Japanese pagoda tree, apricots, ailanthus predominate. Conifers are less common: juniper, pine, thuja.

245. Along the rural road, the highest tree vegetation is represented by poplar, elm, willow, mulberry growing along the roads. Less common are oleaster (*Elaeagnus*) and ailanthus. Juniper, pine, thuja (*Thuja*) grow near administrative and social facilities. Near residential buildings, garden crops of apricot, cherry, plum, and grape are found.

246. Along the rural road the tallest woody vegetation is mainly represented by elm, poplar, mulberry growing along the roads. Less common are judas, thallus and garden crops.

247. Along all the crossing collectors and channels in the earthen channel, aquatic and coastal higher vegetation grows, these are tamarisk, reeds, cattail (*Chitalpa tashkentensis*), char plants, urut (*Mysiophyllum verticillatum*) and hornwort, in some places there are thickets of vallisneria, duckweed (*Chlorophyta*) etc. In places there are mosses and lichens. Algae are represented by filaments of various forms.

248. Of the herbs, bluegrass (*Poa*), sow thistle (*Sonchus arvensis*), azhrek (*Aeluropus*), chicory (*Cichorium* spp.), syt (*Cyperus*), burdock (*Arctium lappa*), licorice (*Glycyrrhiza*), and other herbs predominate.

249. Agricultural fields along all roads are cultivated and sown with the following crops: cereals - wheat, corn; cotton; legumes - mung bean, alfalfa, beans; sunflower; apricots, apples, plums, grapes are grown in the orchards.

250. In general, the vegetation is in a satisfactory condition. The habitus of plants, their height, shape, length of shoots, the area of the leaf blade corresponds to their norm. This is facilitated by watering of plants carried out in the area. Tree plantations perform important cleaning functions of the atmosphere, reducing the content of dust and gases. A visual inspection of the vegetation revealed a slight dust content of the foliage. The foliage of trees is not generally covered with dust. The mouths on the leaf plates are open and not clogged with dust. There were no damages of leaf plates such as black necrotic spots in various representatives of tree plantations and agricultural crops. There is also no chlorophyll damage, as foliage of various parts of trees and shrubs of the same green color. There are no pale green and yellow-green spots. All this indicates that the vegetation is in a good physiological state.

251. Photos of vegetation observed during the site visit are shown in figures below.



Figure 59. Example of vegetation of Tashkent province

### Fauna

252. Fauna recorded in the Project area is limited to those species that are able to adapt to life in anthropogenic conditions in the urbanized part of the Tashkent province. In general, it can be stated that the area under consideration is characterized by the distribution of those animal species that were able to find their niche and adapted to an environment where the dominant place is occupied by humans and their economic activity.

253. Based on the field visits and local understandings a range of fauna are known to be present in the region as shown in the headings below. A number of other more uncommon species could also be present but have not been verified by the project team.

## Mammals

254. There were no large wild mammals typical of the uninhabited regions of Uzbekistan recorded in the Tashkent province. The following species of mammals live in some areas of the Tashkent region:

- i. Wild boar (*Sus scrofa*)
- ii. Muskrat (*Ondatra zibethicus*)
- iii. Golden jackal (*Canis aureus*)
- iv. Corsac fox (*Vulpes corsac*)
- v. Hare (*Lepus tolai*)
- vi. Badger (*Meles meles*)
- vii. Nutria (*Myocastor coypus*)
- viii. Long-eared hedgehog (*Hemiechinus auritus*)
- ix. Bat species; bocharic myotis (*Myotis buharensis*), Botta's serotine (*Eptesicus bota*)

255. Rodent species are often found near the settlements including brown rat (*Rattus norvegicus*) and house mouse (*Mus musculus*). Domesticated animals present include cats, dogs, donkeys, horses, and cattle.

## Birds

256. Throughout the Tashkent region, white stork nests (*Ciconia Ciconia*) are often found on power lines, including white storks feeding near canals and collectors. In addition to white storks, white herons (*Ardea alba*), grey herons (*Ardea cinerea*) and little cormorants (*Microcarbo pygmaeus*) are found, this is due to the presence of a large number of surface water sources. The following bird species are present throughout the Tashkent region, these include:

- i. House sparrow (*Passer domesticus*)
- ii. Indian sparrow (*Passer indicus*)
- iii. Wagtails (*Motacilla*)
- iv. Blue-cheeked bee-eater (*Merops persicus*)
- v. Common myna (*Acridotheres tristis*)
- vi. Laughing dove (*Spilopelia senegalensis*)
- vii. Swifts (*Apodidae*)
- viii. Barn swallow (*Hirundo rustica*)
- ix. Rock dove (*Columba livia*)

257. Less common are:

- i. Garden warbler (*Sylvia borin*)
- ii. Common nightingale (*Luscinia megarhynchos*)
- iii. Eurasian magpie (*Pica pica*)
- iv. Common raven (*Corvus corax*)
- v. Roller (*Coraciidae*)

258. Of the birds of prey, the common kestrel (*Falco tinnunculus*) are also present. Other bird species present in the region include:

- i. Northern lapwing (*Vanellus vanellus*)
- ii. Purple heron (*Ardea purpurea*)
- iii. Small golden eagle (*Aquila chrysaetos*)
- iv. Sparrow hawk (*Accipiter badius*)
- v. Common pheasant (*Phasianus colchicus*)
- vi. Nine species of duck; *Anas platyrhynchos*, *Tadorna ferruginea*, *Tachybaptus ruficollis*, *Podiceps nigricollis*, *Podiceps auratus*, *Podiceps grisegena*, *Podiceps cristatus*, *Mareca strepera*
- vii. Two species of teal; *Marmaronetta angustirostris*, *Anas crecca crecca*
- viii. Little owl (*Athene noctua*)

- 
- ix. Raven (*Corvus corone*)
  - x. Eurasian coot (*Fulica atra*)
  - xi. Three species of doves; *Columba palumbus*, *Columba livia*, *Spilopelia senegalensis*
  - xii. Reed bunting (*Emberiza schoeniclus*)
  - xiii. Quail (*Coturnix coturnix*)
  - xiv. Snowcock (*Pyrrhula pyrrhula*)
  - xv. Two species of geese; *Anser anser*, *Anser indicus*
  - xvi. Two species of cormorants; *Phalacrocorax pygmaeus*, *Phalacrocorax carbo*
  - xvii. Eurasian hoopoe (*Upupa epops*)
  - xviii. Eastern imperial eagle (*Aquila heliaca*)
  - xix. Eurasian skylark (*Alauda arvensis*)
  - xx. Turkestan tit (*Parus bokharensis*)

### Reptiles

259. Reptiles in the Project area are represented by the gray gecko (*Sphaerodactylus cinereus*), living near buildings and in grassy crops. In the vicinity of waterbodies and ravines, common watersnake (*Nerodia sipedon*)

260. Other reptiles present in the region include:

- i. Steppe viper (*Vipera renardi*)
- ii. Four species of lizard; *Trapelus sanguinolentus*, *Phrynocephalus mystaceus*, *Lacerta agilis*,
- iii. *Tenuidactylus fedtschenkoi*
- iv. Central Asian tortoise (*Testudo horsfieldii*)

### Amphibians

261. Amphibians are represented by frogs and toads including the green toad (*Bufo viridis*) and lake frog (*Pelophylax ridibundus*).

### Fish

262. The following species of fish live in the reservoirs of Tashkent region:

- i. Eurasian carp (*Cyprinus carpio*)
- ii. Prussian carp (*Carassius gibelio*)
- iii. Soma (*Glyptosternon reticulatum*)
- iv. Mudfish (*Channa argus*)
- v. Zander (*Sander lucioperca*)
- vi. Barbel (*Barbus barbus*)
- vii. Asp (*Aspius aspius taeniatus*)
- viii. Redeye (*Scardinius erythrophthalmus*)
- ix. Caspian roach (*Rutilus caspicus*)
- x. Grass carp (*Ctenopharyngodon idella*)
- xi. Northern pike (*Esox Lucius*)
- xii. Sabrefish (*Pelecus cultratus*)
- xiii. Common bream (*Abramis brama*)
- xiv. Turkestan barbel (*Barbus conocephalus*)

263. The following fish species are present in the water collector structures:

- i. Common gudgeon (*Gobio gobio*)
  - ii. Amur bitterling (*Rhodeus sericeus*)
  - iii. Char (*Nemacheilus malapterurus*)
  - iv. Common minnow (*Phoxinus phoxinus*)
  - v. Common rudd (*Scardinius erythrophthalmus*)
  - vi. Common carp (*Cyprinus carpio*)
  - vii. Northern snakehead (*Channa argus*)
-

viii. Mosquitofish (*Gambusia affinis*); invasive non-native species**Invertebrates**

264. Among invertebrates, those species that inhabit grassy vegetation were recorded:

- i. Crickets (*Gryllidae* spp., *Acheta domesticus*)
- i. Grasshoppers (*Tettigonia caudata* Charp)

265. Among shrubs the following species were recorded:

- ii. Praying mantis (*Hierodula tenuidentata*)
- iii. Wasps (*Polistinae*, *Vespula germanica*, *Masarinae*, *Vespidae*, *Sphecidae*)
- iv. Bumblebees (*Vespa crabro*, *Vespa orientalis*)

266. Various pests also live in crops of fodder grasses:

- i. Phytonomus leaf elephant (*Curculionidae*)
- ii. Nodule weevils (*Curculionidae*)
- iii. Seed eaters (*Protapion apricans*)
- iv. Aphids (*Aphidoidea*)
- v. Alfalfa and field bugs (*Palomena prasina*, *Pyrrhocoris apterus*)

267. Fruit trees suffer from:

- i. Codling moth (*Cydia pomonella*)
- ii. Aphids (*Aphidoidea*)
- iii. Coccids (*Coccoidea*)
- iv. Mites
- v. Fungal diseases

**C. Critical Heritage and Critical Habitat Assessment Overview**

268. An analysis was conducted in Tashkent Region, which identified several protected areas, such as: the Chatkal Biosphere Reserve, Ugam-Chatkal National Park, Charvak Reservoir & Buffer Zone, Zaamin National Park, and Aksu-Zhabagly Nature Reserve (on the border with Kazakhstan). These protected areas are located approximately 40–50 km away from the sections where the construction of rural roads will take place. Therefore, there are no protected areas within the project area.

**Critical Heritage Assessment and Mitigation Measures**

269. The proposed Tashkent province rural roads Project does not trigger critical habitat for any species or biodiversity features under ADB Requirements. However, internationally endangered species are present and should inform the detailed design of the Project and application of the mitigation hierarchy as appropriate to avoid, minimise, restore, and address any potential significant residual impacts via offsets and additional conservation actions.

- i. Detail Design Stage – Summary (Critical Habitat Considerations)
  - During the detail design stage, the project must identify and map critical habitats for the Egyptian Vulture, Pallas's Fish-Eagle, and Saker Falcon through ecological screening and species-specific habitat assessments;
  - The alignment should avoid key nesting, roosting, and foraging zones, particularly within 2–5 km of sensitive areas;
  - Design modifications—such as raptor-safe powerlines, noise-reducing infrastructure, and landscape buffers—should be integrated where avoidance is not possible;
  - All plans must be reviewed by biodiversity specialists to ensure compliance with ADB's Critical Habitat Policy and national environmental regulations.
- ii. Construction Stage – Summary (Critical Habitat Considerations)

- During construction, works should be carefully scheduled to avoid critical breeding and migration periods, particularly near active nests or roosting sites;
- Construction zones adjacent to sensitive habitats should implement noise control, habitat exclusion zones, and awareness training for personnel;
- Habitat protection measures such as riparian zone fencing, avoidance of tree removal, and supervision by qualified ecologists are essential;
- Adaptive management through continuous wildlife monitoring must be enforced to minimize disturbance and ensure compliance with ADB's biodiversity safeguard requirements.

270. Species which do not trigger critical habitat but should be considered for specific mitigation measures within the Project design include:

- i. Egyptian vulture (*Neophron percnopterus*), EN
- ii. Pallas's fish-eagle (*Haliaeetus leucoryphus*), EN
- iii. Saker falcon (*Falco cherrug*), EN

271. The species listed above are all endangered bird species in global decline and susceptible to the risks associated with habitat disturbance, noise, and vibrations from construction projects. They are known to use habitats similar to those located within the Project Aol, suggesting that the species may be present. Local data to the project area is deficient for these species but the CHA found they could be nearby in significant numbers, although no evidence was available to confirm they would meet or exceed IFC GN6 thresholds.

### **Critical Heritage Assessment and Mitigation Measures**

272. Under ADB's Safeguard Policy Statement (2009), the identified cultural assets in the Tashkent Region—Og'och Sardoba, rural mosques and cemeteries, and archaeological scattered sites—are recognized as Physical Cultural Resources (PCR) with significant historical, spiritual, and engineering value. These sites represent traditional water management systems, sacred community heritage, and potentially undiscovered archaeological remains. As such, they require proactive protection measures including avoidance, buffer zoning, community consultation, and implementation of Chance Find Procedures throughout the project lifecycle.

273. Following action shall be required in phase by phase:

- i. Recommendation during Detail Design Phase are:
  - Og'och Sardoba (Traditional Water Cistern): The alignment design shall avoid direct intrusion into the Sardoba's structural buffer zone (recommended minimum of 50 meters); Visual and physical impact assessments must be conducted, including vibration propagation modeling; Engineering drawings shall clearly demarcate the heritage zone and protective perimeters; Coordination with relevant cultural heritage authorities is required to secure necessary clearances prior to finalizing the alignment;
  - Historical Mosques and Cemeteries in Rural Villages: Community consultations shall be carried out to identify undocumented cultural sites and establish their significance; Alignment adjustments shall be made where necessary to prevent encroachment or adverse visual influence; Traffic calming measures (e.g., speed control, signage) and landscape screening shall be incorporated into the design near culturally sensitive areas; The design package shall include cultural sensitivity mitigation components, including setbacks and visual buffer landscaping;
  - Tashkent Archaeological Scattered Sites: A preliminary archaeological risk screening shall be conducted based on geospatial overlays and field reconnaissance; Areas with high potential for sub-surface artifacts shall be flagged for pre-construction trial trenching or geophysical surveys; The "Chance Find Procedure" shall be formally included in all contractor technical specifications and contract documents; Collaboration with archaeological experts shall be ensured during the planning of high-risk excavation zones.
- ii. Recommendation during Construction Phase are:

- 
- Og'och Sardoba: Vibration monitoring equipment shall be installed within proximity to the heritage structure to ensure threshold compliance; Temporary physical barriers and exclusion zones shall be established to prevent unauthorized access and mechanical interference; All construction personnel shall receive site-specific cultural heritage protection training before mobilization; Any deviation or encroachment into the protective zone shall trigger immediate suspension and reassessment;
  - Historical Mosques and Cemeteries in Rural Villages: Construction activities shall be scheduled to avoid religious observance periods where feasible; Dust suppression and noise control measures shall be implemented in proximity to these sites; Visual shielding (e.g., opaque fencing or green screening) shall be installed where the alignment runs adjacent to religious or funerary structures; Community relations personnel shall maintain open communication channels to address local concerns during construction;
  - Tashkent Archaeological Scattered Sites: In the event of accidental discovery of archaeological materials, all work in the vicinity shall cease immediately in accordance with the "Chance Find Procedure." ; Secure fencing and access control shall be implemented to prevent looting or secondary damage to discovered sites; Discovered artifacts shall be documented and handled under the supervision of qualified cultural heritage professionals; Construction may only resume upon written clearance from the designated authority or supervising archaeologist.

## VII. SOCIO-ECONOMIC CONDITIONS

274. This section of the report discusses the existing social conditions for the Project based on the Social and Economic scoping criteria which has been based on ADB's Rapid Environmental Assessment (REA) Checklist.

### A. AOI

275. For construction and operation phases, 'human / high sensitivity receptors' within 350 m and 2 km of the site/s, respectively, have been identified as the most susceptible to adverse impacts as a direct result of the Project.

The Aol represents the locations where people are directly exposed and affected by the Project.

### B. Baseline

276. The process for developing the baseline for the social and economic impacts has involved the following phases:

- i. Data collection (commencing at the reconnaissance visit and scoping stage;
- ii. Baseline data collection;
- iii. Spatial data mapping; and
- iv. Consultation

### C. Tashkent Region Overview

277. Tashkent region was formed on February 16, 1963. The administrative center is the city of Nuravshan. Tashkent region is divided into 15 administrative districts. The region includes 16 cities and 18 urban settlements.



Figure 60. Administrative map of Tashkent province

278. The main socio-economic indicators of Tashkent region are provided in Figure 61.



Figure 61. Socio-economic indicators of Tashkent region

279. The main sectors of agriculture are cotton growing, grain growing, meat and dairy farming, melon-growing, and sericulture. The main industries are electric power, light and food industry, flour and cereal processing.

#### D. Population

280. Uzbekistan is one of the most populous countries in Central Asia. As of 1 January 2025, the population of the Republic of Uzbekistan was estimated at approximately 37.5 million, showing a steady annual growth trend. The gender distribution remains balanced, with 50.2% male and 49.8% female. The country continues to experience high population growth, characterized by a predominantly young population with an estimated 30~37% of the population under the age of 19, and only 4~5% aged 65 and older. Over the past decade, Uzbekistan has maintained a relatively stable fertility rate, averaging above 2 children per woman, and reaching 3.5 in 2023, 3.35 in 2024, before declining to 2.27 in 2025. This demographic profile highlights Uzbekistan’s youthful and growing population, which has significant implications for the planning of education, healthcare, employment, and infrastructure services.

281. The number of permanent populations of Tashkent province on January 1, 2024 amounts at 3,051,800 people.

282. 7.8% of the total population falls on pensioners (most of them are women – 53.7%). About 10% of total population in project communities is registered in local governmental bodies as vulnerable people. Out of them, 3.2% are single mothers / fathers; 45.7% receiving children benefits. 2.5% are low-income families. Number of persons with disabilities amounts at 11.4% of total population.

283. The main activity of the population: agriculture (including seasonal works), animal husbandry, small business. The female half of the population is mainly involved in the childcare and household chores.

**Table 26. Employment**

Status of employment	% of population
Number of employees in enterprises and organizations	28,0%
Number of people engaged in business / entrepreneurs	10,4%
Number of people engaged in household chores	4,9%
Number of people engaged in national handicrafts	4,2%
Number of traders	45,3%
Number of people engaged in livestock, poultry and beekeeping	45,5%
Number of people engaged in seasonal work	8,0%
Long term employees in foreign countries	11,2%
Number of people engaged in childcare	3,5%
Number of students	0,7%
Number of working pensioners	6,9%
Number of unemployed	31,3%
TOTAL	100%

Source: Agency of Statistics under the President of the RUz

284. According to the data sheets, drinking water supply in communities is not constant (satisfactory). 100% of HHs is consumers of gas supply, including liquefied gas. Power supply is provided, but not regularly.

### **E. Healthcare and Education**

285. In the past 30 years, Uzbekistan has implemented healthcare reforms in rural areas. Some improvements include increasing sanitation levels in hospitals and healthcare availability, allowing for all patients to get better care. Overall, the under-5 mortality rate has decreased by 50%, and healthcare access and quality (HAQ) grew from 50.3 to 62.9 from 1990 to now. Despite the complex situation with providing of high-quality medical services, the country has relatively high life expectancy 75.1 years including 77.4 years for women and 72.8 years for men.

### **F. Sanitation**

286. Uzbekistan's water supply and sanitation infrastructure were designed and constructed during the Soviet Period and significantly deteriorated.

### **G. Ethnic Composition and Languages**

287. Uzbekistan's population profile is characteristic with high ethnic and cultural diversity. The main ethnic group is Uzbeks (79.2%), however there are over 130 of various ethnic groups in the country. The main ethnic minorities are Russian (4.1%), Kazakhs (3.8%), and Karakalpaks (2.2%).

288. By law, Uzbek is Uzbekistan's exclusive nation-wide state language. Government policy requires the use of Uzbek in all dealings with officials, in street signage, and in business and education.

289. Russian is still spoken widely and enjoys ambiguous legal status as the language of inter-ethnic communication. In the autonomous Karakalpakstan region, Karakalpak is a state language alongside Uzbek. Within the project area, the main language is Uzbek, however part of population of Boysun District speaks Tajik as a mother language.

290. Islam is by far the dominant religion in Uzbekistan, as Muslims constitute 90% of the population while 5% of the population follow Russian Orthodox Christianity, and 5% of the population follow other religions. 54% of Muslims are non-denominational Muslims, 18% are Sunnis and 1% are Shias.

## H. Land Use, Sources of Income

291. As the road involves rehabilitation mostly of an existent road alignment, the Project impact on the land acquisition is not required. The land acquisition and resettlement will not be required under the project.

292. In all centers of population, a variety of businesses have been established along the roadside ranging from temporary sales points for fruit and vegetables through open-air restaurants and shacks selling vehicle lubricants to more “permanent” bakeries, shops and restaurants, general stores, petrol stations, vehicle repair yards and construction materials yards.

293. The household is generally headed by the male, who makes the major decisions concerning its economic undertakings. The household size ranges from 2–8 members. Family members often include the household head and his wife, grown up children with/without their husband/wife, and their grandchildren. The household head’s age ranges from 38–72 years. The highest educational attainment of the household head is usually secondary level but occasionally one has a university degree. Migration of family members seems to be high as a number of adult male members of households in the village usually find work outside, normally in Tashkent, but are not reported as having migrated.

294. The average size of land owned by the household ranges from about a hectare to almost 2 hectares, depending on the village and the region where the household lives. Some households have no land allocated to them. Land is cultivated to grain, cotton or other horticultural, or used as a grazing area for livestock such as cattle or sheep. Some land allocated to households is not used due to any one or a combination of the following factors: (i) distance from the house; (ii) lack of money for inputs, such as tools, seeds and fertilizer, or transport of workers/produce to/from the field. Alternatively, it may be hired out to others.

295. Basic social infrastructure is generally available within the village or a nearby urban centre. Schools and polyclinics are located within walking distance. Most roads to or within villages are unpaved or in such a poor state of repair that they are effectively unpaved. Such roads are a source of dust nuisance for villagers in the dry summer months. During the wetter autumn, winter and spring months they are a source mud and related inconvenience (difficult to drive or walk over, mud carried into houses on people’s shoes). Public transport system is only available in major roads and railway networks: people use them for special needs (e.g. hospital visits) or occasions (e.g. visiting relatives, weddings) for going to major urban centers or Tashkent.

## I. Stakeholder Engagement

296. One of the main goals of the IEE is to facilitate the participation of all stakeholders and local communities at all stages of the project cycle: from the pre-construction phase and construction activities to its operation.

297. Public Consultations were held on April 2025 in Tashkent province. Prior to the public consultations, several meetings were conducted with internal and external stakeholders, such as representatives of the Ministry of Ecology, Environmental Protection and Climate Change, district hokimiyats, mahallas and farmers.

298. The main objectives of the public consultations were the following:

- i. to disseminate information to the people about the project regarding its activities and scope of work;
- ii. to seek local peoples' views on minimizing probable adverse impacts on the environment and on livelihoods;
- iii. to make people aware of the process of the GRM;
- iv. to assess the local people's willingness to get involved with the project, and enumerate the measures to be taken during the implementation of the project; and
- v. to make people aware of the relevant policy principles of national laws and ADB’s Safeguard Policy Statement (2009) related to environment protection.

299. The main issues raised during the meetings with public are presented in Table 27 below.

**Table 27. Questions and Answers Raised During the Public Consultation**

<b>Issues Raised</b>	<b>Response</b>
<b>10V065 (4K768) “Oqqo’rg’on sh. - Mamut q. - Oqqo’rg’on q.” avtomobil yo’lining 11-26 km</b>	
Will there be an expansion of the road during the reconstruction of the road?	The width of the road will remain the same according to the project.
Why is this road being reconstructed? Wouldn't it have been better to improve Mahali's internal roads?	This road is the main one connecting the inner roads of the mahalla, and this is why this roadway was chosen..
Can you solve the water problems?	Unfortunately, we cannot solve these problems, the local khokimiyat is dealing with these issues.
<b>10V068 “b” (4K771 6) “D024 avtomobil yo’lidan shahobcha – Hosildorlik q. (53 km.dan)” avtomobil yo’lining 0-7 km</b>	
Why is the road surface cement concrete and not asphalt?	According to the research results, cement concrete coating is more environmentally friendly, durable and durable. .
Will pedestrian crossings and sidewalks be taken into account, which will provide crossings to the public?	Additional elements will be announced after the final road design. The PIU staff informed that this issue is being discussed with the local road administration.
<b>10V085 (4K781) “D020 avtomobil yo’li (88km.dan) - Jumabozor q. - Qushchi q.” avtomobil yo’lining 0-5 km</b>	
Will trees, shrubs, and other plantings along the roads be removed?	Due to the lack of road expansion, the flora will not be affected.
Where does the road reconstruction start and end?	The beginning of the selected road section starts from the main road and passes through populated areas.
When will the renovation work begin?	Work on the reconstruction of the road will begin after collecting all necessary documentation and permits during 2025.
<b>10V087(4K783) “D020 avtomobil yo’li (95km.dan) – Qo’rg’on q.” avtomobil yo’lining 2-7 km</b>	
Can you solve the issue of lighting this road?	Additional elements will be announced after the final road design. The PIU staff informed that this issue is being discussed with the local road administration.
Will you be repairing internal access roads during road reconstruction?	No, the project provides for the reconstruction of this road only.
Can we help the builders to complete the work quickly?	When carrying out construction work, it is forbidden for outsiders to walk on the site. In this regard, the builders do not need public assistance.
How will we drive and walk during construction work?	Detours, detours, and crossings will be arranged by contractors during construction work.
<b>10V091 (4H731) “D020 avtomobil yo’li (91km.dan) - Jumabozor q. - Xamza q. - O’rtabo’z q.” avtomobil yo’lining 0-6 km</b>	
Who is financing the reconstruction of this road?	The loan financing is provided by the ADB.
Is it possible to install sidewalks and lighting?	After the final design of the road, additional elements will be known.
Will trees, shrubs, and other plantings along the roads be removed?	Due to the lack of road expansion, the flora will not be affected.

<b>10V060 "a" (4K742a) "Do'stobod sh. - Gul q. - Qo'rg'oncha q." avtomobil yo'lidan shahobcha - Kushek qishlog'iga (4km.dan)" avtomobil yo'lining 0-6 km</b>	
Why is this road being reconstructed? Wouldn't it have been better to improve Mahali's internal roads?	This is the main road connecting the inner roads of the mahalla, and this is why this highway was chosen.
Will you be repairing internal access roads during road reconstruction?	No, the project provides for the reconstruction of this road only.
We would like to thank you for your work. We are glad that our road will be modern.	Thank you for understanding and supporting this project.
Will you be repairing internal access roads during road reconstruction?	Thank you for understanding and supporting this project. No, the project provides for the reconstruction of this road only.
<b>10V130 "d" (4H715 r) "D022 avtomobil yo'lidan shahobcha - G'allabotir qishlog'iga (31 km.dan)" avtomobil yo'lining 0-4 km</b>	
How will we drive and walk during construction work?	Detours, detours, and crossings will be arranged by contractors during construction work.
Will the roads be built in accordance with the correct norms and standards?	These roads will be reconstructed according to the International Standard and the ADB will conduct regular monitoring.
Can sidewalks, lighting and pedestrian crossings be installed as part of this project?	After the final design from the road, additional elements from the Road will be known. The PIU staff replied that they would talk to the local traffic police about the issue.
<b>10V061(4H716) "Gul q.-Sattarobod q." avtomobil yo'lining 0-7 km</b>	
Will you be repairing internal access roads during road reconstruction?	No, the project provides for the reconstruction of this road only.
Can you solve the problems with gas and water?	Unfortunately, we cannot solve these problems, the local government is dealing with these issues.
How will we drive and walk during construction work?	Detours, detours, and crossings will be arranged by contractors during construction work.
<b>10V138 (4K721) "Kangli q.-Qursoy q." avtomobil yo'lining 0-6 km</b>	
Will there be an expansion of the road during the reconstruction of the road?	The width of the road according to the project will remain the same.
Will trees, shrubs, and other plantings along the roads be removed?	Due to the lack of road expansion, the flora will not be affected.
Why is this road being reconstructed? Wouldn't it have been better to improve Mahali's internal roads?	This road is the main one connecting the inner roads of the mahalla, and this is why this highway was chosen.

## VIII. POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

### A. Traffic and Transport Introduction

300. The proposed Project involves the rehabilitation and upgrading of rural road sections located in Tashkent region, aimed at improving climate resilience, safety, and connectivity in rural areas. This section provides an overview of the current condition and anticipated future development of the transport infrastructure in the project area, with a specific focus on the rural road network. It identifies and evaluates potential environmental and socio-economic impacts—both beneficial and adverse—arising from the proposed road interventions. Where adverse residual effects are anticipated, appropriate mitigation measures have been proposed to minimize such impacts to the extent that is technically and economically feasible

#### Approach and Methodology

301. The evaluation of impact magnitude has been conducted for both beneficial and adverse effects associated with the Project. In parallel, the significance of each identified impact has been assessed as a function of two interrelated parameters: (i) the sensitivity or value of the environmental or social receptor, and (ii) the magnitude of the predicted impact. This assessment follows the impact significance matrix methodology detailed in Section V of this report, ensuring a structured and transparent approach to determining the relative importance of each environmental effect

#### Construction Phase Impacts

302. The construction phase of the Project is anticipated to generate a range of temporary environmental and social impacts resulting from specific project activities. The primary sources of potential impact during construction works are identified as follows:

- i. The movement of construction vehicles and heavy machinery to and from the designated work sites, which may lead to increased dust, noise, vibration, and traffic congestion;
- ii. The transport of construction materials, equipment, and personnel, which may contribute to localized air and noise emissions, as well as road safety concerns along the haul routes; and
- iii. The implementation of partial or temporary road closures to facilitate construction activities, potentially resulting in traffic disruption, access limitations, and short-term inconvenience for local communities and road users.

303. Construction-phase activities are expected to alter existing traffic patterns and place additional strain on known congestion points, thereby elevating the risk of traffic-related incidents. These disruptions are likely to affect both general road users and the local population residing along the proposed road alignment and designated haul routes. The significance of these impacts is influenced by several interrelated factors, including the current road classification and design capacity, pavement condition, existing traffic volumes, frequency and duration of road user delays, known bottlenecks, and identified traffic safety hotspots. Furthermore, the presence of vulnerable road users—such as pedestrians, cyclists, and schoolchildren—and the adequacy of current public transportation services represent critical considerations in assessing overall impact severity.

304. The additional vehicle movements generated as a result of construction activities are anticipated to be relatively minor in comparison to the existing traffic volumes and the carrying capacity of the current road network. The following factors contribute to this assessment:

- i. Road construction projects typically involve the deployment of substantial heavy machinery, which in turn reduces the requirement for manual labor. Consequently, the daily number of worker commutes to and from the construction site is expected to remain low;
- ii. Once mobilized to a particular construction segment (or "spread"), heavy equipment is generally retained on-site until the completion of works in that section. Therefore, the movement of large construction plant is expected to generate only short-term and infrequent traffic impacts;
- iii. A centralized project site office is expected to be maintained throughout the construction

phase, housing key engineering and support personnel. The resultant increase in light vehicle movements will be minimal and likely distributed across the working day, thereby minimizing any peak-hour traffic pressure.

### Impacts of Construction Traffic

305. The impacts resulting from construction-related traffic and associated activities are multifaceted and may contribute to temporary but notable disturbances along the affected corridors. Key anticipated impacts include:

- i. Traffic delays for road users, particularly in the event of simultaneous construction at multiple segments, which may result in cumulative congestion and reduced travel efficiency;
- ii. Road safety risks, as the presence of slow-moving construction vehicles may increase driver impatience, thereby elevating the likelihood of unsafe overtaking maneuvers and traffic conflicts; and
- iii. Increased exposure of vulnerable road users, including pedestrians, cyclists, and schoolchildren, to traffic hazards. These groups may face heightened accident risks in areas lacking adequate temporary traffic management or pedestrian safety measures

306. The impacts associated with construction traffic and related activities are generally assessed to range in magnitude from minor to major, depending on location-specific conditions and receptor sensitivity. A detailed characterization of these impacts is provided in subsequent sections of this report. Notably, impacts related to air quality degradation, pollutant emissions, and noise and vibration are addressed comprehensively in Section VIII.

307. Additional impacts may arise from the physical deterioration of existing roadway infrastructure, including surface wear, kerb damage, and pavement degradation caused by the repeated movement of heavy vehicles. However, such impacts are not considered to be significant or residual in nature, as the entire road corridor is planned for full re-pavement as part of the Project scope, thereby mitigating any long-term infrastructure damage.

**Table 28. Road user delays and impact**

Aspect	Road user delays				
	Impact nature	Negative		Positive	
Impact type	Direct		Indirect		Induced
Impact duration	Temporary	Short-term	Long-term		Permanent
Impact extent	Local		Regional		International
Impact scale	Small		Medium		Large
Impact frequency	Infrequent		Frequent		Continuous
Impact Magnitude	Positive	Negligible	Small	Medium	Large
Receptor sensitivity	Low		Medium		High
Impact significance	Positive	Negligible	Minor	Moderate	Major

**Table 29. Road safety issues**

Aspect	Road safety issues / increased risk of collisions and accidents				
	Impact nature	Negative		Positive	
Impact type	Direct		Indirect		Induced
Impact duration	Temporary	Short-term	Long-term		Permanent
Impact extent	Local		Regional		International
Impact scale	Small		Medium		Large
Impact frequency	Infrequent		Frequent		Continuous
Impact Magnitude	Positive	Negligible	Small	Medium	Large
Receptor sensitivity	Low		Medium		High
Impact significance	Positive	Negligible	Minor	Moderate	Major

### Operational Phase Impacts Road users

308. Although projected increases in traffic volumes may gradually diminish the long-term operational benefits of the Project, a number of short-term positive impacts are anticipated during the initial post-construction period. These are outlined as follows:

- i. **Reduced Travel Time:** Most road users are expected to experience shorter journey durations as a result of decreased traffic congestion and improved road surface conditions. This is assessed as a significant beneficial impact, contributing to improved transport efficiency and user satisfaction.
- ii. **Enhanced Traffic Flow Efficiency:** Upgrades to the carriageway surface are expected to reduce the frequency of braking, acceleration, and erratic driving behavior, thereby contributing to smoother traffic operations. In locations where road deterioration previously led to informal diversions or off-pavement driving, such behavior is expected to decline substantially.
- iii. **Improved Road Safety Conditions:** The rehabilitated road surface may lead to increased vehicular speeds, which could pose heightened risks to vulnerable users—particularly within settlement zones. However, the substantial safety risks previously associated with poor pavement conditions, such as potholes and surface instability, will be significantly reduced, resulting in an overall enhancement of road safety for both motorists and non-motorized users.

**Table 30. Reduced journey times / Improved road safety**

Aspect	Reduced journey times / Improved road safety				
Impact nature	Negative		Positive		Neutral
Impact type	Direct		Indirect		Induced
Impact duration	Temporary	Short-term	Long-term x		Permanent
Impact extent	Local		Regional		International
Impact scale	Small		Medium		Large
Impact frequency	Infrequent		Frequent		Continuous
Impact Magnitude	Positive	Negligible	Small	Medium	Large
Receptor sensitivity	Low		Medium		High
Impact significance	Positive	Negligible	Minor	Moderate	Major

**Table 31. Traffic estimates and projections for the Tashkent Region**

Period	2025~2030	2031~2041	After 2041
Traffic Growth Rate(%)			
Car	+10%	+12%	+1.0%
Bus	+8.5%	+10%	+0.8%
Goods Vehicles	+6.5%	+8%	+0.6%

Source: Report of transport and climate profile in Uzbekistan developed by Asian Transport Outlook/asiatransportobservatory.org

### Proposed Mitigation Measures Construction

309. Throughout the duration of construction activities, a comprehensive and site-specific Construction Traffic Management Plan (CTMP) shall be developed and implemented to minimize potential adverse impacts on road users and surrounding communities. The CTMP will address key concerns related to traffic delays, connectivity disruptions, and road safety risks. The CTMP will be designed to ensure the continuous and safe access for both vehicular and pedestrian traffic through active work zones. It will also support the establishment of a secure working environment for roadside personnel. Specific provisions will be made to maintain access to adjacent residences, commercial establishments, and public services, while the movement of vehicles to and from site offices and construction compounds (precise locations to be confirmed) will be regulated. Measures will also be included to prevent the deposition of debris, soil, or construction-related material onto public roadways, thereby preserving the operational integrity of the existing road network.

310. The Construction Traffic Management Plan (CTMP) shall be prepared in close coordination with relevant national and local government authorities and regulatory agencies, including the traffic police, road authorities, and other institutional stakeholders. Additionally, meaningful consultation shall be undertaken with local communities and affected stakeholders to ensure the plan is responsive to site-specific concerns and conditions. The CTMP will serve as a dynamic, living document, subject to regular review and updates by the Contractor as construction methodologies evolve and detailed vehicle movement schedules are finalized. As part of this process, the Contractor shall engage with the appropriate governmental bodies to ensure alignment between project-related traffic operations and existing road development strategies at the district and provincial levels. Furthermore, the Contractor shall initiate targeted consultation with representatives of communities expected to experience significant increases in traffic volume, with the aim of raising awareness regarding the CTMP's mitigation measures and securing community cooperation during the construction phase.

311. The Construction Traffic Management Plan (CTMP) shall be developed in close coordination with relevant national and local government authorities, including the traffic police, road administration agencies, and other institutional stakeholders. In parallel, the Contractor shall undertake meaningful consultations with affected local communities and stakeholders to ensure that the CTMP reflects site-specific concerns and accommodates local conditions. The CTMP shall be treated as a dynamic and adaptive document, subject to regular review and iterative updates by the Contractor as construction methodologies evolve and detailed vehicle routing and scheduling requirements are finalized. The Contractor shall engage with the appropriate government agencies to ensure that all proposed traffic management measures are consistent with district and provincial-level road development strategies and do not conflict with ongoing or planned infrastructure initiatives. In addition, the Contractor shall conduct targeted stakeholder engagement with representatives of communities likely to be affected by increased traffic volumes. These consultations aim to raise public awareness of the CTMP's mitigation measures and facilitate community cooperation throughout the construction period.

**Table 32. Mitigation measures for traffic impacts**

<b>Issue</b>	<b>Mitigation</b>	<b>Responsibility</b>
Design and Road Safety	Design standards will apply GIP where it can be incorporated in existing road design legislation.	Executing Agency
Further Public Consultation	Regular public consultation will be held with the local community and road users throughout the project cycle. These will report the results of additional studies as they are completed. A website/freephone telephone number will be provided so interested parties can access up to date information on the project and raise any concerns. During the construction phase local residents will be provided with details and timings of traffic management plans.	Executing Agency
Timing of works and Journey times	Timings for diversions, closures, and other measures which may have a detrimental impact on traffic flows will be programmed to occur where the least impact on traffic will occur. This may necessitate completing some works overnight, or during weekends.	Executing Agency
Traffic Speeds	Effective speed management will be implemented throughout the project with clearly posted speed limits to be adhered to during works. Signs will be clearly marked and visible to road users and speeds will be appropriate for the conditions. Old, unneeded signs will be covered or removed. Upon completion of works clear and concise signage will be put in place to ensure road users are aware of the applicable speed limit and where changes in the posted speed occur.	Executing Agency
Access to site compound	The Contractor will be required to carefully plan site access and put in place relevant H&S warning signage and provisions to minimize any risks to workers, local communities, users of the route/areas etc. The proposed location of the site should be selected on the basis that turning movements to and from the site can be conducted safely and without creating disadvantages to other roads users and local communities. Access to the site should be paved and wheel cleaning facilities installed so that debris is not taken from site vehicles onto the public roads.	Contractor

## **Operation**

312. The impacts associated with the operational phase of the road are intrinsically linked to the safety features integrated into the final engineering design. These may include geometric design standards, signage, lane markings, lighting, pedestrian infrastructure, and traffic-calming measures. The effectiveness of these elements will directly influence the long-term safety performance of the rehabilitated road corridor. The ultimate responsibility for ensuring road safety during operation shall rest with the Executing Agency (EA). The EA will be accountable for overseeing the enforcement of design compliance, coordinating with relevant traffic management authorities, and implementing periodic safety audits to ensure that the road operates in accordance with national safety standards and ADB safeguard principles.

### **Residual Impacts Construction**

313. The development and strict implementation of a comprehensive Construction Traffic Management Plan (CTMP) will serve to minimize, to the extent practicable, the adverse impacts of construction activities on the existing road network and surrounding environment. Notwithstanding these measures, it is recognized that some residual impacts are likely to persist throughout the construction phase.

314. To ensure that such residual effects remain within acceptable thresholds, continued stakeholder engagement—particularly with local communities—and effective change management protocols will be essential. Through proactive communication, adaptive mitigation, and responsive planning, it is anticipated that the significance of any remaining impacts can be maintained at a Minor to Negligible level.

## **Operation**

315. The project roads are subject to forecasted traffic growth, reflecting regional development trends and increasing vehicular demand. The implementation of an upgraded road design, incorporating improved geometric alignment, surface quality, and safety features, is expected to significantly reduce accident risk and decrease travel times by addressing current infrastructure deficiencies.

316. These enhancements are anticipated to yield substantial positive outcomes in terms of road safety performance and overall user experience. Accordingly, the residual impacts during the operational phase are assessed to be beneficial in nature, contributing to the long-term functionality, safety, and efficiency of the rural transport network

## **B. Air Quality Introduction**

317. This section evaluates the potentially significant impacts on ambient air quality associated with both the construction and operational phases of the Project. During the construction phase, activities such as excavation, material handling, earthworks, and vehicle movement are expected to generate fugitive dust emissions, which may result in localized, short-term deterioration of air quality, particularly in areas adjacent to the alignment and construction zones.

318. In the operational phase, vehicular emissions from traffic using the upgraded road may contribute to incremental changes in air quality, particularly in proximity to residential dwellings and other sensitive receptors located within the Area of Influence (Aol). These impacts will be further assessed to determine their significance and to recommend appropriate mitigation measures where necessary.

## **Approach and Methodology**

### **Construction Methodology**

319. The principal air quality impacts anticipated during the construction phase relate to the generation and dispersion of particulate matter, most notably dust deposition and the resulting

elevation of PM<sub>10</sub> concentrations in the ambient environment. These impacts are primarily associated with dust-emitting construction activities, including earthworks, material transport, stockpiling, and vehicle movement within and around the site. Dust deposition may result in the soiling of surfaces, including buildings, vegetation, and vehicles.

320. Dust emissions will consist of a range of particle sizes. Of these, PM<sub>10</sub> (particulate matter  $\leq$  10 microns in diameter) is of particular concern due to its implications for human health. Although PM<sub>2.5</sub> ( $\leq$ 2.5 microns) is the fraction most strongly associated with cardiopulmonary health effects, it typically constitutes only 10–15% by mass of the total particulate emissions generated from construction activities. The majority of airborne dust will fall within the PM<sub>2.5</sub>–PM<sub>10</sub> range, which is still relevant for regulatory compliance and health risk assessments.

321. The assessment framework developed by the Institute of Air Quality Management (IAQM) has been adopted to evaluate the potential impacts of dust and particulate matter on both human and ecological receptors, defined as follows:

- i. Human Receptor: Any location where individuals or properties may be exposed to adverse effects from dust deposition, dust soiling, or elevated PM<sub>10</sub> concentrations, over a duration relevant to recognized air quality standards or public health objectives.
- ii. Ecological Receptor: Any sensitive habitat potentially affected by dust, either through direct deposition on vegetation or aquatic systems, or indirect impacts on dependent fauna as a result of altered ecological conditions

322. Assessment is normally required where there is:

- i. A human receptor within 350 m of the boundary of the site or 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s); and
- ii. An ecological receptor within 50 m of the boundary of the site or 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s).

323. For the purpose of impact assessment, construction-phase activities are classified into four principal categories—demolition, earthworks, construction, and track out—to reflect the distinct nature and magnitude of dust generation associated with each activity. The potential for fugitive dust emissions is systematically evaluated for each category, based on the anticipated scope, scale, and duration of works.

- i. The assessment considers three key types of dust-related impacts, as defined by the Institute of Air Quality Management (IAQM<sup>6</sup>) methodology:
- ii. Annoyance from dust soiling, which may affect the cleanliness of buildings, vehicles, and outdoor surfaces, resulting in nuisance to local residents and businesses;
- iii. Health risks associated with exposure to PM<sub>10</sub>, particularly among sensitive population groups such as children, the elderly, and individuals with pre-existing respiratory conditions; and
- iv. Ecological harm, including the potential for dust deposition to negatively impact sensitive habitats, disrupt plant physiology, or affect aquatic and terrestrial ecosystems

324. The sensitivity of the surrounding area to dust-related impacts is determined through a combination of factors, including the number and type of receptors, their relative sensitivity to dust exposure, and their proximity to the emission source. For example, in the assessment of dust soiling impacts, an area containing more than 100 high-sensitivity receptors (e.g., residential dwellings, schools, healthcare facilities) located within 50 meters of the construction boundary would be classified as having high sensitivity. Conversely, the same number of receptors located beyond 100 meters from the source would warrant a classification of low sensitivity. The detailed criteria and thresholds used to determine receptor sensitivity levels are outlined in Appendix 6: Air Quality Methodology of this report, consistent with the guidance provided by the Institute of Air Quality

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<sup>6</sup> IAQM - Guidance on the assessment of dust from demolition and construction (2014)  
<https://iaqm.co.uk/text/guidance/construction-dust-2014.pdf>

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Management (IAQM) and aligned with internationally accepted best practice

325. The magnitude of dust emissions is determined based on the scale, nature, and intensity of the proposed construction activities and is categorized as Small, Medium, or Large. Representative examples of emission magnitudes associated with each construction activity type—such as demolition, earthworks, construction, and track out—are provided in Appendix 6. This emission magnitude classification is then integrated with the sensitivity of the surrounding area, as determined through receptor type, number, and proximity, to establish the overall risk level of dust-related impacts in the absence of mitigation. Based on the outcome of this risk assessment, appropriate mitigation measures can be identified and tailored to ensure proportional response to the level of risk, thereby minimizing potential adverse effects on human health, amenity, and ecological resources

### **Operational Methodology**

326. The assessment of air quality impacts during the operational phase of the Project has been conducted in accordance with the methodology outlined in the UK Design Manual for Roads and Bridges (DMRB), specifically the guidance on air quality issued by Highways England (HE Guidance<sup>7</sup>). This internationally recognized framework provides a robust and standardized approach for evaluating pollutant concentrations and assessing compliance with applicable air quality objectives. In addition, the impact descriptors used to characterize the significance of operational air quality effects have been adopted from the Institute of Air Quality Management (IAQM<sup>8</sup>) guidance. This ensures that the assessment is aligned with current best practice for evaluating effects on both human health and ecological receptors

327. The baseline traffic volumes and associated assumptions regarding future traffic growth, vehicle composition, and average speeds used in the operational phase air quality assessment are detailed in Section 7.1.6 of this report. These parameters form the foundation for evaluating pollutant dispersion and assessing potential changes in ambient air quality. As outlined in Section X, the implementation of the Project is expected to result in enhanced traffic flow efficiency, reduced travel times, and improved road safety conditions, all of which are anticipated to contribute positively to long-term air quality outcomes within the Project's Area of Influence (AoI)

328. The Highways England (HE) Guidance provides specific scoping criteria to determine whether the air quality impacts of a proposed road scheme can be excluded from detailed assessment. These criteria are applied by comparing the projected conditions under the 'Do Something' scenario (with project implementation) and the 'Do Nothing' scenario (without project) for the opening year of operation. According to the HE Guidance, a detailed air quality assessment is required if any of the following thresholds are exceeded:

- i. The Annual Average Daily Traffic (AADT) increases by more than 1,000 vehicles;
- ii. The AADT for Heavy Duty Vehicles (HDVs) increases by more than 200 vehicles;
- iii. The speed band of the affected road segment changes (e.g., from low-speed urban to high-speed rural classification); or
- iv. The carriageway alignment is altered by more than 5 meters from its existing configuration.

329. These thresholds serve as a conservative screening mechanism to ensure that any potential air quality impacts resulting from changes in traffic volume, composition, or roadway geometry are appropriately evaluated.

### **Construction Phase Impacts Identification of sensitive receptors (screening)**

330. Within certain segments of the proposed road reconstruction alignment, there are multiple instances where clusters of sensitive receptors—including residential dwellings, educational

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<sup>7</sup> Highways England (2019). Design Manual for Roads and Bridges- Sustainability & Environment Appraisal LA105 Air quality

<sup>8</sup> Environmental Protection UK/IAQM (January 2017) Land-Use Planning & Development Control: Planning for Air Quality

institutions, and community facilities—are located within 20 meters of the carriageway. The proximity and concentration of these receptors elevate their vulnerability to dust emissions and air quality degradation during the construction phase. These locations have been identified as priority zones for enhanced mitigation and monitoring measures as part of the overall Construction Environmental Management Plan (CEMP).

331. In accordance with the methodology outlined by the Institute of Air Quality Management (IAQM), additional contextual factors have been incorporated into the assessment of receptor sensitivity beyond proximity and receptor type. These include:

- i. The likelihood of concurrent dust-generating activities occurring at nearby construction sites, which may result in cumulative impacts on air quality at shared receptors; and
- ii. The anticipated duration of exposure, as receptors exposed to elevated dust levels over extended periods are considered to exhibit increased vulnerability due to prolonged environmental stress.

These considerations are integrated into the overall sensitivity classification to ensure a comprehensive and precautionary approach to dust impact assessment and mitigation planning.

332. Based on the short-term and localized nature of construction activities at any given segment of the Project alignment, and in the absence of any present or reasonably foreseeable concurrent developments in the surrounding area that may result in cumulative air quality impacts (as confirmed in Appendix 6), the overall sensitivity classification for human health receptors has been determined to be Medium. This classification reflects a balanced consideration of proximity, duration of exposure, and the absence of overlapping construction-related emissions sources.

333. No designated sensitive ecological receptors—such as protected habitats, conservation areas, or ecologically significant vegetation—have been identified within 50 meters of any construction activity zones. As such, ecological receptors have been scoped out of further assessment for construction-phase air quality impacts.

#### **Identification of potential magnitude of dust emissions**

334. The magnitude of dust emissions during the construction phase has been assessed in accordance with standard guidance and is determined based on the scale, intensity, and duration of the proposed construction activities. Emission magnitudes are categorized as Small, Medium, or Large, with illustrative examples provided in Appendix 10.

335. For this Project, considering the use of concrete and other dust-generating construction materials, the overall dust emission magnitude has been classified as Medium. This assessment is based on the assumption that no on-site concrete batching will be undertaken and that construction activities will be temporary and sequential in nature, minimizing long-term dust generation at any single location

#### **Summary of dust risks**

336. By combining the sensitivity classification of the surrounding area with the assessed magnitude of dust emissions from construction activities, a pre-mitigation risk level has been determined in accordance with established IAQM methodology. The resulting qualitative risk classification—prior to the application of mitigation measures—is summarized in Table 33 below.

337. The construction phase poses potential environmental and health risks, with the following estimated impact levels:

- i. Dust Soiling: Medium Risk – due to construction vehicle movement, excavation, and material handling, which may result in nuisance dust deposition on nearby properties and vegetation.
- ii. Human Health (Airborne Dust Exposure): Medium Risk – related to inhalation of particulate matter (PM10/PM2.5) by workers and nearby residents, particularly in areas with high dust generation and inadequate mitigation.

338. Appropriate dust suppression and monitoring measures must be implemented as outlined in the Air Quality Management Plan to ensure risks are controlled to acceptable levels

**Table 33. Risk assessment of dust impacts**

Aspect	Air quality impacts from construction dust					
	Impact nature	Negative		Positive		Neutral
Impact type	Direct		Indirect		Induced	
Impact duration	Temporary	Short-term		Long-term		Permanent
Impact extent	Local		Regional		International	
Impact scale	Small		Medium		Large	
Impact frequency	Infrequent		Frequent		Continuous	
Impact Magnitude	Positive	Negligible	Small	Medium	Large	
Receptor sensitivity	Low		Medium		High	
Impact significance	Positive	Negligible	Minor	Moderate	Major	

### Operational Phase Impacts

**Table 34. Assessment of the Project against the HE Criteria**

Criteria	Assessment of project against the criterion
Annual average daily traffic (AADT) increases by more than 1,000	As outlined in Section 0, the project does not cause a change in AADT of more than 1,000. Although flows increase as shown in Appendix 5, this is a direct result of the growth assumption used in the modelling based on GDP growth and not because of the Project itself.
Heavy duty vehicles (AADT) increase by more than 200	There is no change in the AADT of heavy-duty vehicles as a result of the project. Again, whilst numbers of HDVs increase, this is a result of the growth assumptions used in the modelling based on GDP growth and not as a result of the Project itself.
Speed band of the road changes	Speed bands of the road enable consideration of factors such as heavy congestion and its impact on emissions to be considered. However, it is currently understood at the time of writing that the current speed limit for the road (100 km/h) is not set to change as a result of the Project.
Carriageway alignment changes by more than 5 m	The carriageway alignment will not change by more than 5 m along the route.

339. As indicated in Table 34, none of the applicable scoping thresholds outlined in the Highways England (HE) Guidance have been exceeded. Accordingly, in line with this guidance, further detailed assessment of operational air quality impacts is not required for this Project.

340. It is important to note, however, that the rehabilitation and improvement of the road surface is expected to yield minor beneficial effects on local air quality during operation. These benefits arise from the facilitation of steadier traffic flows, reduced congestion, and decreased vehicle idling times, all of which contribute to lower vehicular emissions along the upgraded corridor

**Table 35. Air quality impacts**

Aspect	Air quality impacts during operation					
	Impact nature	Negative		Positive		Neutral
Impact type	Direct		Indirect		Induced	
Impact duration	Temporary	Short-term		Long-term		Permanent
Impact extent	Local		Regional		International	
Impact scale	Small		Medium		Large	
Impact frequency	Infrequent		Frequent		Continuous	

Impact Magnitude	Positive	Negligible	Small	Medium	Large
Receptor sensitivity	Low		Medium		High
Impact significance	Negligible	Minor	Moderate		Major

## Proposed Mitigation Measures

### Construction Mitigation Measures

341. To manage and minimize potential air quality impacts during the construction phase, a series of targeted mitigation measures have been identified in accordance with international best practices and IAQM guidance. These measures are intended to reduce fugitive dust emissions and control particulate matter concentrations in the vicinity of sensitive receptors. A summary of the proposed mitigation actions is presented in Table 36 below.

**Table 36. Construction Mitigation Measures**

Issue	Mitigation Measures
Site management	<ul style="list-style-type: none"> <li>• Maintain records of dust and air quality complaints in the Air Quality Management Plan. Identify causes and measures taken to reduce emissions.</li> <li>• Record any exceptional incidents that cause dust or air emissions.</li> </ul>
Monitoring	<ul style="list-style-type: none"> <li>• Undertake regular off-site inspections, where sensitive receptors are nearby (within 50m of site boundary).</li> <li>• Increase frequency of inspections when activities with a high potential to produce dust are being undertaken and during prolonged windy or dry conditions.</li> </ul>
Site preparation and maintenance	<ul style="list-style-type: none"> <li>• Plan site layout so that machinery and dusty activities are located away from receptors where possible.</li> <li>• Erect solid screens or barriers around dusty activities or site boundary that are at least as high as any stockpiles.</li> <li>• Keep site fencing, barriers etc. clean using wet methods.</li> <li>• Cover stockpiles with the potential to produce dust.</li> </ul>
Site vehicles and equipment	<ul style="list-style-type: none"> <li>• Vehicle loading and movements to be optimised, with backfilling where possible, to minimise the number of journeys</li> <li>• Journeys to be planned to avoid peak hours</li> <li>• Maximum speed limits on surfaced and un-surfaced haul route and work areas to be specified</li> <li>• Ensure all vehicles switch off engines when stationary.</li> <li>• All onsite and on road vehicles and machinery to be appropriately maintained and to comply with relevant emission standards.</li> </ul>
General construction activities	<ul style="list-style-type: none"> <li>• Cutting, grinding or sawing equipment should be fitted with, or used in conjunction with, suitable dust suppression techniques such as water sprays or local extraction.</li> <li>• Drop heights to be minimised and fine water sprays to be used when appropriate.</li> <li>• Ensure an adequate water supply on site for effective dust suppression / mitigation using non-potable water where possible</li> </ul>
Demolition	<ul style="list-style-type: none"> <li>• Ensure effective water suppression during demolition operations.</li> </ul>
Construction	<ul style="list-style-type: none"> <li>• Ensure sand and aggregates are stored in bunded areas and not allowed to dry out.</li> <li>• Bulk cement and other fine powder materials to be delivered in enclosed tankers and stored in silos with suitable control systems to prevent overflow.</li> </ul>
Trackout	<ul style="list-style-type: none"> <li>• Haul routes and construction site to be damped down to minimise dust generation</li> <li>• Vehicles leaving the site to be covered.</li> <li>• Dry sweeping of large areas to be avoided.</li> </ul>

### Operation Mitigation Measures

342. As the Project is not expected to generate any significant increase in vehicle movements, and

is instead anticipated to deliver net beneficial impacts—including improved traffic flow, reduced idling, and enhanced road safety—no specific mitigation measures are deemed necessary for the operational phase. The Project is expected to contribute positively to air quality performance through enhanced infrastructure and reduced vehicle emissions per kilometer traveled.

### **Residual Impacts Construction**

343. With the implementation of the proposed mitigation measures outlined above, the Project is not expected to result in any significant residual impacts on air quality during the construction phase. The adopted controls are considered sufficient to effectively manage dust emissions and minimize exposure risks to both human and ecological receptors, ensuring compliance with applicable environmental standards and best practice guideline

### **Operation**

344. Given that the road is already in operation and the proposed upgrades are not expected to directly induce additional traffic, the residual impacts during the operational phase are anticipated to be minor and beneficial. These positive outcomes are primarily attributed to improved pavement conditions, enhanced traffic flow, and reduced vehicle idling, all of which contribute to incremental improvements in air quality and road user experience.

## **C. Noise and Vibration Introduction**

345. This section evaluates the potential temporary and long-term impacts associated with noise and vibration arising from the implementation of the Project. The assessment considers impacts during both the construction phase, where short-term elevated noise and vibration levels may affect nearby receptors, and the operational phase, where changes in traffic volume, speed, and road surface condition may result in permanent alterations to the acoustic environment within the Project's Area of Influence (Aoi).

### **Approach and Methodology**

346. This section outlines the methodological approach adopted to assess potential noise impacts on human receptors arising from both the construction and operational phases of the rural road project. The assessment is focused on identifying temporary construction-related disturbances as well as longer-term changes in environmental noise levels resulting from modifications to traffic flow, vehicle composition, and road surface characteristics following completion of the works.

### **Construction Methodology**

347. For the purposes of assessing potential construction-phase noise impacts, representative noise levels associated with standard construction activities and equipment have been utilized to estimate maximum on-site noise emissions. It is assumed that all machinery and equipment employed during construction will be fitted with noise-reducing features, such as enclosed cabs and mufflers, in accordance with industry best practices and occupational safety standards.

348. Among the various construction activities, concrete chipping has been identified as one of the noisiest operations, with measured sound pressure levels reaching up to 97 dB(A) at a distance of 1 meter, according to OSHA (2011). For the purpose of this assessment, and to conservatively account for the simultaneous operation of multiple equipment types with slightly varying acoustic profiles, an upper bound of 100 dB(A) at 1 meter has been adopted. Noise propagation and attenuation over distance have been calculated using the inverse square law, a standard acoustic modeling approach that estimates sound pressure level reduction as a function of distance from the source. Construction sites present critical opportunities for mitigating occupational noise exposure through collaborative actions between site personnel and management. Workers can contribute by identifying high-noise equipment, participating in risk assessments, and implementing noise control strategies. These include the use of acoustical insulation, extension cords to allow equipment repositioning, and prefabricated noise barriers. Management support is essential to ensure the provision of necessary materials, tools, and sufficient preparation time to implement control

measures effectively. In accordance with OSHA regulations, when worker noise exposure exceeds the permissible exposure limit (PEL) of 90 dB(A) as an 8-hour time-weighted average (TWA), employers are required to implement feasible engineering and/or administrative controls to reduce exposure. Hearing protective devices (HPDs) must be provided and used when these controls do not adequately reduce exposure. HPDs cannot be used as a substitute for engineering or administrative controls when such measures are practical. Furthermore, OSHA mandates that a hearing conservation program be implemented when worker exposure equals or exceeds 85 dB(A) (8-hour TWA). This includes monitoring, audiometric testing, training, and the provision of hearing protection. OSHA recommends that workers wear HPDs whenever noise exposures approach or exceed this action level, as a proactive measure to prevent long-term auditory damage.

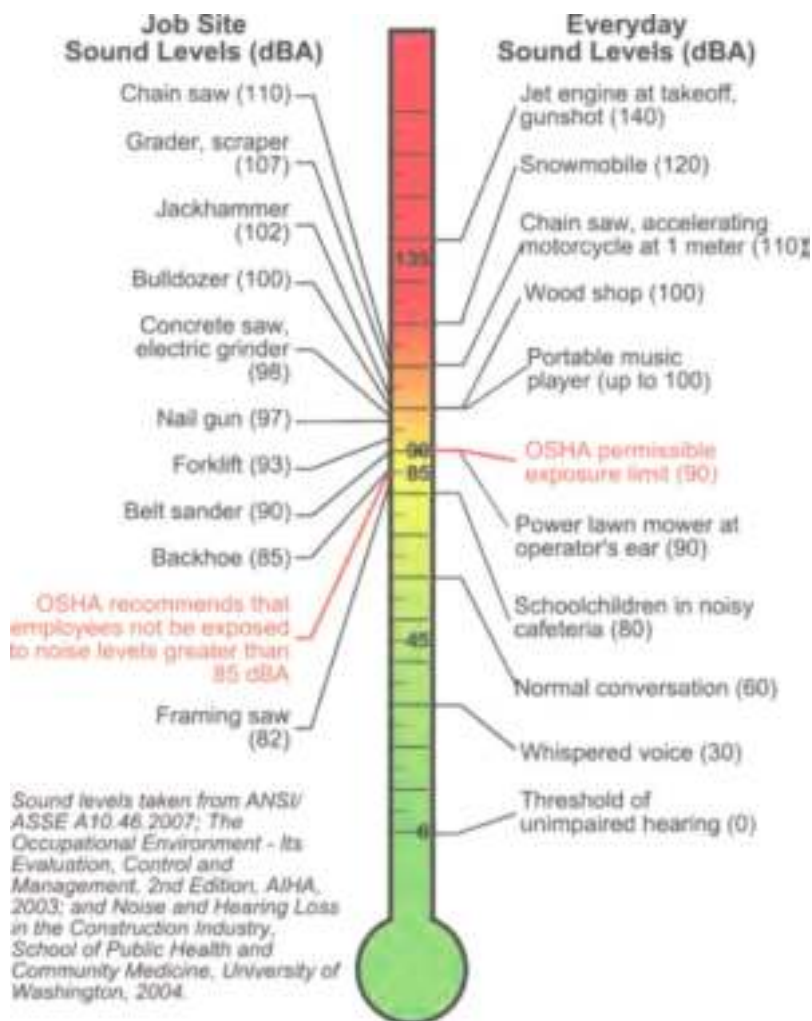


Figure 62. Typical noise levels during construction (OSHA, 2011)

### Operational Methodology

349. The assessment of noise impacts during the operational phase will employ the same computational methodology applied to the construction phase, with modifications to the input parameters to reflect operational conditions. Specifically, the maximum source noise level will differ. Based on data published by the United States Department of Transportation (US DOT, 2022), the highest representative traffic-related noise source is a diesel-powered truck traveling at a speed of 40 miles per hour, producing a sound pressure level of 85 dB(A) when measured at a distance of 15 meters. This value will serve as the reference emission level for the operational noise modeling in this assessment.

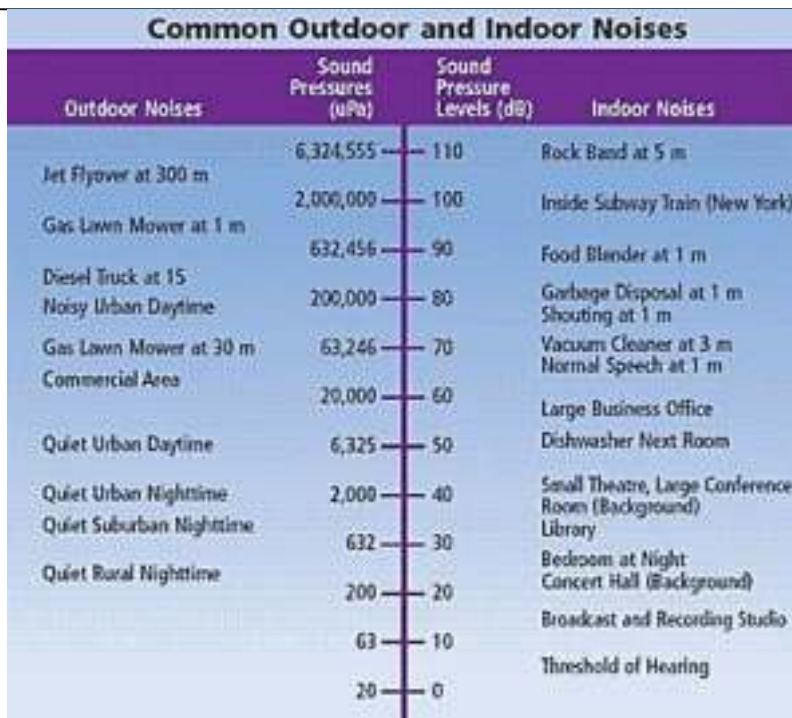


Figure 63. Common outdoor and indoor noises (US DOT, 2022)

**Construction Phase Impacts**

**Construction Noise Impacts**

350. Within the Area of Influence (AoI) for construction-related noise, several human and environmentally sensitive receptors have been identified in close proximity to the proposed reconstruction sections of the highway. A number of these receptors are located adjacent to the road alignment, indicating a potential for exposure to elevated noise levels during construction activities.

351. The impact associated with construction noise is characterized as negative in nature, direct in type, and local in extent, due to the limited propagation range of noise emissions. Although the construction activities will be transient at each specific location, the noise generated will be frequent and repetitive throughout the duration of works. The cumulative effect of these variables is assessed to result in an impact of medium magnitude.

352. The extent of ground-borne vibration will depend on the construction methodologies adopted, particularly during compaction activities. The contractor will be required to prepare and implement a Vibration Management Plan to mitigate potential impacts during key operations. Given the similarity in vehicular loading and operational conditions post-construction, no significant change in vibration levels is anticipated during the operational phase.

353. Considering the short-term nature of the construction works and the fact that the receptors, including noise-sensitive ones, are already subject to existing noise levels from the operational A380 corridor, only a minor incremental increase in noise exposure is anticipated. Receptor sensitivity in this context is assessed as medium.

354. Based on the above parameters—impact nature, duration, magnitude, and receptor sensitivity—the overall impact significance of construction-phase noise is classified as Moderate

**Table 37. Noise and vibration levels**

Aspect	Increased noise and vibration levels during construction			
	Negative	Positive	Neutral	Induced
Impact nature	Negative	Positive	Neutral	Induced
Impact type	Direct	Indirect	Induced	
Impact duration	Temporary	Short-term	Long-term	Permanent
Impact extent	Local	Regional	International	
Impact scale	Small	Medium	Large	

Aspect	Increased noise and vibration levels during construction				
Impact frequency	Infrequent		Frequent		Continuous
Impact Magnitude	Positive	Negligible	Small	Medium	Large
Receptor sensitivity	Low		Medium		High
Impact significance	Negligible	Minor	Moderate		Major

### Construction/Operation Vibration Impacts

355. Given the proposed construction methodologies, which do not include high-impact activities such as piling or blasting, the potential for vibration-related impacts during the construction phase is assessed as negligible. Furthermore, due to the expected similarity in vehicle type, frequency, and traffic volume post-reconstruction, no significant change in ground-borne vibration levels is anticipated during the operational phase.

### Operation Noise and Vibration Impacts

356. During the operational phase, typical vehicular noise emissions will arise from engine performance, transmission mechanisms, and tire-road interaction, while braking may contribute minimally to ground-borne vibration. As discussed in Section 7.1.6, the Project is not expected to alter existing traffic volumes or patterns. Therefore, operational noise levels should be evaluated against the established baseline, which already reflects noise generated by an active roadway.

357. Given that the project roads are currently in service and that the proposed interventions aim to enhance traffic flow efficiency, no additional adverse noise or vibration impacts are anticipated during operations. On the contrary, the operational phase is expected to deliver minor environmental improvements in terms of noise and vibration conditions due to smoother traffic movement and reduced congestion.

**Table 38. Noise levels during operation**

Aspect	Increased noise levels during operation				
Impact nature	Negative		Positive		Neutral
Impact type	Direct		Indirect		Induced
Impact duration	Temporary	Short-term	Long-term		Permanent
Impact extent	Local		Regional		International
Impact scale	Small		Medium		Large
Impact frequency	Infrequent		Frequent		Continuous
Impact Magnitude	Positive	Negligible	Small	Medium	Large
Receptor sensitivity	Low		Medium		High
Impact significance	Negligible	Minor	Moderate		Major

### Proposed Mitigation Measures

358. To minimize the potential adverse effects of noise and vibration during both the construction and operational phases of the Project, a series of mitigation measures have been proposed. These measures are outlined in the following sections and are intended to ensure compliance with applicable environmental standards while safeguarding the well-being of sensitive receptors within the Project's Area of Influence (Aol).

#### Construction Mitigation Measures

359. During the construction phase, specific noise abatement measures will be implemented to minimize noise emissions to the extent that is reasonably practicable. These measures are particularly critical when construction activities are undertaken in close proximity to sensitive receptors. The following mitigation strategies shall be applied:

- i. Stakeholder engagement with affected communities as well as with the Ministry of Tourism and Cultural heritage to determine preferred timeframes for construction works, minimizing potential disturbances, as well as for the ministry to provide proper guidance, which should be furthered considered if necessary;

- ii. Restriction of construction activities during night-time hours to prevent elevated noise levels during periods of increased sensitivity;
- iii. Deployment of low-noise machinery and installation of appropriate noise suppression devices, such as mufflers and acoustic enclosures, on construction equipment; and
- iv. Routine noise monitoring to record actual noise levels at sensitive locations, with the preparation and implementation of adaptive management plans should noise thresholds be exceeded

### **Operation Mitigation Measures**

360. As the Project is not expected to induce additional vehicular traffic and is anticipated to enhance traffic flow efficiency, no adverse noise or vibration impacts are predicted during the operational phase. Consequently, no specific mitigation measures are deemed necessary for this phase. The Project is expected to yield net positive effects in terms of operational noise and vibration conditions

### **Residual Impacts Construction**

361. Given the significant lowering of noise levels and the avoidance of nighttime working, the residual impact can be considered as Minor.

362. With the implementation of the proposed noise mitigation measures, noise levels are expected to be reduced for receptors located near active construction zones. However, for receptors situated in immediate proximity to the roadway, residual noise impacts may persist despite these reductions. This is particularly relevant given the temporary yet repetitive nature of construction activities. Accordingly, the mitigation strategy should emphasize continued community consultation, including the solicitation of feedback to identify practical approaches for minimizing perceived disruption. Where feasible, community-driven recommendations should be incorporated into the construction management plan to ensure impacts remain as low as reasonably practicable.

363. In view of the anticipated reduction in noise emissions through the use of mitigation measures—particularly the avoidance of nighttime construction activities—the residual noise impact during the construction phase is assessed to be of Minor significance.

### **Operation**

364. As the existing road is already in operation and the proposed upgrades are not expected to result in increased traffic volumes, no significant adverse impacts are anticipated during the operational phase. On the contrary, the improved pavement condition and enhanced traffic flow efficiency are expected to yield minor beneficial residual impacts, such as reduced vehicle noise and smoother travel conditions.

## **D. Geology and Soils Introduction**

365. This section evaluates the potential impacts of Project implementation on geological conditions and soil resources. The assessment specifically considers:

- i. Potential impacts on the functional capacity and quality of soils as a natural resource;
- ii. The risk of soil contamination, including the disturbance of any pre-existing or historical contamination; and
- iii. Potential effects on subsurface geological strata and ground stability.

366. Appropriate actions and mitigation measures are proposed to address and minimize any adverse effects on geological formations and soil quality that may arise during the construction and operational phases of the Project

### **Approach and Methodology**

367. The assessment of geology and soils is conducted through the identification of environmental

receptors and the evaluation of potential impacts using the standardized methodology outlined in Section 5. The significance of each identified impact is determined based on the sensitivity of the receptor and the magnitude of the potential effect. Where impacts are assessed as having medium or high significance, corresponding mitigation measures are proposed and integrated into the Environmental Management Plan (EMP), as detailed in Section 11.

- i. There are no prominent outcrops or exposed natural geological formations within the Project Area of Influence (Aol), as the region is characterized by a flat alluvial plain shaped by historical aeolian processes. Accordingly, no significant adverse impacts on geological structures are anticipated.
- ii. Given the generally level topography within the Project corridor, slope instability or ground movement is not expected to occur, and impacts on geotechnical stability are considered negligible.
- iii. The immediate surroundings of the road corridor exhibit minimal agricultural activity, thereby limiting potential impacts on agriculturally productive soils.
- iv. The construction phase will result in disturbance of soil substrata, primarily due to activities such as soil stripping, road profiling, grading, and subgrade reworking. Additionally, local surface materials—including sands, gravels, and other unconsolidated deposits—will be sourced from existing licensed borrow sites or quarries to support construction activities.
- v. Given the abundance and wide distribution of surface and near-surface alluvial deposits within the region, and the absence of agricultural land use, the overall impact on local geological and soil resources is assessed as negligible

### Construction Phase Impacts

368. The potential for soil and subsurface contamination during the construction phase has been evaluated. While there are no known sensitive environmental features or pre-existing sources of contamination within the Project area, construction activities—if not managed in accordance with established environmental best practices—may give rise to localized contamination events, particularly through improper handling of fuels, lubricants, or construction waste.

369. The primary environmental receptors susceptible to contamination include the topsoil layers and near-surface alluvial substrata within the Project footprint. The range of potential impacts to soil and geological resources arising from road construction activities is summarized in Table 39, which outlines the likely sources, nature, and pathways of impact associated with the proposed works

**Table 39. Potential impacts on soils**

Potential Impacts	Project Activity	Affected Area
Deterioration of quality Loss of soil	<ul style="list-style-type: none"> <li>• Vegetation clearance and removal of the topsoil</li> <li>• Transportation of materials, earth and soil, workforce, etc.</li> <li>• Operation of heavy construction equipment</li> <li>• Incidents involving spills and</li> <li>• leakages of hazardous substances, fuel and lubricants</li> </ul>	<ul style="list-style-type: none"> <li>• Road right of way</li> <li>• Temporary construction sites</li> <li>• Soil &amp; earth storage sites</li> <li>• Borrow pits (new)</li> <li>• Access roads</li> </ul>
Erosion	<ul style="list-style-type: none"> <li>• Vegetation clearance and removal of the topsoil</li> <li>• Temporary storage of soil and earth</li> <li>• Set-up of road facilities – culverts, drainage systems, bridges etc</li> <li>• Reinstatement activities</li> </ul>	<ul style="list-style-type: none"> <li>• Road right of way</li> <li>• Temporary construction sites</li> <li>• Soil &amp; earth storage sites</li> <li>• Borrow pits (new)</li> <li>• Access roads</li> </ul>
Compaction	<ul style="list-style-type: none"> <li>• Transportation of materials, earth and soil, workforce, etc.</li> <li>• Temporary storage of soil and earth</li> <li>• Operation of heavy construction equipment</li> <li>• Construction of road facilities – culverts, drainage systems,</li> <li>• bridges etc</li> </ul>	<ul style="list-style-type: none"> <li>• Temporary construction sites</li> <li>• Soil &amp; earth storage sites</li> <li>• Access roads</li> </ul>

Potential Impacts	Project Activity	Affected Area
Contamination	<ul style="list-style-type: none"> <li>Storage and handling of hazardous materials,</li> <li>Temporary storage of waste or littering of the sites</li> <li>Incidental spills and leakages of fuel and lubricants</li> </ul>	<ul style="list-style-type: none"> <li>Road right of way</li> <li>Temporary construction sites</li> <li>Soil &amp; earth storage sites</li> <li>Borrow pits</li> <li>Access roads</li> </ul>

370. The soils within the Area of Influence (AoI) are generally not highly sensitive to disturbance or contamination due to their limited development, low fertility, and the absence of intensive agricultural activity. However, the subsoil layers—particularly loose alluvial and aeolian deposits—are considered to exhibit moderate to high sensitivity to processes such as erosion, compaction, and potential contamination, given the natural mobility of sands and soils subject to wind action in this region.

371. During the construction phase, vegetation cover and topsoil within the Project footprint will be cleared. All removed topsoil shall be stored in designated stockpile areas in accordance with standard environmental management procedures. Following the completion of construction activities, the stored topsoil shall be reinstated to its original or improved condition to support post-construction revegetation and soil stabilization.

372. Soil erosion may occur as a result of various construction activities, particularly during earthworks and site clearance. The likelihood of erosion is heightened in exposed areas lacking vegetative cover and must be mitigated through appropriate erosion control measures.

373. Subsoil compaction is anticipated throughout the construction corridor due to the repeated movement and operation of heavy construction machinery and vehicles. This impact will be continuous and cumulative during the active construction period and may reduce soil permeability and structural integrity if not properly managed.

374. A wide range of construction activities pose a risk of subsoil contamination, especially in areas where the topsoil layer has been removed and temporarily stored. The severity and reversibility of such contamination will depend on the nature, concentration, and volume of pollutants released, with potential long-term implications for soil quality and recovery

### Operational Phase Impacts

375. During the operational phase, potential impacts on soil resources are limited primarily to localized soil contamination and soil erosion adjacent to the road infrastructure. These impacts may arise from surface runoff, vehicular emissions, accidental spillage of fuels or lubricants, and poor drainage conditions. The specific project locations and associated operational activities that may contribute to these impacts are summarized in Table 40.

**Table 40. Potential soil impact during operational phase**

Potential Impacts	Project Activity	Affected Area
Erosion	<ul style="list-style-type: none"> <li>Poor maintenance of the road drainage</li> <li>Poor reinstatement</li> </ul>	<ul style="list-style-type: none"> <li>Road embankments</li> <li>Slopes and areas adjacent to the road</li> <li>Road crossings of the rivers, riverlets and gullies</li> </ul>
Stability	<ul style="list-style-type: none"> <li>Operation of the road elements – road lanes,</li> <li>culverts, drainage systems, bridges etc.</li> </ul>	<ul style="list-style-type: none"> <li>Road right of way</li> </ul>

376. During the operational phase, soil-related impacts are expected to be minimal under normal conditions. However, insufficient maintenance of the roadside drainage infrastructure and inadequate post-construction reinstatement of soils may lead to localized erosion along the road fringes, shoulders, and embankments. Preventive measures must be established to avoid long-term

degradation of soil structure in these areas.

377. In the initial years following road commissioning, erosion of reinstated topsoil layers may occur along the road corridor, particularly in areas where drainage systems become blocked or poorly maintained, or where reinstatement of disturbed soils has been inadequately executed. If left unaddressed, such erosion could progressively penetrate into the subsoil layers, compromising the structural stability of embankments. These impacts are assessed as localized, reversible, and of low environmental significance, primarily due to the flat terrain characterizing the Project area.

378. The risk of hydrocarbon contamination during the operational phase is associated with potential spills and leakages resulting from traffic accidents, poor vehicle maintenance, or the transportation of hazardous materials. In particular, incidents involving the release of fuels, lubricants, or other hazardous substances may lead to spot contamination of roadside soils. These risks should be mitigated through standard road safety protocols, emergency spill response measures, and regular monitoring of high-risk zones. Notably, the likelihood of such incidents is expected to decrease with improved pavement conditions, which in turn may contribute to a reduction in road traffic accidents, compared to pre-project conditions.

### Proposed Mitigation measures

379. As no significant adverse impacts on geological resources or receptors within the Area of Influence (Aoi) are anticipated, no major interventions are required. However, to further minimize potential impacts on soil resources and near-surface geological strata, a set of precautionary and good practice measures are proposed. These measures aim to enhance environmental performance during Project implementation and ensure the protection of soil integrity and subsurface conditions throughout the construction and operational phases

### Construction

380. In recognition of the potential risks associated with the loss or degradation of soil resources and near-surface geological layers, the Project shall implement a suite of targeted mitigation measures. These measures shall address general construction practices, as well as the handling, storage, and management of hazardous substances, fuels, and construction-related waste. Additionally, they shall govern the layout and operation of ancillary facilities such as equipment yards, material stockpiles, and worker camps.

381. Through the systematic implementation of these environmental protection measures, the Project will effectively reduce the risk and severity of adverse impacts on soil integrity, fertility, and contamination potential during the construction phase, thereby ensuring compliance with applicable environmental standards and best management practices.

**Table 41. Mitigation measures for soils**

Issue	Mitigation
General measures	<ul style="list-style-type: none"> <li>• Ensure strict and regular control on the implementation of all measures intended for mitigation of the impacts on soils.</li> <li>• Ensure the construction workforce is informed regarding soil protection measures envisaged in the Project and ensures their implementation.</li> </ul>
Erosion & Compaction	<ul style="list-style-type: none"> <li>• Position construction sites, borrow pits and earth/soil storage sites on land unsuitable for agricultural use.</li> <li>• Use existing brownfield / abandoned mining sites along the roads for storage areas or construction sites.</li> <li>• Reprofile all construction-related sites including borrow pits after use, to minimize erosion by water and wind.</li> <li>• Store removed soil materials in stockpiles ≤2m in height to minimize losses by erosion and compaction.</li> </ul>

Issue	Mitigation
Loss of Soil Resource	<ul style="list-style-type: none"> <li>• Use removed, segregated topsoil in specific reinstated areas to facilitate planned biological reclamation and the natural re-vegetation of the Project area.</li> <li>• Use excess soil/fill for reinstatement of disturbed terrains/sites found near the road (e.g., abandoned sites).</li> </ul>
Contamination	<ul style="list-style-type: none"> <li>• Reclaim temporary construction sites and clear all associated construction waste simultaneous with project progress to the subsequent road section.</li> <li>• Ensure the ground in the areas designated for storage of hazardous materials and fuels is impervious, flat and hard, where necessary these materials should be stored under cover.</li> <li>• Servicing of the construction equipment should be carried out in designated areas, equipped with means to prevent spills and leakages.</li> <li>• Re-fueling should be strictly controlled and subject to formal procedures. Drip pans and spill response kits should be used at all times during refueling in the field and in sites without drainage system.</li> <li>• Timely remediation of any hydrocarbon or other contamination leakages should be performed, and any wastes disposed of appropriately.</li> <li>• Sanitary wastewater generated at operational sites should be collected. The wastewater from septic tanks should be transported by special vehicles for further appropriate treatment and disposal by licensed contractors approved by Company.</li> <li>• Appropriate waste management procedures should be in place for all construction and related wastes, and licensed contractors utilized for reuse / recycle / disposal.</li> <li>• Rain and snowmelt water in the Project sites should be collected by a drainage system; if necessary, retention ponds should be used to accommodate excess rainwater and meltwater run off to allow settlement prior to discharge alternatively silt traps should be used before discharging of the drainage water.</li> </ul>

## Operation

382. The potential impacts on soil resources and quality during the operational phase of the road are assessed to be of low risk. Nonetheless, to reinforce the protection measures implemented during the construction phase and to ensure continued environmental stewardship, the following supplementary mitigation measures are recommended. These measures aim to maintain the integrity of soil conditions and prevent localized degradation over the life cycle of the road infrastructure.

**Table 42. Proposed Mitigation Measures – Operation – Soil**

Issue	Mitigation
General measures	<ul style="list-style-type: none"> <li>• Assess the recovery of soil and vegetation post-construction, to identify at an early-stage potential problems resulting in soils contamination or erosion in the road easement. Plan for additional measures if necessary.</li> </ul>
Erosion & Compaction	<ul style="list-style-type: none"> <li>• Maintain vegetation cover within the reinstated areas to minimize soil erosion. Any maintenance activities should be carried out outside the main growing periods to minimise damage to vegetation.</li> </ul>

## Residual Impacts Construction

383. The implementation of the mitigation Contamination n measures outlined in this report and integrated into the Project's environmental management framework is expected to minimize the potential impacts on soil and geological resources and receptors. As a result, residual impacts are anticipated to be of negligible to low significance.

384. Residual impacts related to soil disturbance, including effects on fertility, compaction, and erosion, are expected to remain negligible, provided that the proposed mitigation measures are effectively implemented. In the case of localized soil contamination, residual impacts are assessed as ranging from Negligible to Minor, depending on the extent and nature of the contaminant release.

385. Based on the planned construction practices and soil management procedures, no permanent loss of topsoil is anticipated. Proper handling, storage, and reinstatement of topsoil will ensure its preservation and reuse post-construction.

### **Operation**

386. Provided that the recommended mitigation measures are effectively implemented and maintained, residual impacts on soil resources during the operational phase of the road are expected to be negligible. Continued monitoring and proper maintenance of drainage infrastructure and roadside vegetation will support the long-term preservation of soil quality and stability.

## **E. Groundwater Quality Introduction**

387. This section evaluates the potential impacts of the rural road upgrade on groundwater quality and quantity, as well as the associated effects on human health and environmental receptors within the Project's Area of Influence (Aoi). The assessment considers both the construction and operational phases of the Project. Where potential adverse impacts are identified, corresponding mitigation measures and management actions are proposed to ensure the protection and sustainable use of groundwater resources

### **Approach and Methodology**

388. The assessment is conducted based on the identification of groundwater receptors and the evaluation of potential impacts, in accordance with the assessment methodology outlined in Section VI of this report. The significance of impacts is determined by considering both the sensitivity of the identified receptors and the magnitude of the anticipated effects. Where impacts are assessed as having medium to high significance, appropriate mitigation measures are proposed. These measures are further detailed and incorporated into the Environmental Management Plan (EMP) provided in Section XII

### **Construction Phase Impacts**

389. Given the nature of the proposed construction activities, there exists a potential risk of groundwater contamination resulting from accidental releases of hazardous substances such as fuels, oils, or construction-related chemicals. These risks will be further assessed and detailed within the framework of this Initial Environmental Examination (IEE) to ensure appropriate preventive measures are incorporated.

390. Although water will be required for various construction processes (e.g., compaction, dust suppression, concrete works), it is understood that surface water sources will be utilized, and abstraction from groundwater resources is not anticipated. All relevant environmental management plans shall incorporate specific preventive measures to mitigate the risk of groundwater pollution, including proper storage, handling, and disposal protocols for hazardous materials.

391. The most relevant and probable groundwater-related impacts associated with the construction phase of the Project are summarized in the Table 43 below. These include potential pathways of contamination and receptor exposure, along with corresponding risk management considerations

**Table 43. Potential impacts on groundwater during construction phase**

Project Activity	Potential Impacts
<ul style="list-style-type: none"> <li>• Storage and handling of hazardous substances and fuels</li> <li>• Incidental spills and leakages of hazardous substances, oil or fuel</li> <li>• Temporary storage of waste or littering of the sites</li> <li>• Control of sanitary wastewater</li> </ul>	Contamination of groundwater body

392. The most sensitive potential groundwater receptors within the Area of Influence (AoI) are local water supply sources, including wells and community abstractions. Additional information regarding the location, usage, and vulnerability of these groundwater sources will be obtained during the public consultation process. Prior to the commencement of construction activities, the Contractor shall conduct a detailed hydro-environmental survey to confirm the availability and utilization of surface water sources, and to assess the potential impacts of construction on sensitive groundwater receptors.

393. Given the relatively shallow depth of groundwater in the Project area, all identified receptors are vulnerable to surface infiltration of contaminants, particularly in zones underlain by unconsolidated alluvial deposits. These highly porous materials facilitate the rapid transmission of pollutants, thereby increasing the susceptibility of groundwater to contamination. The degree of impact may vary depending on local hydrogeological conditions, but proactive management measures are essential to mitigate these risks.

### **Operational Phase Impacts**

394. The most sensitive potential groundwater receptors within the Area of Influence (AoI) are local potable water sources, including private wells and community-based abstractions. To establish a comprehensive understanding of these receptors, additional data on their location, usage patterns, and vulnerability will be gathered through the public consultation process. Prior to the initiation of construction activities, the Contractor shall be required to undertake a hydro-environmental baseline survey to verify the availability of surface water sources and evaluate the potential impacts on sensitive groundwater receptors, particularly in areas where groundwater may serve as a critical resource for local communities.

395. Due to the shallow water table present in much of the Project area, all identified groundwater receptors are inherently susceptible to surface-derived contamination, especially in regions characterized by unconsolidated, permeable alluvial deposits. These geologic formations enable rapid vertical infiltration, significantly increasing the risk of pollutant migration into groundwater systems. Although the degree of vulnerability may vary depending on localized hydrogeological conditions, the adoption of preventive and adaptive management measures is essential to safeguard groundwater quality throughout the Project lifecycle

### **Proposed Mitigation Measures**

396. This section outlines a set of targeted mitigation measures aimed at further minimizing potential impacts on groundwater receptors resulting from the implementation of the Project. These measures are designed to ensure the protection of groundwater quality and quantity, particularly in areas with sensitive hydrogeological conditions, and will support the Project's compliance with national environmental regulations and international best practices

### **Construction**

397. In recognition of the potential risk of groundwater contamination from the inadvertent release of hazardous substances during construction activities, the Project shall implement a suite of specific mitigation measures. These measures will address general construction site practices, including the safe handling, storage, and disposal of fuels, chemicals, and construction waste, as well as the planning and management of ancillary facilities such as equipment staging areas, fuel storage zones,

and worker camps.

398. Through the systematic application of these environmental safeguards, the Project will effectively mitigate the risk and severity of pollutant infiltration into groundwater systems during the construction phase, thereby preserving groundwater quality and ensuring compliance with environmental protection standards.

**Table 44. Proposed Mitigation Measures – Construction – Groundwater**

Issue	Mitigation
General measures	<ol style="list-style-type: none"> <li>1. Prior to commencement of construction, the use of groundwater for local water supply in the project area needs to be studied. The study shall include identification of the sources of groundwater supply in the Aol and assessment of how the Project activities affect them. Special attention shall be paid to residential communities and any other isolated dwellings where groundwater may be the only source of water supply. Prior to construction, the Project must ensure that the impacts on the groundwater source(s) are as low as reasonably possible but also acceptable.</li> <li>2. Ensure strict and regular control of the implementation of all measures intended for environmental protection in the Project.</li> </ol>
Contamination minimization	<ol style="list-style-type: none"> <li>1. Potentially polluting activities shall be minimized at all times.</li> <li>2. All sewage and wastewaters generated in the Project sites should be collected and treated as appropriate before discharging. Oil traps and silt traps should be in place prior to wastewater discharges, and if drainage water contamination is suspected the water quality should be analyzed and the water should only be discharged if it meets the applicable norms.</li> <li>3. Formal solid and liquid waste management, collection and disposal procedures should be in place, and the waste disposal sites used by the project should be agreed with the authorities</li> <li>4. Wastewater from the washing of construction vehicles should be collected and reuse after treatment</li> <li>5. Appropriately spill prevention and containment measures should be applied when storing and handling of fuels and other environmentally hazardous substances to prevent leaks and spills</li> <li>6. The use and handling of fuel and lubricants onsite should be limited and monitored closely at all times. Drip trays shall be used when refueling onsite or handling hazardous liquids.</li> <li>7. Timely remediation of any hydrocarbon or other contamination leakages should be performed, and any wastes disposed of appropriately.</li> </ol>

**Operational Phase Impacts**

399. To address potential groundwater-related risks during the operational phase of the road, the following additional risk mitigation measures are proposed. These measures aim to prevent pollutant infiltration, ensure proper management of accidental spills, and maintain the integrity of groundwater resources over the long term

**Table 45. Proposed Mitigation Measure – Operation – Groundwater**

Issue	Mitigation
General measures	<ul style="list-style-type: none"> <li>• Regular control to ensure timely and professional maintenance of the road drainage systems</li> </ul>

**Residual Impacts Construction**

400. The implementation of the mitigation measures outlined in this report and incorporated into the Project’s environmental management framework is expected to significantly minimize impacts on sensitive groundwater receptors. As a result, residual impacts are anticipated to be of negligible to minor significance, with the exception of locations where groundwater is utilized as a source of potable or agricultural water supply, which may warrant further scrutiny.

401. The identification and characterization of local groundwater-dependent water supply sources

remain pending. A detailed hydrogeological assessment is recommended as a critical risk reduction measure to inform the final impact evaluation and guide the development of appropriate mitigation strategies. This task is included as a priority action in the current environmental management planning process.

## Operation

402. Under normal operating conditions, and assuming that the proposed mitigation and monitoring measures are effectively implemented and maintained, no significant residual impacts on groundwater receptors are anticipated during the operational phase of the Project.

## F. Surface Water Quality

### Introduction

403. This section evaluates the potential impacts of the rural road upgrade on surface water quality and hydrology, including any effects these changes may have on human populations and ecological receptors within the Area of Influence (AoI). Where relevant, mitigation measures and management actions are proposed to address any adverse effects and ensure the protection of surface water resources during both construction and operation phases of the Project.

### Approach and Methodology

404. The assessment is based on the identification of surface water receptors and the evaluation of potential impacts, applying the standardized methodology described in Section V of this report. Impact significance is determined by taking into account the sensitivity of receptors and the severity of potential effects.

405. Where potential impacts are classified as having medium or high significance, appropriate mitigation measures are proposed. These measures are further detailed in the Environmental Management Plan (EMP) outlined in Appendix 10.

### Construction Phase Impacts

406. A number of surface water features, including streams, canals, and drainage channels, have been identified in close proximity to the Project alignment. These water bodies may be vulnerable to disturbance or contamination during construction activities.

407. Given the nature of the planned construction works, there is potential for the creation of contamination pathways—such as through surface runoff, fuel or chemical spills, and sediment transport. As a result, surface water has been included in the scope of this environmental assessment. Furthermore, surface water resources are expected to be utilized for various construction purposes, including dust suppression and material processing.

408. The most relevant and likely impacts on surface water quality and hydrology associated with the road construction phase—such as increased turbidity, pollutant loading, and disruption of flow regimes—are summarized in Table 46. These identified risks will serve as the basis for defining appropriate mitigation and monitoring measures.

**Table 46. Potential impacts on surface water during construction phase**

Project Activity	Potential Impacts
<ul style="list-style-type: none"> <li>• Vegetation clearance and removal of topsoil</li> <li>• Discharge of surface water runoff from construction areas</li> <li>• Storage and handling of hazardous substances and fuels</li> <li>• Incidental spills and leakages of hazardous substances, oil or fuel</li> <li>• Temporary storage of waste or littering of the sites</li> <li>• Control of sanitary wastewater</li> </ul>	Contamination of surface water body
Abstraction of water for construction use	Lowering of water level Depletion of reserves

409. The most sensitive potential surface water receptors within the Area of Influence (Aoi) are local water supply sources, including irrigation canals and reservoirs that may be impacted by construction activities. Additional information on surface water abstractions and usage patterns will be obtained through the public consultation process. Prior to the commencement of construction works, the Contractor shall conduct a detailed assessment of surface water use within the Project area, with particular attention to the three identified irrigation canals and the existing rivers, in order to evaluate potential impacts and inform the implementation of targeted mitigation measures

### **Operational Phase Impacts**

410. During the normal operational phase of the road, potential impacts on surface water resources are expected to be limited in scope and primarily associated with non-routine events, such as accidental spills or periodic maintenance activities. These impacts are of a similar nature to those identified during the construction phase but are generally less frequent and more localized.

411. Provided that standard control measures for stormwater drainage, runoff management, and wastewater handling—including those related to road service facilities and rest areas—are properly implemented and maintained, no significant adverse impacts on surface water quality are anticipated during the operational phase of the Project.

412. Notwithstanding the above, there remains a risk of localized point-source contamination within the road easement due to accidental releases of fuels or hazardous substances (e.g., resulting from vehicular accidents). These risks should be mitigated through established road safety protocols, including emergency spill response procedures, which are part of routine road operation and maintenance management systems

### **Proposed Mitigation Measures**

413. This section outlines targeted mitigation measures aimed at minimizing potential impacts on surface water receptors arising from the implementation of the Project. The measures address wastewater management, drainage control, and spill prevention during both construction and operational phases to ensure compliance with environmental standards and best practices.

414. Wastewater and Drainage Systems:

- i. In the absence of centralized sewerage and wastewater treatment infrastructure in the Project area, the Contractor shall be responsible for the provision of on-site wastewater treatment facilities appropriate to the scale of operations.
- ii. For smaller construction sites accommodating fewer than 150 personnel, sealed and regularly maintained septic tanks may be utilized for domestic wastewater management.
- iii. For larger construction camps or sites, liquid waste must undergo at least primary treatment. This includes the use of an anaerobic settling tank or pond, preceded by a bar screen to remove large solids (e.g., sticks, rags). Primary treatment allows wastewater to remain in a settling basin for approximately two hours, during which time solids settle and floatable (such as oils and grease) are separated. This process effectively reduces suspended solids, biological oxygen demand (BOD), and removes floating debris.
- iv. No direct discharge of untreated sanitary, oily, or industrial wastewater into surface water bodies shall be permitted under any circumstances.
- v. All wastewater generated on-site must be collected and removed through a temporary, well-designed drainage system, and disposed of at designated off-site facilities to prevent environmental pollution or nuisance. The Site Environmental Management Plan (SEMP) shall clearly delineate the proposed wastewater management system, including the location of latrines, holding tanks, and related facilities. Discharge of any form of sanitary or wash water directly into surface water bodies is strictly prohibited. The disposal of lubricating oils, fuels, or other hazardous liquids directly onto soil or into watercourses is also prohibited.
  - Storage areas for liquid materials shall be designed to prevent direct drainage to surface water bodies.
  - Storage containment areas equipped with drainage valves must remain locked in the closed position under supervisory control.

- Spills of lubricating or fuel oils must be addressed immediately, with cleanup materials maintained at each designated storage site.
- vi. Contractual provisions must require that construction camps and all temporary facilities be properly located, sited away from surface water bodies, and equipped with effective wastewater and stormwater drainage systems. Drainage infrastructure and wastewater control systems shall be detailed in the SEMP.
- vii. Drainage Control: Construction site layout shall be designed to capture rainwater runoff in retention ponds, sediment traps, or other appropriate containment structures. All spills of fuel, oil, and chemicals must be immediately contained and remediated, and appropriate spill response equipment must be available and functional on-site at all times.

**Construction**

415. In recognition of the potential risks associated with the release of pollutants into the environment, the Project shall implement a set of specific mitigation measures to protect surface water resources during the construction phase. These measures shall address key areas, including general construction site practices, the safe handling, storage, and disposal of hazardous substances, fuels, and construction waste, as well as the planning and management of ancillary facilities such as storage yards, workshops, and worker accommodations.

416. By adhering to these environmental protection protocols, the Project will effectively minimize both the likelihood and severity of surface water contamination, thereby ensuring compliance with applicable environmental standards and reducing the potential for adverse impacts on downstream receptors

**Table 47. Proposed Mitigation Measures – Construction – Surface water**

Issue	Mitigation
General measures	<ol style="list-style-type: none"> <li>1. Prior to commencement of construction, the use of surface water for local water supply in the studied area needs to be studied. The study shall include identification of the sources of surface water supply in the AoI and assessment of how the Project activities affect them. Special attention shall be paid to protection of supplies to existing surface water users.</li> <li>2. Prior to construction, the Project must ensure that the impacts on the surface water source(s) are as low as reasonably possible but also acceptable.</li> <li>3. Ensure strict and regular control of the implementation of all measures intended for environmental protection in the Project.</li> </ol>
Contamination minimization	<ol style="list-style-type: none"> <li>1. Potentially polluting activities shall be minimized at all times.</li> <li>2. All sewage and wastewaters generated in the Project sites should be collected and treated as appropriate before discharging. Oil traps and silt traps should be in place prior to wastewater discharges, and if drainage water contamination is suspected the water quality should be analyzed and the water should only be discharged if it meets the applicable norms.</li> <li>3. Formal solid and liquid waste management, collection and disposal procedures should be in place, and the waste disposal sites used by the project should be agreed with the authorities</li> <li>4. Wastewater from the washing of construction vehicles should be collected and reuse after treatment</li> <li>5. Appropriately spill prevention and containment measures should be applied when storing and handling of fuels and other environmentally hazardous substances to prevent leaks and spills</li> <li>6. The use and handling of fuel and lubricants onsite should be limited and monitored closely at all times. Drip trays shall be used when refueling onsite or handling hazardous liquids.</li> <li>7. Timely remediation of any hydrocarbon or other contamination leakages should be performed, and any wastes disposed of appropriately.</li> </ol>

**Operation**

417. During the operational phase of the road, the following supplementary risk mitigation measures are proposed to prevent and manage potential adverse impacts on surface water quality. These measures are designed to address risks arising from road runoff, accidental spills, and maintenance activities, ensuring the long-term protection of nearby surface water bodies and alignment with environmental compliance obligations.

**Table 48. Proposed Mitigation Measures – Operations – surface water**

Issue	Mitigation
General measures	<ul style="list-style-type: none"> <li>• Regular control to ensure timely and professional maintenance of the road drainage systems, and servicing and appropriate disposal of the wastewaters generated at service stations or rest stops</li> </ul>

### Residual Impacts Construction

418. The implementation of the mitigation measures proposed in this report and planned in the Project will minimize the effects of the Project on vulnerable surface water receptors. Residual impacts with negligible and Minor significance are expected except when sources of water supply from surface water are concerned.

419. Local sources of water supply and potential surface water impacts due to Project activities are yet to be studied in detail to inform accurate assessment and appropriate mitigation strategies. This task is proposed as an appropriate risk reduction measure in the current document.

### Operation

420. During the normal operation of the road, and assuming that all prescribed mitigation and management measures are effectively implemented and maintained, no residual impacts of significance on surface water receptors are anticipated. The operational phase is expected to have minimal interaction with surface water bodies under standard conditions, provided that drainage and spill control systems function as intended

### G. Waste

421. Due to the nature of construction activities, the Project is expected to generate various types of construction and demolition waste, which may pose adverse environmental impacts if not managed properly. To address these risks, a Site Waste Management Plan (SWMP) and a Materials Management Plan (MMP) are recommended for development and implementation. These plans should be guided by the waste management hierarchy, which prioritizes waste minimization, followed by on-site reuse, waste segregation, and recycling, in order to reduce the environmental footprint of construction activities.

422. This section presents the proposed strategies and measures for managing waste generation and disposal during both the construction and operational phases of the Project, with the objective of ensuring compliance with national regulations and best environmental practices.

423. Depending on the classification and hazard level of the waste materials generated, different handling, storage, and disposal procedures must be adopted to prevent environmental release and associated risks. Improperly managed waste may result in harm to terrestrial and aquatic ecosystems, solid waste pollution, contamination of surface and groundwater resources, and potential health hazards to site personnel and local communities. Therefore, all waste must be managed in accordance with the waste management hierarchy, which includes:

- i. Waste avoidance and minimization at source,
- ii. Re-use of materials on-site where feasible,
- iii. Segregation of waste streams to enhance recovery potential, and
- iv. Recycling or appropriate off-site disposal of non-recoverable waste.

424. Baseline waste management conditions in the Project area have been established through the review of secondary data sources and field-level observations. This baseline serves as the

foundation for assessing potential waste-related impacts and defining appropriate management responses throughout the Project lifecycle



**Figure 64. Waste management hierarchy (United States Environmental Protection Agency (EPA))**

425. As part of the scoping process, the following sources of potential environmental impact have been identified within the scope of waste management for the Project:

- i. Contaminated wastewater discharge, which may result from construction activities or improper handling of liquid wastes.
- ii. Spillage of hazardous substances, including accidental leaks during the handling, transport, or storage of fuels, lubricants, and other chemicals.
- iii. Improper storage of hazardous waste, which may lead to leakage, soil or water contamination, and fire risks if containment measures are inadequate.
- iv. Disposal of hazardous and non-hazardous waste, which could adversely affect the receiving environment if not managed in compliance with national regulations and international best practices.

426. To address these potential impacts, the Project adopts the internationally recognized waste management hierarchy, which serves as a key decision-making framework by clearly establishing environmental, economic, and social priorities for sustainable waste management. The hierarchy ranks waste management strategies in order of preferred action, as follows:

- i. **Source Reduction:** The highest-priority strategy focused on minimizing waste generation at the source, thereby preventing pollution before it occurs.
- ii. **Recycling:** The reprocessing of used materials into raw materials that can be reused in the production cycle.
- iii. **Energy Recovery:** The conversion of waste materials into usable forms of energy, such as heat or electricity, typically through incineration.
- iv. **Treatment:** The application of physical, chemical, or biological processes to reduce the hazardous characteristics of waste.
- v. **Disposal or Other Releases:** Considered the least desirable option, this involves landfill or environmental release, and is used only when other methods are not feasible.
- vi. By following this hierarchical approach, the Project aims to minimize environmental impacts and ensure that waste is managed in a responsible, efficient, and sustainable manner throughout the construction and operational phases

### **Types and Sources of Waste Generated During Construction**

427. During the construction phase of the rural road development, various types of waste will be generated by both construction activities and the onsite workforce. These wastes are broadly categorized as non-hazardous and hazardous and must be managed in accordance with national

regulations and international good environmental practices to avoid contamination of soil, water, and ecosystems.

- i. Non-Hazardous Waste
  - The following types of non-hazardous waste are expected to be generated during construction:
  - Excavated earth and surplus soil
  - Construction debris (e.g., concrete, brick fragments)
  - Bituminous material residues
  - Scrap metal (rebar, pipes, etc.)
  - Waste timber and formwork materials
  - Cement residues and empty bags
  - Plastic packaging and containers
  - Paper and cardboard waste from site offices and logistics
- ii. Hazardous Waste
  - Hazardous waste types anticipated at the construction sites include:
  - Paints, primers, and solvent residues
  - Selected household-type waste generated from construction camps
  - Waste rubber (e.g., worn-out tires)
  - Clinical waste (e.g., from first-aid facilities)
  - Used personal protective equipment (PPE) contaminated with hazardous substances
  - Waste oils, lubricants, and greasy rags
  - Used batteries from equipment and vehicles
  - Fluorescent tubes and lighting waste from site offices
  - Contaminated excavated soils (if any are encountered)
  - Sludge and residual solids from onsite sanitary wastewater treatment systems
- iii. Wastewater Generation
 

In addition to solid waste, wastewater is another critical environmental concern during the construction phase. Two primary sources include:

  - Stormwater runoff – This may carry suspended solids, oils, and construction residues, posing risks of erosion and sedimentation into nearby water bodies if not properly managed.
  - Sewage water from construction camps – Untreated or poorly managed sewage discharge may cause significant environmental pollution and public health risks. Proper treatment or connection to existing sanitation infrastructure is essential.

428. A comprehensive Construction Site Waste Management Plan (CSWMP) will be developed to address the generation, segregation, storage, transport, and disposal of both solid and liquid waste streams. This plan will integrate the waste hierarchy (reduce, reuse, recycle, dispose) and include appropriate mitigation measures to ensure compliance with environmental safeguards.

### **Local Facilities**

429. A preliminary assessment under this IEE indicates that existing knowledge on the capacity of local waste management infrastructure remains limited, particularly in relation to hazardous and construction waste treatment. Although municipal waste disposal sites are available, options for industrial or construction waste remain inadequate. It will be incumbent upon the selected Contractor to carry out further due diligence, in coordination with relevant local authorities, to ensure that all disposal facilities are properly licensed and environmentally compliant for each category of waste generated under the Project. Current known facilities include Uzbneftegaz for waste oil recycling, Cvetmet for used batteries, and Chermet for scrap metal. Non-hazardous waste is expected to be segregated into recyclable and non-recyclable streams, with the latter deposited in municipal landfills and recyclable fractions (e.g., paper, plastic) transferred to authorized agencies.

430. To ensure strict compliance with environmental safeguards, the Contractor will be required to develop a Hazardous Materials Management Plan (HMMP), encompassing comprehensive protocols for the handling, storage, and disposal of hazardous substances. Key elements of the HMMP must include:

- i. Clear identification of designated storage areas for all liquid and toxic substances on impervious surfaces within bunded, fenced enclosures, located away from watercourses and with a minimum containment capacity of 110% of the stored volume;
- ii. Restriction of fueling operations to bunded containment zones under formal procedures, with spill prevention and response mechanisms;
- iii. Secure, tamper-proof fuel valves and trigger guns, locked when not in use;
- iv. Mandatory labelling of all storage containers and prohibition of any discharge into drains or watercourses;
- v. Immediate spill response protocols and secure containment of contaminated cleanup materials for transfer to authorized hazardous waste facilities;
- vi. Segregated and clearly labelled storage of liquid chemical waste in compliance with Material Safety Data Sheets (MSDS), to be transferred to specialized treatment facilities;
- vii. On-site separation and secure temporary storage of electrode residues, which contain high iron content and must be directed to certified scrap metal processors;
- viii. Designated outdoor storage areas for used paint and varnish containers, maintained in an orderly manner and emptied regularly under contract with licensed handlers;
- ix. Safe containment and controlled transfer of used oil and oil-contaminated waste to certified recycling or incineration companies;
- x. Proper metal container storage and specialized treatment of waste bitumen by licensed operators.

These measures will ensure environmentally sound waste management practices throughout the construction phase and uphold compliance with ADB’s environmental safeguard requirements

**Approach and Methodology**

431. Impact magnitude will be assessed according to the impact ratings as shown in Table 49. The magnitude of environmental impacts resulting from the Project will be assessed using a standardized impact rating system, as outlined in Table 49. This table provides a framework for evaluating the scale, intensity, and duration of potential impacts, enabling a consistent and objective determination of their significance across all project activities

**Table 49. Impact assessment ratings**

Assessment endpoint	Negligible Impact	Low impact	Medium impact	High Impact	Very High Impact
Spillage of waste	Little waste produced, no hazardous waste, temporary production of waste, waste management anticipated	Significant waste produced, no hazardous waste, temporary production of waste, waste management anticipated	Significant waste produced, some hazardous waste, temporary production of waste, waste management anticipated	Significant waste produced, large quantities of hazardous waste, some continuous production of waste, waste management anticipated	Significant waste produced, large quantities of hazardous waste, continuous production of waste, no waste management anticipated.
Improper storage of waste	Little waste produced, no hazardous waste, temporary production of waste, proper storage of waste anticipated	Significant waste produced, no hazardous waste, temporary production of waste, proper storage of waste anticipated	Significant waste produced, some hazardous waste, temporary production of waste, proper storage of waste anticipated	Significant waste produced, large quantities of hazardous waste, some continuous production of waste, proper storage of waste anticipated	Significant waste produced, large quantities of hazardous waste, continuous production of waste, no waste management anticipated.

Assessment endpoint	Negligible Impact	Low impact	Medium impact	High Impact	Very High Impact
Waste disposal	Little waste produced, no hazardous waste, temporary production of waste, intention to work with legitimate contractor for disposal	Significant waste produced, no hazardous waste, temporary production of waste, intention to work with legitimate contractor for disposal	Significant waste produced, some hazardous waste, temporary production of waste, intention to work with legitimate contractor for disposal	Significant waste produced, large quantities of hazardous waste, some continuous production of waste, intention to work with legitimate contractor for disposal	Significant waste produced, large quantities of hazardous waste, continuous production of waste, no waste management anticipated.

### Construction Phase Impacts Spillage of Waste

432. Improper handling, segregation, or storage of construction-related waste poses a key risk of spillage into the surrounding environment. Without the implementation of clear procedures and adequate monitoring, various waste types generated during the construction phase may inadvertently be released. This risk is particularly elevated where waste management protocols are poorly defined or inadequately enforced.

433. Although certain types of waste—particularly hazardous materials—can persist in the environment for decades if mismanaged, the volume of hazardous waste anticipated from this Project is low. Additionally, the project area lacks a high density of sensitive environmental or human receptors that would amplify the consequences of such spillage. Therefore, while long-term persistence is a theoretical concern, the overall environmental impact of waste spillage during construction is assessed as being of Minor significance, provided that mitigation measures are properly implemented

**Table 50. Impacts of waste generation**

Aspect	Solid Waste Generation				
Impact nature	Negative		Positive		Neutral
Impact type	Direct		Indirect		Induced
Impact duration	Temporary	Short-term	Long-term	Permanent	
Impact extent	Local		Regional		International
Impact scale	Small		Medium		Large
Impact frequency	Infrequent		Frequent		Continuous
Impact Magnitude	Positive	Negligible	Small	Medium	Large
Receptor sensitivity	Low		Medium		High
Impact significance	Negligible		Minor	Moderate	Major

### Improper storage of waste

434. Improper handling, segregation, or storage of construction-related waste presents a significant risk of unintentional spillage into the surrounding environment. In the absence of clearly defined procedures and robust monitoring systems, various types of waste generated during construction may be released due to mishandling or poor storage practices. This risk is heightened where waste management protocols are inadequately developed or insufficiently enforced.

435. While certain waste types—particularly hazardous materials—can persist in the environment for extended periods if not properly managed, the volume of hazardous waste expected from this Project is relatively low. Furthermore, the project area contains a limited number of sensitive environmental and human receptors, reducing the likelihood of widespread adverse effects. Given these considerations, the environmental impact of construction waste spillage is assessed as Minor in significance, assuming that appropriate mitigation measures are effectively implemented and enforced

### Waste disposal

436. During both the construction and operational phases of the Project, waste will be generated and must be managed in accordance with environmental best practices. Waste generation should be minimized through resource-efficient methods, and all reusable or recyclable materials should be segregated and handled accordingly. A clear waste segregation protocol must be established on-site to facilitate recycling and reuse, with permitted specialist contractors identified to receive the appropriate materials. Residual waste that cannot be reused or recycled must be collected by licensed waste transport contractors and transported to officially regulated disposal sites authorized to accept the corresponding categories of waste.

437. Prior to the implementation of comprehensive waste management measures, the risk associated with improper waste disposal is assessed to be of Moderate significance, due to the potential for environmental contamination and health hazards if not appropriately managed

**Table 51. Impacts of waste disposal**

Aspect	Waste Disposal			
	Negative	Positive	Neutral	
Impact nature	Negative	Positive	Neutral	
Impact type	Direct	Indirect	Induced	
Impact duration	Temporary	Short-term	Long-term	Permanent
Impact extent	Local	Regional	International	
Impact scale	Small	Medium	Large	
Impact frequency	Infrequent	Frequent	Continuous	
Impact Magnitude	Positive	Negligible	Small	Medium
Receptor sensitivity	Low	Medium	High	
Impact significance	Negligible	Minor	Moderate	Major

### Mitigation and Monitoring

438. Given the nature and scale of the construction works, adverse environmental impacts related to waste generation are anticipated during the construction phase. To address these risks effectively, a comprehensive set of mitigation measures will be formulated and integrated into a Site Waste Management Plan (SWMP) and a Materials Management Plan (MMP) to be developed specifically for the Project.

439. These plans shall be guided by the internationally recognized waste management hierarchy, prioritizing the following sequence:

- i. Minimization of waste generation at the source;
- ii. On-site reuse of materials where feasible;
- iii. Systematic segregation of waste streams to facilitate appropriate handling;
- iv. Recycling of suitable waste materials through authorized channels.

440. The implementation of these measures will ensure that construction activities align with environmental best practices and regulatory requirements, thereby reducing the potential for significant waste-related impacts.

### Contractor's Waste Management Procedures

441. To ensure effective and environmentally responsible waste management throughout the construction phase, the Contractor shall develop and implement detailed procedures tailored to the specific scope of works. These procedures will form an integral part of the Contractor's Environmental Management Plan (EMP) and must include, at a minimum, the following components:

- i. Waste Inventory Procedure
  - A comprehensive inventory shall be developed, outlining key data on anticipated waste generation. This shall include:
    - Primary sources of waste;
    - Classification of waste streams (hazardous and non-hazardous);
    - Specific waste types;

- Estimated annual waste volumes for each stream (subject to annual review and update).
- ii. Waste Reduction Procedure: Measures to minimize the volume of waste generated during construction activities shall be clearly defined, emphasizing source reduction through design, procurement, and construction methods.
- iii. Reuse and Recycling Procedure: This procedure shall outline practical opportunities for on-site reuse and recycling of construction waste, aiming to reduce off-site disposal and encourage circular resource flows wherever feasible.
- iv. Waste Collection, Segregation, and Storage Procedure: The contractor shall specify systematic methods for the handling of all waste streams prior to collection. This includes appropriate segregation at source, temporary storage protocols, and safe containment to prevent accidental releases.
- v. Waste Training Procedure: Training modules shall be developed to ensure personnel are adequately informed and capable of executing the waste management procedures. This includes:
  - General awareness training integrated into the Health, Environment, and Safety (HES) induction for all workers;
  - Specialist training for personnel with specific responsibilities related to waste handling, segregation, and compliance.
 These procedures shall be periodically reviewed and refined to reflect evolving site conditions, regulatory requirements, and best practice standards.

### Plans and Procedures

442. To ensure effective and compliant waste management during the construction phase, the Contractor shall develop specific procedures in accordance with the project's scope of works. These procedures shall form an integral part of the Contractor's Environmental Management Plan (EMP) and must include, but are not limited to, the following:

- i. Waste Inventory Procedure: The Contractor shall prepare a detailed Waste Inventory, which includes:
  - Identification of key sources of waste;
  - Classification of waste by type and stream;
  - Categorization into hazardous and non-hazardous waste streams;
  - Estimated annual volumes for each type or stream, subject to regular (at least annual) review and update.
- ii. Waste Reduction Procedure: A procedure outlining the measures the Contractor shall implement to minimize the volume of waste generated. These may include strategies such as material optimization, efficient procurement, and minimization of surplus or discarded materials.
- iii. Reuse and Recycling Procedure: This procedure shall describe how the Contractor will maximize reuse and recycling of waste materials generated on-site. Emphasis should be placed on reducing dependency on third-party treatment or disposal services through in-house resource efficiency.
- iv. Waste Collection, Segregation, and Storage Procedure: The Contractor must specify clear methods for:
  - Safe on-site collection of waste;
  - Segregation of recyclable and non-recyclable materials;
  - Proper storage in designated, secure, and labeled containers or areas prior to removal.
- v. Waste Training Procedure: A structured training program that ensures personnel are competent in implementing waste management procedures, including:
  - General waste awareness training for all workers, delivered during the site's General Health, Environment, and Safety (HES) Induction;
  - Specialist training for workers with designated responsibilities in waste classification, storage, handling, and compliance.

These procedures shall be monitored, periodically reviewed, and updated to reflect evolving site conditions, regulatory updates, and performance audit findings, ensuring alignment with national

legislation and ADB's safeguard policy requirements

443. To ensure effective and environmentally sound waste management throughout the construction phase, the Contractor shall develop and implement specific procedures aligned with the scope of works. These procedures shall form an integral part of the Contractor's Environmental Management Plan (EMP) and must include, but not be limited to, the following key components:

- i. **Waste Inventory Procedure:** The Contractor shall establish and maintain a detailed Waste Inventory, which includes:
  - Identification of key sources of waste;
  - Classification of waste by type and stream;
  - Categorization into non-hazardous and hazardous waste streams;
  - Estimated annual waste volumes for each stream, to be reviewed and updated annually.
- ii. **Waste Reduction Procedure:** This procedure shall outline specific measures the Contractor will adopt to reduce waste generation at the source. This may include efficient material planning, optimized construction techniques, and procurement strategies to minimize surplus and waste.
- iii. **Reuse and Recycling Procedure:** The Contractor shall identify feasible opportunities for reuse and recycling of construction waste. This may involve repurposing materials on-site or coordinating with licensed facilities to divert suitable waste from landfills or off-site disposal.
- iv. **Waste Collection, Segregation, and Storage Procedure:** A clearly defined system for:
  - On-site collection and segregation of waste materials by type;
  - Secure and labelled storage of waste in designated locations prior to transport;
  - Ensuring containment to prevent leakage, cross-contamination, or environmental harm.
- v. **Waste Training Procedure:** A structured training framework to ensure all personnel are adequately informed and equipped to manage waste in compliance with the EMP. At a minimum, this shall include:
  - General waste awareness training as part of the Health, Environment, and Safety (HES) Induction for all site workers;
  - Specialized training for staff with direct responsibilities in waste handling, segregation, monitoring, and compliance.

These procedures shall be reviewed regularly and updated as necessary to reflect changes in work practices, regulatory requirements, or site conditions, ensuring full alignment with national legislation and ADB's Safeguard Policy Statement (SPS 2009)

### **Spillage of waste**

444. The Waste Management Plan (WMP) to be developed by the Contractor shall provide comprehensive details on the handling and management of all waste types generated during the construction phase. The Plan shall include, at a minimum, the following elements:

- i. **Use of Safety Data Sheets (SDS):** All hazardous materials must be accompanied by up-to-date Safety Data Sheets, which shall be accessible on-site. SDSs must guide the safe handling, storage, and emergency response procedures for each substance.
- ii. **Personal Protective Equipment (PPE) Requirements:** Specific PPE must be prescribed for the handling of different waste categories. The Plan shall detail the type, condition, and usage requirements of PPE for waste-handling personnel, in line with occupational health and safety standards.
- iii. **Proper Storage Techniques:** The WMP shall specify storage requirements for each type of waste, including segregation, containment, labelling, bunding, and access restrictions. Storage facilities must minimize the risk of leaks, cross-contamination, and environmental exposure.
- iv. **Reporting Requirements:** The Plan shall define procedures for tracking and reporting waste generation, movement, and disposal. This includes maintaining waste manifests, inventory updates, incident reports, and compliance documentation for internal audits and regulatory review.

- v. Emergency Procedures and Spill Response: The WMP must outline site-specific emergency procedures, including actions to be taken in the event of accidental spillage or leakage. It shall list the required spill response equipment (e.g., spill kits, absorbents, containment barriers) and identify responsible personnel for emergency response.
- vi. These measures will ensure that all waste-related activities are conducted in a safe, compliant, and environmentally responsible manner.

### **Improper storage of waste**

445. The Waste Management Plan (WMP) shall address risks associated with improper storage of various waste types by prescribing detailed measures that ensure safe, compliant, and environmentally sound storage practices. These measures shall include:

- i. Segregation of waste by category (e.g., hazardous, non-hazardous, recyclable, organic);
- ii. Provision of adequate, clearly labelled waste bins throughout the construction site for all waste streams;
- iii. Weatherproof coverings to prevent exposure to rain, wind, or sunlight that could degrade materials or cause leaching;
- iv. Limiting on-site storage durations—particularly for hazardous wastes—to reduce the risk of leakage or environmental contamination;
- v. Routine maintenance and cleaning of storage facilities to prevent overflow, odour, and pest infestation;
- vi. Availability of spill response kits in proximity to all hazardous waste storage areas;
- vii. Strategic placement of storage sites at a safe distance from sensitive receptors such as water bodies, residential zones, and ecologically sensitive areas.

446. Domestic solid waste shall be stored in dedicated metal containers placed on hard, level surfaces within the construction site. These containers should be enclosed on three sides by a durable fence, with convenient vehicle access provided for waste collection. Containers must not be overloaded and shall be emptied regularly by a licensed waste disposal company under formal agreement.

447. Food waste must be separated from other domestic waste streams and collected in clearly labelled containers. It shall be transferred exclusively to authorized food waste collection services for proper disposal or treatment.

448. Construction debris shall be placed in designated metal containers located on hard surfaces and enclosed on three sides by a solid fence with access roads for transportation. The containers must be managed to prevent overfilling and be emptied in a timely manner by an authorized contractor. Specific waste from concrete batch plants, including waste oil, oil-contaminated sand, oiled rags, concrete slurry, metals, and electrode residue, is prohibited from landfill disposal and must be segregated and transferred to specialized recycling or treatment facilities.

449. Waste generated from construction vehicle and plant maintenance, provided it is not contaminated with oil, shall be directed to certified scrap metal recycling companies for proper processing and reuse.

### **Waste disposal**

450. In cases where waste generation cannot be prevented, and reuse or recycling is not feasible, disposal must be carried out in accordance with the waste type, through a qualified and licensed waste management contractor. The Waste Management Plan (WMP) shall provide a comprehensive explanation of all disposal processes and requirements, covering the following aspects:

- i. Pre-qualification and Selection of Waste Contractors: Prior to engaging any waste disposal or treatment service, the Contractor shall implement a pre-qualification process to ensure the selected company adheres to recognized best practices and regulatory standards.
- ii. Verification of Licensing: Before any waste is transferred to a third-party service provider, the Contractor shall verify that the provider holds valid licenses issued by the relevant Uzbek

- authorities, authorizing them to handle, treat, or dispose of the specific waste category.
- iii. Waste Handling Requirements: All hazardous waste shall be securely stored in bunded, impermeable, and locked containment areas, as prescribed in the corresponding Material Safety Data Sheets (MSDS). Proper labelling, signage, and restricted access must be enforced to minimize environmental and health risks.
  - iv. Recordkeeping and Documentation: The Contractor shall maintain accurate and verifiable records for each waste disposal event. At a minimum, these records must include:
    - Date of collection
    - Type and description of waste
    - Quantity (by volume or weight)
    - Name and license number of the disposal company
    - Final disposal location
  - v. Disposal Permits and Supervision: The Contractor shall obtain the necessary disposal permits from local authorities prior to initiating any waste disposal activity. These permits must specify the approved disposal site, authorized waste types, and maximum allowable quantities. The Supervision Consultant shall be responsible for verifying that the Contractor disposes of waste exclusively at permitted locations, in full compliance with permit conditions.
  - vi. Reuse of Surplus Materials: Wherever feasible, surplus construction materials shall be reused or recycled in order to reduce the volume of waste requiring off-site disposal and to promote resource efficiency.

### Monitoring

451. The effective implementation of the Waste Management Plan (WMP) requires a structured and ongoing monitoring program to ensure compliance with environmental safeguards and national regulations. The WMP shall include detailed provisions for monitoring the following key aspects:

- i. Implementation of the Waste Management Plan: Regular site inspections and compliance checks to verify that all measures outlined in the WMP are being effectively applied by the Contractor.
- ii. Provision and Use of Personal Protective Equipment (PPE): Monitoring the availability and correct use of PPE by workers involved in waste handling, in accordance with occupational health and safety standards.
- iii. Compliance with Storage Requirements: Verification of proper waste segregation, containment, labelling, and maintenance of storage facilities to ensure alignment with the prescribed procedures.
- iv. Disposal Records and Transport Documentation: Routine review of waste logs and transport manifests to confirm accurate recordkeeping, traceability of waste movement, and disposal at authorized facilities.
- v. Training Updates: Tracking of training sessions conducted for staff with waste management responsibilities, including refresher courses and induction updates for new personnel.
- vi. Spill Prevention and Response Measures: Inspection of spill kits for availability, condition, and strategic placement, along with review of spill response protocols to ensure readiness in case of incidents.
- vii. Audits of Disposal Endpoints: Periodic audits of third-party disposal facilities to confirm that waste is being received, treated, or disposed of in accordance with approved permits and environmental standards

### Residual Impacts

#### Construction Phase Impacts

452. The proper and consistent implementation of the Waste Management Plan (WMP) is expected to ensure the safe and responsible handling, storage, and disposal of all construction-related waste. Through the application of mitigation measures—such as waste segregation, secure storage, licensed disposal, and spill response planning—the likelihood of accidental spillage, unauthorized disposal, or improper storage will be significantly minimized. Provided that all procedures outlined in the Management Plans are rigorously followed, the residual environmental impact from waste during

the construction phase is assessed as Minor.

## Operational Phase Impacts

453. Waste management impacts during the operational phase of the Project are considered outside the scope of this assessment, as it is anticipated that only routine maintenance and minor repair activities will be conducted. These activities are expected to generate negligible volumes of waste, with no significant environmental impacts foreseen as a result

## H. Cultural Heritage

### Introduction

454. This chapter presents the findings of the assessment of potential impacts on Cultural Heritage associated with the Project during both the construction and operational phases. For each phase, the sources and significance of potential impacts are identified, and the proposed mitigation measures to minimize or eliminate adverse effects are described in accordance with national regulations and ADB's Safeguard Policy Statement (SPS 2009)

### Approach and Methodology

455. The assessment of potential impacts on cultural heritage is based on the identification of sensitive receptors and evaluation of potential effects in accordance with the project-wide impact assessment methodology outlined in Section 5. The significance of each impact is determined by considering both the sensitivity of the receptor and the magnitude of the effect.

456. Where impacts are assessed to be of high or medium significance, appropriate mitigation measures are proposed to avoid, reduce, or manage these impacts. These measures are further incorporated into the Environmental Management Plan (EMP) presented in Section XII, ensuring integration into the overall environmental mitigation and monitoring framework for the Project.

### Construction Phase Impacts

457. Minor intrusive earthworks are anticipated during the construction phase, impacts to below-ground or buried cultural heritage assets have not been considered within the scope of this assessment. The construction activities are expected to remain at or above surface level, eliminating the risk of physical disturbance to subsurface archaeological resources.
458. The rehabilitation and upgrading of rural roads may result in temporary visual or contextual impacts on the setting of identified cultural heritage sites, particularly for individuals visiting these locations during the construction period. However, no physical alteration, relocation, or removal of any cultural heritage assets is foreseen as part of the Project, and thus, no direct or permanent impacts to such assets are anticipated.
459. The potential for cosmetic or structural damage to nearby cultural heritage structures due to ground-borne vibrations during construction has been evaluated in Section 8.3. Based on the findings of that assessment, vibration levels associated with the Project are expected to remain below thresholds of concern, and the risk of vibration-related damage is considered negligible

**Table 52. Construction Cultural Heritage**

Aspect	Cultural Heritage Impacts during construction					
	Impact nature	Negative		Positive		Neutral
Impact type	Direct		Indirect		Induced	
Impact duration	Temporary	Short-term		Long-term		Permanent
Impact extent	Local		Regional		International	
Impact scale	Small		Medium		Large	
Impact frequency	Infrequent		Frequent		Continuous	
Impact Magnitude	Positive	Negligible	Small	Medium	Large	
Receptor sensitivity	Low		Medium		High	

Impact significance	Negligible	Minor	Moderate	Major
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### Operation Phase Impacts

460. As the Project roads are already in operational use and no new routes or realignments are proposed, no adverse impacts on cultural heritage assets are anticipated during the operational phase of the Project.

### Proposed Mitigation Measures

461. In locations where construction activities occur in close proximity to identified cultural heritage sites, visual screening measures (e.g., temporary fencing or barriers) shall be implemented to minimize the visual intrusion and protect the setting of these assets. To enable better protection of these items, the contractor should submit specific “method statement” for evaluation of the CSC. These impacts are expected to be temporary in nature, limited to the duration of the construction works

### Residual Impacts

462. With the effective implementation of the proposed mitigation measures—particularly enhanced screening near sensitive sites—no significant residual impacts on cultural heritage are expected during the construction phase.

### Operational Phase

463. Given that the Project roads are already in use and operational activities will remain unchanged, no residual impacts are anticipated during the operational phase

#### I. Climate Change Impact Assessment

#### Risk assessment

464. For the purpose of this assessment, climate change-related risks to the Project have been evaluated using a 5-point risk matrix and categorized according to three potential risk ratings: Low, Medium, and High (as defined in Table 53). In this context, risk is specifically defined in relation to road infrastructure development, with emphasis on potential impacts to the structural integrity of the road and associated facilities, as well as the health and safety of road users.

465. This assessment is limited to risks directly affecting the road corridor and its functional performance. Broader climate change impacts on the wider environment—those not influencing the road or its use—are outside the scope of this analysis. This assessment will be introduced in CRVA report in detail.

466. Each outcome derived from the risk matrix will correspond to a defined risk rating, the characteristics of which are detailed in the Table 53 below

**Table 53. Definition of risk ratings**

Risk rating	Definition
High	Potential for loss of life, significant adverse safety conditions or damage to the road that renders (part of) the road unusable, requiring significant investment to repair. Measures will have to be implemented to avoid such incidents for as far as practicable, otherwise investment should be reconsidered.
Medium	Risk of incidents and adverse safety conditions is considerable, damage to the road and associated facilities could occur. Most of these risks can be mitigated with the right measures.
Low	Risk of incidents and adverse safety conditions do apply but can be considered limited and not severe. Damage to the road is unlikely. These risks are generally easily mitigatable with little investment.

467. The anticipated climate risks have been identified in accordance with the Asian Development Bank’s (ADB) guidelines for climate proofing road projects (ADB, 2011). Utilizing baseline conditions

and incorporating climate projections based on selected Shared Socioeconomic Pathways (SSPs), the identified risks were evaluated in terms of their potential impact on the road infrastructure and users. Initially, flooding was not identified as a significant risk; however, following a comprehensive review of relevant studies and datasets, flooding has been added to the list of climate-related risks due to its potential to affect the integrity and resilience of the Project infrastructure.

**Table 54. Climate risk evaluation**

Climate risk	Risk rating	Evaluation
Increased Frequency of Very Hot Day and heat waves	Medium	<p>Climate change projections indicate that the number of very hot days (i.e., days with temperatures exceeding 35 °C) is expected to increase by 10–15 days per month during the summer period, particularly in June, July, and August, when baseline temperatures are already elevated. According to ADB (2011) climate proofing guidelines, such sustained high temperatures exceed the threshold at which pavement deterioration can occur, including softening of asphalt layers, traffic-induced rutting, and migration of liquid asphalt. As a result, structural damage to the road surface is considered likely under future climate conditions.</p> <p>Additionally, elevated temperatures may pose a health and safety risk to road users, particularly in the event of vehicle breakdowns in remote areas where access to shade, water, or emergency services may be limited. To address this, it is recommended that emergency call posts or designated safety zones be integrated into the road design to allow users to seek assistance promptly.</p> <p>While the projected increase in hot days is expected to affect pavement durability, it is not anticipated to lead to severe safety impacts if a robust road maintenance strategy is in place. Given the predictability of the risk and the feasibility of effective mitigation measures, the overall climate risk is assessed as Medium</p>
Changes in Precipitation and Risk of Corrosion to Associated Structures	Medium	<p>While the number of very hot days is projected to increase, overall precipitation levels are expected to remain stable or increase slightly, with the potential for more frequent extreme precipitation events. However, historical climate data indicates that the region is already characterized by low average precipitation levels. According to ADB (2011) climate resilience guidelines, the combination of prolonged heat events and limited rainfall may lead to increased surface salt accumulation, which is known to accelerate corrosion of steel reinforcements in concrete structures, such as bridges and culverts.</p> <p>For certain associated structures, including bridges and drainage elements, this form of climate-induced corrosion may pose a structural risk. Nonetheless, the selection of appropriate construction materials and implementation of regular maintenance protocols are expected to sufficiently mitigate this risk. Given the relatively minor projected change in average precipitation patterns, and the availability of feasible engineering controls, the risk is considered limited.</p> <p>While corrosion of structural elements could increase the long-term risk of failure or safety incidents, the probability of occurrence is deemed low, and the impact manageable through proactive design and maintenance. Accordingly, the climate risk is rated as Medium.</p>
Seasonal and Temperature Variability	Low	<p>Projected increases in seasonal and temperature variability may lead to more abrupt transitions between hot and cold periods, potentially introducing a thermal shock effect on road infrastructure. Such abrupt changes can stress pavement materials and structural joints, possibly resulting in localized damage over time.</p> <p>However, for the majority of the project road section, warmer average temperatures and reduced exposure to freezing conditions, snow, and ice are expected to lessen cold-related deterioration mechanisms such as frost heave and freeze-thaw cracking. These changes may, in fact,</p>

Climate risk	Risk rating	Evaluation
		<p>have a neutral to slightly positive impact on overall road performance and safety.</p> <p>Given the limited exposure to freeze-induced damage and the potential benefits from milder winter conditions, the climate risk associated with seasonal variability is rated as Low</p>
Intense Precipitation Events	Low	<p>While projections indicate that intense precipitation events may increase slightly during the winter months, the magnitude of this change is expected to be minor and not sufficient to pose a significant risk to road infrastructure or associated facilities. Given the limited intensity and frequency of such events, and the anticipated capacity of the road drainage systems to accommodate moderate increases in runoff, the likelihood of adverse impacts is considered low.</p> <p>Accordingly, the risk associated with intense winter precipitation events is assessed as negligible and unlikely, resulting in a risk rating of Low.</p>
Increased Probability of Droughts	Medium	<p>Climate projections indicate a likely increase in the frequency and intensity of drought events during the summer months. While the health and safety risks posed by drought—such as vehicle breakdowns in remote areas without access to water or shelter—are comparable to those associated with extreme heat and heatwaves, these risks have already been addressed in the assessment of hot days.</p> <p>However, prolonged drought conditions may also have indirect effects on infrastructure integrity, such as soil desiccation, which can undermine road embankments, foundations, and drainage systems. Additionally, reduced vegetation cover due to arid conditions may contribute to erosion and dust-related visibility issues, further affecting road safety.</p> <p>Considering the combined impact on both infrastructure and user safety, the climate risk associated with drought conditions is rated as Medium</p>
Increased Flood Risk	Medium	<p>Flood risk is projected to increase in the coming years due to two main climate-related factors: (i) the accelerated melting of snow and glaciers at higher elevations, and (ii) the increased intensity and frequency of extreme precipitation events. These factors are expected to elevate the discharge levels of local rivers and streams, thereby heightening the flood risk in the project area.</p> <p>Although culverts currently exist beneath the road alignment, lack of maintenance significantly increases the likelihood of blockages, potentially leading to flood-induced damage to road infrastructure and creating hazards for road users.</p> <p>While flood risk is not expected to increase significantly along the full extent of the road corridor, it remains necessary to implement targeted flood risk reduction measures, particularly in flood-prone sections. Ensuring proper drainage—from the road surface to adjacent water bodies—will be critical in preventing localized inundation and minimizing impacts on nearby land.</p> <p>Given that feasible and effective mitigation measures (e.g., culvert rehabilitation, roadside drainage, and maintenance protocols) are readily available and can be implemented without substantial difficulty, the severity of potential impacts is considered Moderate, and the likelihood of occurrence is Possible. As such, the overall flood risk is rated as Medium</p>

### Proposed mitigation measures

468. No additional mitigation measures have been proposed for climate risks assessed as Low, as these are not expected to result in significant impacts on the Project. However, in the absence of

specific climate adaptation measures documented by the engineering consultant, the following mitigation measures are proposed for risks rated Medium or where vulnerability remains uncertain, in order to enhance the climate resilience of the road infrastructure and associated facilities.

**Table 55. Climate mitigation measures**

Climate risk	Risk rating	Mitigation measures	Residual risk
<p>Increased Frequency of Very Hot Day and heat waves</p> <p>And, changes in Precipitation and Risk of Corrosion to Associated Structures</p>	<p>Medium</p>	<p>To address the identified Medium-rated climate risks, and in the absence of detailed climate adaptation strategies from the engineering consultant, the following practical and project-specific mitigation measures are recommended to enhance the resilience of the road infrastructure and safeguard public safety:</p> <ul style="list-style-type: none"> <li>• Use of Flexible and Heat-Resistant Pavement Materials With summer temperatures expected to reach up to 38°C, pavement structures must be designed using flexible and thermally resistant materials capable of withstanding sustained heat without rutting, deformation, or asphalt bleeding. This will help prevent premature deterioration, reduce accident risk, and minimize long-term maintenance costs.</li> <li>• Increased Maintenance Budget and Implementation Plan In light of projected increases in very hot days, heat waves, and prolonged dry conditions, a dedicated maintenance budget and corresponding implementation plan should be developed. This plan should cover pavement surfaces, drainage infrastructure, bridges, and rest stop facilities, all of which are likely to experience accelerated wear and stress under evolving climate conditions.</li> <li>• Deployment of an Accident Reporting System Given the remote nature of the road corridor and the potential for breakdowns under extreme weather conditions, it is recommended to install an emergency communication system at regular intervals along the road. This system should allow direct contact with emergency services, enabling timely assistance in the event of accidents or health emergencies, and thereby reducing safety risks for road users.</li> </ul> <p>These measures, if implemented effectively, will reduce the likelihood and severity of climate-related impacts and ensure that the road remains functional, safe, and resilient under future climate scenarios</p>	<p>Low</p>
<p>Increased Probability of Droughts</p>	<p>Medium</p>	<p>In addition to the risks posed by increased hot days and heatwaves, drought conditions and potential wildfires may further impact road integrity, particularly through soil desiccation, loss of vegetation cover, and exposure to high surface temperatures. These conditions may accelerate the deterioration of pavement surfaces and associated infrastructure, thereby increasing the need for routine and emergency repairs.</p> <p>To address this, it is essential to allocate an additional maintenance budget specifically accounting for climate-induced stressors. The availability of such a budget will allow for timely maintenance and rehabilitation works, ensuring that any emerging damage is promptly repaired.</p> <p>With this mitigation measure in place, the residual risk associated with drought- and wildfire-related impacts on road infrastructure is assessed as Low</p>	<p>Low</p>

Climate risk	Risk rating	Mitigation measures	Residual risk
Increased Flood Risk	Medium	<p>To address the projected increase in flood risk resulting from intensified seasonal thaw and extreme precipitation events, the following mitigation measures are proposed during phase of detail design and construction:</p> <p>Flood Risk and Runoff Study: A comprehensive hydrological study shall be conducted to assess flood risk and surface runoff patterns from local rivers, streams, and upstream catchment areas. This study will guide the rehabilitation and redesign of existing culverts to ensure they are sized to accommodate future flood scenarios, based on climate change projections. Special consideration should be given to areas susceptible to flash floods and seasonal snowmelt, with a focus on during detail design phase:</p> <ul style="list-style-type: none"> <li>• Resizing of key culverts in high-risk flood zones;</li> <li>• Elevation adjustments to the road profile in flat or low-lying sections;</li> <li>• Integration of cement-treated base layers to increase pavement resilience and structural integrity against flood-induced erosion.</li> </ul> <p>Flood Risk Mitigation Near Settlements: Enhanced flood protection measures shall be implemented in areas where the road alignment passes through or near populated settlements. These areas are particularly vulnerable to property damage and safety hazards during flooding events. Drainage designs must be tailored to direct runoff away from residential zones and critical infrastructure.</p> <p>By incorporating site-specific runoff data and adapting drainage infrastructure accordingly, the project can significantly reduce vulnerability to flood events. With proper implementation of these measures, the residual flood risk is expected to be reduced to Low.</p>	Low

## J. Greenhouse Gases

469. Given the nature and scale of the proposed construction activities, the greenhouse gas (GHG) emissions generated during the construction phase are expected to be significantly below the ADB's reporting threshold of 100,000 tonnes of CO<sub>2</sub> equivalent per year, as defined under the ADB Safeguard Policy Statement<sup>9</sup>. Furthermore, the emissions fall below the level that would trigger mandatory quantification and monitoring requirements, in accordance with internationally recognized methodologies. As such, the potential impact of GHG emissions associated with construction activities is considered negligible, and the issue has been scoped out of further assessment

## K. Ecological Resources

### Introduction

470. This ecological impact assessment has been prepared in accordance with the Asian Development Bank (ADB) Safeguard Policy Statement (SPS, 2009), IFC Performance Standard 6 Guidance Note (GN6), and the Good Practices for Biodiversity-Inclusive Impact Assessment and Management Planning (Multilateral Financing Institutions Biodiversity Working Group, 2015), which includes guidance developed by the ADB.

471. In line with ADB SPS requirements, this assessment provides a summary of the existing biodiversity conditions within the Project area and evaluates the significance of potential impacts on

<sup>9</sup> Safeguard Policy Statement (June 2009) (adb.org)

key biodiversity receptors. The purpose of this assessment is not to catalogue all possible ecological effects, but to identify and evaluate the most significant risks, particularly those affecting sensitive receptors, such as threatened or endangered species and critical habitats.

472. Where potential impacts on biodiversity are identified, appropriate avoidance and mitigation measures are recommended. The objective is to achieve negligible residual impacts and to ensure no net loss of biodiversity. In cases where significant adverse residual impacts are unavoidable, the application of biodiversity offset measures and additional conservation actions is recommended, where relevant, to maintain alignment with ADB's environmental safeguards and to ensure that the Project does not result in significant long-term ecological harm.

### **Approach and Methodology**

473. This section evaluates the anticipated impacts on biodiversity receptors arising from the proposed Project. The methodology applied is informed by the Good Practices for Biodiversity-Inclusive Impact Assessment and Management Planning developed by the Multilateral Financing Institutions Biodiversity Working Group (2015) and IFC Guidance Note 6 (GN6).

474. Biodiversity receptors relevant to this assessment were identified during the baseline surveys. For each receptor, the sensitivity or ecological value was determined. The expected impacts and their pathways were then identified, and the scale and magnitude of each impact was characterized. The level of significance was subsequently assessed by comparing the receptor's sensitivity with the scale of the predicted impact, incorporating both the likelihood and potential consequence of the effect. All impact assessments take into account embedded design measures or mitigation features incorporated into the Project to avoid or minimize adverse effects.

475. Definitions and explanations of a receptor's sensitivity, the scale of impact, and the resulting level of significance are provided in subsequent sections. The level of significance determines whether an impact is acceptable, or if additional mitigation measures are necessary to reduce its severity.

476. The magnitude of each impact is informed by a range of characteristics, which collectively define the scale of the effect. The primary characteristics considered include:

- i. Positive or Negative – whether the impact enhances or degrades the condition of the receptor;
- ii. Extent – the spatial coverage of the impact;
- iii. Duration – the temporal scale of the effect, relative to the ecological importance of the receptor;
- iv. Scale – the intensity, size, or degree of the impact, such as the percentage change in population or habitat area;
- v. Frequency and Timing – how often and at what stage of ecological cycles the impact occurs;
- vi. Reversibility – whether the receptor can recover naturally or through intervention within a reasonable timeframe.

477. In predicting impacts, the assessment also considers the historical, current, and potential future pressures on biodiversity receptors. These may include:

- i. Resource availability (e.g., habitat quality, food, and water);
- ii. Environmental processes (e.g., flooding, drought, or climate change);
- iii. Ecological processes (e.g., species migration, breeding cycles, or natural population variation);
- iv. Human activities (e.g., land-use change, resource extraction, or cultural dependencies);
- v. Historical context (e.g., habitat fragmentation, species range reduction, and long-term ecological trends).

478. Impacts are assessed individually for each receptor, taking into account the specific conditions of the receptor and the nature of the proposed project activities. The impact characterization is based on the best available data, and impacts are quantified wherever feasible. Where data is lacking or

insufficient, professional expert judgment is applied to ensure a precautionary and evidence-based approach.

479. The assessment focuses only on those impact characteristics relevant to understanding the receptor's ecological response. The scale of impact is informed by these characteristics, and the analysis leads to an evaluation of impact magnitude, categorized as Negligible, Small, Medium, or Large for the purposes of this assessment.

**Table 56. Impact scale description for biodiversity receptors**

Impact Magnitude	Illustrative Description
Large	May affect an entire population or species in sufficient magnitude to cause a decline in abundance and/or change in distribution beyond which natural recruitment (reproduction, immigration from unaffected areas) would not return that population or species, or any population or species dependent upon it, to its former level within several generations.
Medium	May affect a portion of a population and may bring about a change in abundance and/or distribution over one or more generations but does not threaten the integrity of that population or any population dependent on it.
Small	May affect specific group of localised individuals within a population over a short time period (one generation or less), but does not affect other trophic levels or the population itself.
Negligible	Immeasurable, undetectable or within the range of normal natural variation.

480. The significance of a potential impact is partially determined by the sensitivity of the biodiversity receptor being assessed. Sensitivity is a function of the receptor's fragility and its susceptibility to environmental change or external pressures. A more sensitive receptor is likely to experience more severe consequences from a given impact. Guidance on determining receptor sensitivity is provided in Table 57.

**Table 57. Sensitivity of biodiversity receptors approach description**

Sensitivity	Receptor	Illustrative Description
High	Sites	<p>Biodiversity receptors considered to be of high sensitivity typically include the following:</p> <p>Internationally Recognized and Nationally Protected Areas:</p> <ul style="list-style-type: none"> <li>• Key Biodiversity Areas (KBAs)</li> <li>• Important Bird and Biodiversity Areas (IBAs)</li> <li>• Ramsar Sites</li> <li>• World Heritage Sites, Natura 2000 and Emerald Network Sites</li> <li>• Nationally designated protected areas (e.g., nature reserves, wildlife sanctuaries, national parks)</li> <li>• Rare or Endangered Habitats:</li> </ul>
	Habitats	<p>Habitats listed as Critically Endangered (CR) or Endangered (EN) on the IUCN Red List of Ecosystems</p> <ul style="list-style-type: none"> <li>• Habitats protected under national legislation</li> <li>• Globally restricted habitats with limited spatial distribution</li> <li>• Habitats unlikely to recover after disturbance</li> <li>• Habitats supporting globally threatened species, or those considered Critical Habitat under international definitions</li> <li>• Ecosystems significant for key evolutionary processes, including Alliance for Zero Extinction (AZE) sites</li> </ul>
	Species	<p>Species of Conservation Concern:</p> <ul style="list-style-type: none"> <li>• Species categorized as Critically Endangered (CR) or Endangered (EN) on the IUCN Red List</li> <li>• Endemic species or those with restricted geographic ranges</li> <li>• Species that trigger Critical Habitat thresholds</li> <li>• Species that are the basis for the designation of internationally protected sites</li> </ul>

Sensitivity	Receptor	Illustrative Description
Medium	Sites	Biodiversity receptors classified as having medium sensitivity generally include the following:  Regionally Protected Areas: <ul style="list-style-type: none"> <li>Sites designated for conservation at the regional or subnational level (e.g., regional nature reserves or ecological corridors not internationally recognized)</li> </ul>
	Habitats	Regionally Rare or Threatened Habitats: <ul style="list-style-type: none"> <li>Habitats that are rare, threatened, or limited in extent within the regional or national context</li> <li>Habitats exhibiting a slow natural recovery rate following disturbance</li> <li>Habitats known to support nationally or regionally rare or threatened species</li> </ul>
	Species	Species of Regional Conservation Concern: <ul style="list-style-type: none"> <li>Species categorized as Vulnerable (VU) on the IUCN Red List</li> <li>Species listed in the National Red Data Book or equivalent national conservation registers</li> </ul>
Low	Sites	N/A
	Habitats	Habitat that is not rare, threatened or protected under national legislation, nor is it designated as protected or conservation site. Habitat often degraded or highly modified with no national protection for biodiversity purposes.
	Species	Common species of plants and animals that are not rare, threatened or protected, or used to designate conservation sites under legislation.

481. The significance of an ecological impact is determined as a function of the sensitivity of the biodiversity receptor and the scale or magnitude of the impact. This evaluation is based on the best available data. Where data is insufficient and additional field surveys are not feasible, the application of the precautionary principle requires that significant impacts be assumed unless a confident, evidence-based conclusion of no significant effect can be scientifically supported.

482. The level of impact significance is categorized as follows:

- i. Positive Significance: The impact results in an overall improvement in the condition or viability of the biodiversity receptor.
- ii. Negligible Significance: The impact is barely detectable and does not affect the biodiversity value or ecological function of the receptor.
- iii. Minor Significance: The impact results in no net loss of biodiversity value, regardless of the receptor's conservation status.
- iv. Moderate Significance: The impact results in a net loss of biodiversity value for receptors with conservation status of Least Concern (LC), Near Threatened (NT), or Vulnerable (VU).
- v. Major Significance: The impact causes a net loss in biodiversity value to receptors classified as Critically Endangered (CR) or Endangered (EN), or causes a receptor's conservation status to change to CR or EN. Impacts to receptors that trigger Critical Habitat thresholds also fall within this category.

483. To manage impacts on biodiversity receptors, the Project will implement the Biodiversity Mitigation Hierarchy (see Figure 65) in alignment with ADB's Safeguard Policy Statement (2009). This hierarchy aims to achieve No Net Loss (NNL) of biodiversity, and, where possible, contribute to Net Gain (NG). The hierarchy involves the following sequential steps:

- i. Avoid: Give priority to avoiding biodiversity impacts altogether through appropriate project siting and design.
- ii. Minimize: For impacts that cannot be avoided, implement measures to reduce the duration, intensity, and extent of the impacts.
- iii. Restore: Undertake actions to rehabilitate affected ecosystems and restore their ecological

functions.

- iv. Offset: After all previous steps have been exhausted, implement offset measures to compensate for residual impacts. This is considered a last resort to ensure at least No Net Loss of biodiversity.

484. This hierarchy reflects the procedural structure defined under ADB's ESS6, following the sequence of Avoid → Minimize → Restore → Offset, to systematically guide biodiversity conservation efforts



Figure 65. Biodiversity mitigation hierarchy ([www.usgs.gov](http://www.usgs.gov))

485. Figure 65 illustrates the Biodiversity Mitigation Hierarchy, outlining the sequential steps required to reduce residual impacts and achieve the desired outcomes of No Net Loss (NNL) or Net Gain (NG) in biodiversity value. The Project will not result in significant conversion or degradation of natural habitats unless all of the following conditions are met:

- i. There are no feasible alternatives to the proposed activities within the identified location;
- ii. A comprehensive cost-benefit analysis clearly demonstrates that the overall project benefits outweigh the associated environmental and social costs, including long-term biodiversity losses;
- iii. Any conversion or degradation is subject to appropriate mitigation measures, aligned with the Biodiversity Mitigation Hierarchy, including potential offsets where applicable.

486. The Project will ensure that losses of modified habitats and any potential degradation are minimized through careful planning and design. Where possible, the Project will also seek opportunities to enhance habitat conditions and promote biodiversity conservation as part of its ongoing operations.

487. All mitigation measures—including both those already embedded in the Project design and those recommended as part of the impact assessment process—will be clearly outlined and incorporated into the Project's Environmental Management Plan (EMP). The EMP will serve as the implementation framework for biodiversity safeguards and compliance monitoring.

488. Impacts on Aquatic Fauna: The duration of works on the bridges in Tashkent Region will be approximately 6 months or more. Therefore, the impact will be short-term. No new bridges will be constructed; only major repairs will be carried out. However, water turbidity may increase due to construction activities, which could lead to the death of zooplankton and zoobenthos. In the sections of the planned construction works on the Syrdarya and Angren rivers, there are no spawning grounds or other areas of high fish concentration. At the bridges where repairs will be conducted, there are no rare or Red Book-listed fish species or other sensitive species. However, it should be noted that

the Syrdarya shovelnose (*Pseudoscaphirhynchus fedtschenkoi*) inhabits the Syrdarya River and is listed in the Red Book of Uzbekistan. No mitigation measures are required. However, the contractor shall implement controls to prevent the discharge of domestic wastewater into irrigation canals and stormwater drainage systems.

489. **Animal-Related Accidents:** To prevent harm to wildlife during construction, the following measures shall be implemented:

- i. **Schedule Construction Outside of Breeding and Migration Periods:** Major construction activities should be planned to avoid bird breeding seasons and migration periods.
- ii. **Pre-Construction Surveys and Monitoring:** Prior to commencement, surveys should be conducted to identify the presence of key wildlife species within the project area, and corresponding mitigation plans should be established.
- iii. **Minimize Habitat Disturbance:** Avoid unnecessary clearing of grasslands and forests within the construction zone. The removal of natural vegetation should be minimized to preserve existing habitats.
- iv. **Develop and Implement Vegetation Restoration Plans:** After construction, restoration measures should be taken in areas where vegetation has been disturbed, such as replanting native species and rehabilitating grassland areas.
- v. **Biodiversity Protection Training and Site Management:** Construction workers shall receive training on biodiversity protection measures to ensure that environmentally responsible practices are followed on-site.
- vi. **Waste and Pollutant Management:** Proper control and disposal of waste and hazardous substances shall be enforced to prevent environmental contamination that could affect wildlife.

490. **Presence of Protected or Endangered Species:** Saiga antelope, wild boar, argali, goitered gazelle, and other species listed in Uzbekistan's national conservation register are not present within the Project area. No other rare or endangered species are recorded within the Project corridor. Mitigation actions are not required.

491. Tashkent Region is located in a foothill zone, which includes several vegetation zones such as foothill steppes, mountain slopes with shrub and forest vegetation, as well as tugai thickets in river valleys.

492. The plant life of Tashkent Region is diverse and includes both mountain and plain vegetation. In the foothills and valleys grow various trees and shrubs such as poplar, birch, almond, cherry, hawthorn, maple, pistachio, wild apple, walnut, and willow. Also found are various species of onions, tulips, rhubarb, and irises. In the mountainous areas, shrubs such as almond, curly-leaved shrubs, and cherry bushes can be seen, while in the lower mountain areas, a valuable tree species—the Zarafshan juniper—is present. Herbaceous communities are also found, including licorice and camelthorn.

493. In close proximity to the planned roads, trees are rarely encountered. Rural roads mostly pass through open areas, and where trees and shrubs are visible, they are located outside the right-of-way and will not be affected by construction works. Figure 66 presents an aerial photograph illustrating that vegetation is located at a distance from the planned road, and trees are rarely planted.

494. Road widening is not planned. The roads are of category IV–V, and all construction activities will take place along existing rural roads. Therefore, there will be no impact on green vegetation.



Figure 66. Aerial photograph of planted green vegetation (approximately 7–12 m)

**Operational Phase Impacts Habitats and Flora**

495. The Project entails the reconstruction of existing roads, with no planned increase in the road footprint and no permanent land acquisition beyond the current alignment. The habitat and vegetation within the Project area are characterized by sparse and degraded flora, and the Project design has intentionally embedded measures to prioritize the siting of temporary construction facilities within already modified or disturbed areas. Baseline assessments have confirmed that no threatened or endangered plant species are present within the area of influence.

496. Given the limited ecological value of the affected habitat, the absence of significant flora, and the avoidance of undisturbed natural areas, the scale of impact is considered negligible, particularly when viewed within the context of the broader landscape

**Table 58. Habitat and flora loss**

Aspect	Habitat and Flora Loss					
	Negative		Positive		Neutral	
Impact nature	Negative		Positive		Neutral	
Impact type	Direct		Indirect		Induced	
Impact duration	Temporary	Short-term	Long-term	Permanent		
Impact extent	Local		Regional		International	
Impact scale	Small		Medium		Large	
Impact frequency	Infrequent		Frequent		Continuous	
Impact magnitude	Positive	Negligible	Small	Medium	Large	
Receptor sensitivity	Low		Medium		High	
Impact significance	Positive	Negligible	Minor	Moderate	Major	

**Mammals**

497. Based on baseline surveys and habitat assessments, no mammal species present within the Project area trigger Critical Habitat status in accordance with ADB Safeguard Policy Statement (2009). Therefore, the sensitivity of the mammal receptor group is assessed as Medium.

498. The scale of potential impacts on mammal species is deemed negligible, with anticipated infrequency of interaction with Project activities, if any. Species recorded within the Project area are considered either abundant, regionally widespread, or sparsely distributed. While some disturbance may occur during the construction phase, such impacts are expected to be intermittent and localized,

and limited to specific phases of construction.

499. Given the modified condition of the existing habitat and the widespread availability of similar habitat types across the region, the temporary disturbance or loss of suitable habitat is not expected to result in any significant or long-term impact on mammal species populations within or around the Project area

**Table 59. Mammals: Habitat loss**

Aspect	Habitat Loss				
	Negative	Positive	Neutral		
Impact nature	Negative	Positive	Neutral		
Impact type	Direct	Indirect	Induced		
Impact duration	Temporary	Short-term	Long-term	Permanent	
Impact extent	Local	Regional	International		
Impact scale	Small	Medium	Large	Continuous	
Impact frequency	Infrequent	Frequent	Large	Continuous	
Impact magnitude	Positive	Negligible	Small	Medium	Large
Receptor sensitivity	Low	Medium		High	
Impact significance	Positive	Negligible	Minor	Moderate	Major

**Table 60. Mammals: Disturbance from construction, noise, dust and emissions**

Aspect	Disturbance from Construction Noise, Dust and Emissions				
	Negative	Positive	Neutral		
Impact nature	Negative	Positive	Neutral		
Impact type	Direct	Indirect	Induced		
Impact duration	Temporary	Short-term	Long-term	Permanent	
Impact extent	Local	Regional	International		
Impact scale	Small	Medium	Large	Continuous	
Impact frequency	Infrequent	Frequent	Large	Continuous	
Impact magnitude	Positive	Negligible	Small	Medium	Large
Receptor sensitivity	Low	Medium		High	
Impact significance	Positive	Negligible	Minor	Moderate	Major

**Table 61. Mammals: Induced poaching from construction workers**

Aspect	Induced Poaching from Construction Workers				
	Negative	Positive	Neutral		
Impact nature	Negative	Positive	Neutral		
Impact type	Direct	Indirect	Induced		
Impact duration	Temporary	Short-term	Long-term	Permanent	
Impact extent	Local	Regional	International		
Impact scale	Small	Medium	Large	Continuous	
Impact frequency	Infrequent	Frequent	Large	Continuous	
Impact magnitude	Positive	Negligible	Small	Medium	Large
Receptor sensitivity	Low	Medium		High	
Impact significance	Positive	Negligible	Minor	Moderate	Major

## Birds

500. Although no bird species recorded within the Project area trigger Critical Habitat designation under ADB's Safeguard Policy Statement (2009), three bird species classified as Endangered (EN) on the IUCN Red List have been identified as likely to be present based on the Critical Habitat Assessment (CHA). These include the Egyptian vulture (*Neophron percnopterus*), Pallas's fish-eagle (*Haliaeetus leucoryphus*), and Saker falcon (*Falco cherrug*). These species are subject to global population declines and are sensitive to construction-related disturbances such as habitat disruption, noise, and vibrations. Therefore, the sensitivity of this receptor group is assessed as High.

501. The scale of potential impacts on bird species is considered negligible and infrequent, if occurring at all. Most bird species observed or likely to occur in the area are either widespread, regionally abundant, or only sparsely distributed. Any disturbance is expected to be localized and intermittent, limited to specific phases of construction and not continuous throughout the construction period.

502. Considering the application of appropriate mitigation measures—such as timing construction

activities to avoid peak breeding periods—and the distance between core bird habitats and the Project footprint, the temporary impacts on bird populations are not expected to result in any significant or lasting effects on the conservation status or viability of these species within the reg

**Table 62. Birds: Habitat loss**

Aspect	Habitat Loss				
Impact nature	Negative		Positive		Neutral
Impact type	Direct		Indirect		Induced
Impact duration	Temporary	Short- term	Long- term	Permanent	
Impact extent	Local		Regional		International
Impact scale	Small	Medium	Large		Continuous
Impact frequency	Infrequent	Frequent		Large	Continuous
Impact magnitude	Positive	Negligible	Small	Medium	Large
Receptor sensitivity	Low		Medium		High
Impact significance	Positive	Negligible	Minor	Moderate	Major

**Table 63. Birds: Disturbance from construction noise, dust and emissions**

Aspect	Disturbance from Construction Noise, Dust and Emissions				
Impact nature	Negative		Positive		Neutral
Impact type	Direct		Indirect		Induced
Impact duration	Temporary	Short-term	Long-term	Permanent	
Impact extent	Local		Regional		International
Impact scale	Small	Medium	Large		Continuous
Impact frequency	Infrequent	Frequent		Large	Continuous
Impact magnitude	Positive	Negligible	Small	Medium	Large
Receptor sensitivity	Low		Medium		High
Impact significance	Positive	Negligible	Minor	Moderate	Major

**Table 64. Birds: Induced poaching from construction workers**

Aspect	Induced Poaching from Construction Workers				
Impact nature	Negative		Positive		Neutral
Impact type	Direct		Indirect		Induced
Impact duration	Temporary	Short-term	Long-term	Permanent	
Impact extent	Local		Regional		International
Impact scale	Small	Medium	Large		Continuous
Impact frequency	Infrequent	Frequent		Large	Continuous
Impact magnitude	Positive	Negligible	Small	Medium	Large
Receptor sensitivity	Low		Medium		High
Impact significance	Positive	Negligible	Minor	Moderate	Major

## Reptiles

503. No reptile species identified within the Project area meet the criteria for triggering critical habitat as defined under applicable safeguard standards. Accordingly, the sensitivity of this ecological receptor is assessed as medium.

504. The magnitude of potential impacts on reptile species is considered negligible and is expected to be infrequent, if it occurs at all. The reptile species likely to be present are generally characterized as either abundant, widely distributed, or sparsely populated. Therefore, the overall scale of impact is assessed as small. Any impact that may occur will be confined to the construction phase, and even then, only to certain intervals within that phase.

505. Given the altered condition of the habitat and the broad regional availability of similar habitat types, any temporary disturbance to suitable habitat is not anticipated to result in significant adverse effects on the reptile populations present within the Project area

**Table 65. Reptiles: Habitat loss**

Aspect	Habitat Loss				
Impact nature	Negative		Positive		Neutral
Impact type	Direct		Indirect		Induced
Impact duration	Temporary	Short-term		Long-term	Permanent
Impact extent	Local		Regional		International
Impact scale	Small		Medium		Large
Impact frequency	Infrequent		Frequent		Continuous
Impact magnitude	Positive	Negligible	Small	Medium	Large
Receptor sensitivity	Low		Medium		High
Impact significance	Positive	Negligible	Minor	Moderate	Major

**Table 66. Reptiles: Disturbance from construction noise, dust and emissions**

Aspect	Disturbance from Construction Noise, Dust and Emissions				
Impact nature	Negative		Positive		Neutral
Impact type	Direct		Indirect		Induced
Impact duration	Temporary	Short-term		Long-term	Permanent
Impact extent	Local		Regional		International
Impact scale	Small		Medium		Large
Impact frequency	Infrequent		Frequent		Continuous
Impact magnitude	Positive	Negligible	Small	Medium	Large
Receptor sensitivity	Low		Medium		High
Impact significance	Positive	Negligible	Minor	Moderate	Major

**Table 67. Reptiles: Induced poaching from construction workers**

Aspect	Induced Poaching from Construction Workers				
Impact nature	Negative		Positive		Neutral
Impact type	Direct		Indirect		Induced
Impact duration	Temporary	Short-term		Long-term	Permanent
Impact extent	Local		Regional		International
Impact scale	Small		Medium		Large
Impact frequency	Infrequent		Frequent		Continuous
Impact magnitude	Positive	Negligible	Small	Medium	Large
Receptor sensitivity	Low		Medium		High
Impact significance	Positive	Negligible	Minor	Moderate	Major

## Operational Phase Impacts

### Habitats and Flora

**Table 68. Habitats and flora degradation**

Aspect	Habitat and Flora Degradation				
Impact nature	Negative		Positive		Neutral
Impact type	Direct		Indirect		Induced
Impact duration	Temporary	Short-term		Long-term	Permanent
Impact extent	Local		Regional		International
Impact scale	Small		Medium		Large
Impact frequency	Infrequent		Frequent		Continuous
Impact magnitude	Positive	Negligible	Small	Medium	Large
Receptor sensitivity	Low		Medium		High
Impact significance	Positive	Negligible	Minor	Moderate	Major

**Mammals****Table 69. Mammals: Habitat fragmentation**

<b>Aspect</b>	<b>Habitat Fragmentation</b>				
Impact nature	Negative		Positive		Neutral
Impact type	Direct		Indirect		Induced
Impact duration	Temporary	Short-term	Long-term	Permanent	
Impact extent	Local		Regional		International
Impact scale	Small		Medium		Large
Impact frequency	Infrequent		Frequent		Continuous
Impact magnitude	Positive	Negligible	Small	Medium	Large
Receptor sensitivity	Low		Medium		High
Impact significance	Positive	Negligible	Minor	Moderate	Major

**Birds****Table 70. Birds: Habitat fragmentation**

<b>Aspect</b>	<b>Habitat Fragmentation</b>				
Impact nature	Negative		Positive		Neutral
Impact type	Direct		Indirect		Induced
Impact duration	Temporary	Short-term	Long-term	Permanent	
Impact extent	Local		Regional		International
Impact scale	Small		Medium		Large
Impact frequency	Infrequent		Frequent		Continuous
Impact magnitude	Positive	Negligible	Small	Medium	Large
Receptor sensitivity	Low		Medium		High
Impact significance	Positive	Negligible	Minor	Moderate	Major

**Reptiles****Table 71. Reptiles: Habitat fragmentation**

<b>Aspect</b>	<b>Habitat Fragmentation</b>				
Impact nature	Negative		Positive		Neutral
Impact type	Direct		Indirect		Induced
Impact duration	Temporary	Short-term	Long-term	Permanent	
Impact extent	Local		Regional		International
Impact scale	Small		Medium		Large
Impact frequency	Infrequent		Frequent		Continuous
Impact magnitude	Positive	Negligible	Small	Medium	Large
Receptor sensitivity	Low		Medium		High
Impact significance	Positive	Negligible	Minor	Moderate	Major

**Proposed Mitigation Measures Construction**

506. Construction activities will adhere to Good International Practice (GIP) and follow the established mitigation hierarchy to avoid, minimize, and manage biodiversity-related impacts. GIP encompasses general environmental protection measures that are not necessarily species- or receptor-specific and will be implemented regardless of confirmed species presence. These include, for example, scheduling works to avoid bird nesting seasons and ensuring the availability of spill response kits, particularly near sensitive areas such as watercourses.

507. Implementation of biodiversity-related GIP will be overseen by an Ecological Clerk of Works (ECoW), to be appointed by the Contractor. The ECoW will conduct pre-clearance surveys for sensitive biodiversity receptors and ensure that the mitigation commitments outlined in this IEE are incorporated into and implemented through the Project's Environmental Management Plan (EMP). The ECoW will possess appropriate training and experience in applied field ecology, including species handling, identification of sensitive species and habitats, and a working knowledge of environmental regulations and the construction process.

508. A summary of GIP measures relevant to biodiversity mitigation is presented in Table 72. With the implementation of these measures during construction, it is anticipated that residual impacts on biodiversity receptors will be minimized to levels that are not significant. The Critical Habitat Assessment (CHA) identified three endangered avian species requiring special consideration in the application of mitigation measures to ensure no net loss of biodiversity. Due to the low level of residual impact significance, the development of a formal Biodiversity Action Plan or species-specific management plans is not deemed necessary at this stage.

509. The following endangered (EN) bird species require specific attention from the ECoW during the implementation of mitigation measures include:

- i. Neophron percnopterus (Egyptian vulture) – EN
- ii. Haliaeetus leucoryphus (Pallas’s fish-eagle) – EN
- iii. Falco cherrug (Saker falcon) – EN

510. To reduce the risk of construction delays due to the presence of active nests, it is recommended that works be scheduled outside the primary bird breeding season for the above species. Specifically, vegetation clearance or removal of suitable nesting habitat should occur between September and March, subject to confirmation by the ECoW. The ECoW will assess habitat suitability and the presence of active nests through pre-construction checks, as nesting may still occur outside the typical breeding season.

**Table 72. Biodiversity mitigation measures for the Project**

Source of Impact	Proposed mitigation
<p>Vegetation Clearance and Species Mitigation Measures for the road corridor and site compounds</p>	<p>To avoid or minimize the removal of vegetation—including grasses, scrub, and trees—the following mitigation measures will be implemented:</p> <ul style="list-style-type: none"> <li>• Worksite Selection: Construction activities will be confined, wherever feasible, to existing hardstanding areas, barren land, or locations devoid of surface vegetation. This applies to the siting of laydown areas, construction compounds, and material storage zones.</li> <li>• Access Routing: Existing access tracks or natural gaps in vegetation will be utilized as preferred access routes to reduce vegetation disturbance.</li> <li>• Demarcation of Working Zones: All access routes and work areas will be clearly delineated and selected based on the principle of avoidance and minimization of vegetation clearance.</li> </ul> <p>Mitigation Measures Where Vegetation Clearance is Required Where vegetation clearance is unavoidable, the following species protection protocols will be adopted:</p> <ul style="list-style-type: none"> <li>• Pre-Clearance Marking: Areas designated for vegetation removal will be clearly marked in advance using posts and visible markers (tape or rope).</li> <li>• Breeding Season Timing: All vegetation clearance, including that of grasses, trees, and shrubs, will be scheduled outside the recognized bird breeding season, as determined by the Ecological Clerk of Works (ECoW).</li> <li>• Nesting Bird Surveys: If works must proceed during the breeding season, a pre-clearance survey for nesting birds will be conducted by the ECoW.</li> <li>• Exclusion Zones: Upon identification of any active nest, the ECoW will establish an appropriate exclusion zone. Clearance within this zone will be deferred until the nest is confirmed as inactive or no longer in use. These procedures apply particularly to ground-nesting birds, which may nest in low vegetation such as ling grasses and low-lying scrub.</li> </ul> <p>Seasonal Considerations for Other Fauna</p> <ul style="list-style-type: none"> <li>• Hibernation Season Priority: Vegetation clearance will be prioritized during the recognized hibernation season for local reptile, amphibian, and mammal species.</li> <li>• Two-Phase Directional Cutting: Where clearance must occur during the active season:</li> </ul>

Source of Impact	Proposed mitigation
	<p>i. A first cut down to 150 mm will be carried out directionally to allow fauna to escape toward suitable retained habitat.</p> <p>ii. After a 24-hour interval, the vegetation may then be reduced to ground level.</p> <p>iii. The ECoW will assess habitat suitability and determine whether the two-phase cut is necessary. If deemed unsuitable habitat, clearance may proceed in a single phase.</p> <p>Fire Prevention</p> <ul style="list-style-type: none"> <li>• Prohibition of Open Burning: The use of fire for vegetation clearance is strictly prohibited.</li> <li>• Worker Awareness: The workforce will receive training on fire risk management and measures to prevent bushfires.</li> </ul> <p>Processing and Removal of Vegetation Arisings</p> <ul style="list-style-type: none"> <li>• Grass Cuttings and Mulch: Where feasible, arisings from grass and mulch will be left in situ. Where topsoil removal is required, these arisings will be incorporated into soil stockpiles.</li> <li>• Woody Biomass: Woody vegetation will be logged or chipped and either removed off-site for composting or used as firewood. Where practicable, hibernacula will be constructed on-site using log piles, topped with mulch or chippings, to enhance habitat for wildlife.</li> </ul> <p>Reinstatement and Compensation Measures</p> <ul style="list-style-type: none"> <li>• Vegetation Restoration: Temporarily cleared vegetation will be reinstated via reseedling or replanting, using locally sourced seed mixes and saplings. Where possible, tree replanting will be on a like-for-like basis, or at minimum with native species.</li> <li>• Soil Management: Topsoil and subsoil will be stripped and stored separately for use during site reinstatement.</li> <li>• Reinforcement of Fire Protocols: As above, open fires remain prohibited and fire prevention training will be reinforced throughout the workforce.</li> </ul>
Vehicle movements	<ul style="list-style-type: none"> <li>• Single vehicle track policies and use of low-impact vehicles will be applied where practical.</li> <li>• Off-road travel will be prohibited where practical.</li> <li>• Natural breaks in vegetation will be used as preferred access routes where possible.</li> <li>• The workforce will adhere to working corridors.</li> <li>• All staff will be provided with environmental awareness training.</li> <li>• The workforce will not deviate from approved clearance areas.</li> <li>• Appropriate speed limits will be applied, and traffic will be restricted to existing and/or dedicated haul routes to reduce direct mortality and disturbance from vehicles during construction. Penalties for violation will apply.</li> <li>• Pre-clearance site surveys will be conducted before the commencement of all works to prevent animals present in working area being killed or injured during works.</li> <li>• Checks will be for all vertebrate species and will specifically include ground nesting birds and reptiles.</li> <li>• Less noisy machinery and/or noise barriers will be used where appropriate (e.g., around static equipment in sensitive areas).</li> </ul>
Fencing	<ul style="list-style-type: none"> <li>• Fencing will be restricted to work compounds and associated areas to ensure that habitats are not fragmented by workforce activities unless this is for species protection measures. Temporary barriers will be used to prevent wildlife from accessing waste disposal areas and similar areas.</li> <li>• The avoidance/minimisation of fencing being used during construction must be prioritized to reduce negative impacts on</li> </ul>

Source of Impact	Proposed mitigation
	<p>species movements. Any fencing to be used as part of the construction must be wildlife friendly with no barbed wire or sharp points exposed. Recommend Heras fencing to be used as this is anti-climb for humans and will exclude large mammals from the work areas. Relatively long distances of fencing erected must consider animal movements across the landscape and not block key large mammal migration routes during the migratory season or access to key water sources during periods of low rainfall or drought.</p> <ul style="list-style-type: none"> <li>Any fencing erected to be inspected by the ECoW based on the considerations above.</li> </ul>
Waste and Pest Management	<ul style="list-style-type: none"> <li>Contractors will be required to conduct regular debris clean-up activities immediately upon possession of the work site and to maintain the assigned sections throughout project construction including by regular collection and hauling of wastes to government-approved landfill locations.</li> <li>Sign boards will be installed along the project road at 5 km intervals to remind drivers not to throw garbage along the road.</li> <li>The estimated cost of collecting and hauling the waste along the road is assumed to be part of construction costs.</li> <li>Contractor (in coordination with regulators) will undertake rodent control in all camps.</li> </ul>
Construction of working compounds and camps	<ul style="list-style-type: none"> <li>Construction camps will be located away from areas of natural habitat (as determined by the ECoW) and a hunting ban will be enforced for all construction workers.</li> <li>Good site practice regarding the storage of waste and food will be implemented.</li> <li>Temporary barriers and covers will be used to prevent wildlife from accessing waste disposal areas and similar areas.</li> </ul>
Spread of non-native / invasive species	<p>Any invasive non-native species (INNS) will be identified, demarcated, and removed in accordance with GIP. GIP, e.g. cleaning of equipment before transport to site, will be applied to prevent accidental introduction of INNS. The project team will not intentionally introduce any new INNS (not currently established in the country or region of the project) unless this is carried out in accordance with the existing regulatory framework for such introduction. Notwithstanding the above, the project team will not deliberately introduce any INNS with a high risk of invasive behaviour regardless of whether such introductions are permitted under the existing regulatory framework. All introductions of INNS will be subject to a risk assessment (as part of the project's environmental and social risks and impacts identification process) to determine the potential for invasive behaviour. The project team will implement measures to avoid the potential for accidental or unintended introductions including the transportation of substrates and vectors (such as soil, ballast, and plant materials) that may harbour INNS.</p>
Use of fuels and chemicals	<p>Use of GIP to minimise impacts associated with dust and pollution (e.g. use of drip trays understanding equipment, designated refuelling areas with hardstanding).</p>
Use of water during construction	<ul style="list-style-type: none"> <li>Water abstraction and wastewater management must be managed via an on-site water resource management plan to reduce the pressures on local water resources and maintain aquatic habitats at levels to support local ecology.</li> <li>Engagement with local water supply agency to ensure water levels are not depleted to unacceptable levels from the construction activities. Contingency measures must be in place to temporarily stop works involving water usage should levels drop below acceptable levels to allow for water resources to replenish. This risk will be relatively higher during periods of low rainfall.</li> <li>Water resource management plan must also contain measures to control contaminated water runoff from construction activities into</li> </ul>

Source of Impact	Proposed mitigation
	<p>local watercourses. Physical barriers must be in place to avoid contaminated surface water runoff into nearby watercourses.</p> <ul style="list-style-type: none"> <li>• Contractors will be required to avoid water leakage and formation of permanent surface water at construction sites that can attract birds and mammals. As part of this, the roadbed must not have depressions where rainwater is accumulated.</li> <li>• Pre-start checks must be carried out for all machinery and equipment involved in water usage during construction by an authorised and competent person. Service and inspection records must be kept on site to demonstrate the machinery is fit for purpose.</li> </ul>
Construction Lighting	Works will not be lit where this is practical. Where lighting is required, it will be directional and non-UV lighting sources will be employed.
Contractor Behaviour	Biodiversity awareness will be included within the contractor's site induction training. This will include roles and responsibilities, inventory of all critically endangered, endangered, and protected species using photographs, behaviour training including bans on hunting, foraging, and trapping, national regulatory requirements, activities that should be observed in specific sections or periods/months to avoid or minimise the risk of disturbance, injury, or death of critically endangered and endangered, and protected wildlife species, and reporting and protection activities during chance encounter with specific mammals, reptile, amphibian, and bird species.

## Operation

511. The operation of the Project is expected to maintain the road's existing function, as the Project does not involve the construction of new roads or the widening of the current road network. Consequently, no material environmental or ecological impacts are anticipated during the operational phase. Accordingly, no specific mitigation measures are recommended for this phase of the Project

## Residual Impacts

512. Prior to the implementation of mitigation measures, the Project was assessed as having the potential to result in significant adverse impacts on sensitive biodiversity receptors. However, the adoption and effective implementation of Good International Practice (GIP), as outlined in the preceding sections, is expected to reduce these impacts to a non-significant level. The Project scope is limited to the reconstruction of existing roads, without any expansion of the road footprint or permanent land conversion. Moreover, no irreversible impacts are anticipated as a result of the temporary nature of construction activities. Accordingly, no significant residual adverse impacts on biodiversity are expected upon completion of the Project and application of the prescribed mitigation measures.

## IX. ANTICIPATED SOCIAL IMPACTS AND MITIGATION MEASURES

### A. Introduction

513. This section outlines the anticipated significant social impacts of the Project, with a focus on potential effects on people, communities, and aspects of community health and safety during both the construction and operational phases.

514. It is noted that matters related to land acquisition, resettlement, and livelihood restoration fall outside the scope of this Initial Environmental Examination (IEE). These aspects are being addressed separately in detail through the Land Acquisition and Resettlement Plan (LARP) as a part of Social Due Diligence Report in accordance with ADB's Safeguard Policy Statement (2009)

### B. Approach and Methodology

515. The methodology adopted for the assessment of anticipated social impacts under this Project is grounded in a combination of primary data collection, secondary research, and impact evaluation frameworks consistent with international best practices. Specifically, the assessment was conducted using the following components:

- i. Field Observations and Stakeholder Consultations: Direct observations from site visits and field-level interviews and meetings conducted in April and May 2025 with local stakeholders and community representatives.
- ii. Desk-Based Review: Collection and analysis of socio-economic baseline data at both regional and local levels. This includes disaggregated data by age and gender on key indicators such as population, education, employment, and other relevant socio-economic parameters.
- iii. Impact Evaluation Framework: Assessment of the significance of effects was conducted using a structured matrix combining the sensitivity/importance of receptors with the magnitude of anticipated impacts, as outlined in Section V of this report. This evaluation integrates international standards, sectoral guidelines, and professional judgment based on the consultant team's experience and expertise.

### C. Community Health and Safety

#### Introduction

516. Community Health and Safety (CHS) encompasses the potential risks and vulnerabilities faced by local communities arising from physical, chemical, biological, and radiological hazards, which may lead to accidents or health-related impacts during both the construction and operational phases of the Project. Effective management of these risks is required throughout the planning and implementation stages to ensure compliance with national legislation and Good International Industry Practice (GIIP). Specific management plans and procedures must also address the health and safety risks associated with ancillary facilities, including concrete batching plants, bitumen production sites, quarries, construction camps, maintenance depots, and designated waste disposal or dumping areas.

517. During the construction phase, elevated levels of noise and dust emissions are anticipated due to construction activities. From a community health and safety standpoint, it is critical that each construction contractor develops and implements dedicated CHS management plans. These plans should include communication procedures to notify local residents in advance about planned construction activities, particularly those that may cause traffic disruptions or limited access to community infrastructure and residences. Raising community awareness will be key to reducing disturbances and ensuring public safety.

#### Construction Phase Impacts

#### Air Quality and Noise and Vibration

518. The potential impacts of airborne dust emissions, construction-related noise, and vibration affecting nearby communities have been addressed in detail under Sections C of Chapter IV. These impacts are typical of road rehabilitation projects and can contribute to nuisance, health discomfort, and potential structural disturbance to adjacent properties. Appropriate mitigation measures for air quality and noise management have been detailed in the respective sections.

519. The construction phase will involve increased traffic volumes, both on-site and off-site, particularly from heavy construction vehicles such as haul trucks, equipment carriers, and supply transports. This elevated level of traffic poses an increased risk of accidents involving pedestrians and other road users, especially in populated or roadside settlement areas. Additionally, the integrity of local roads may deteriorate due to the sustained use by heavy vehicles, resulting in a decline in road safety and accessibility for community members.

520. The anticipated impacts of construction-related traffic on the local population, along with corresponding mitigation measures, are discussed in the relevant sections of this report. Further mitigation specific to the operational phase is outlined in subsequent sections

### **Exposure to Diseases and Health Infrastructure**

521. The implementation of the Project will result in increased interaction between non-resident construction workers and local communities, particularly in rural or semi-rural areas. This increased contact elevates the risk of transmission of communicable diseases, including sexually transmitted infections (STIs) such as HIV/AIDS, as well as COVID-19 and other contagious illnesses. There is also a potential risk of introducing new diseases or more virulent strains of existing pathogens to the local population and workforce. The establishment of temporary construction camps and the associated influx of migrant labor can place considerable pressure on local health infrastructure, which may already be under-resourced and ill-equipped to handle increased demand for preventive, diagnostic, and emergency medical services. To mitigate these public health risks, the Contractor shall be required to implement the following measures:

- i. Develop and implement a Worker Health and Safety Management Plan, inclusive of protocols for disease prevention, infection control, and health surveillance;
- ii. Conduct routine health awareness and education programs for both workers and local community members, focusing on STI/HIV prevention, COVID-19 protocols, and general hygiene;
- iii. Ensure the availability of on-site medical screening, primary healthcare, and referral services within construction camps;
- iv. Establish and maintain collaboration with local health authorities to support the monitoring of communicable diseases, develop referral systems, and ensure rapid response to any health emergencies or outbreaks.

These measures aim to safeguard both public health and worker well-being, while ensuring the Project is implemented in accordance with national health regulations and Good International Industry Practice (GIIP), including standards outlined by the ADB Safeguard Policy Statement (2009) and IFC Performance Standard 4 on Community Health, Safety, and Security.

522. The potential increase in communicable diseases and the occurrence of construction-related accidents associated with Project implementation may place additional strain on local health care systems, particularly due to the influx of construction labor who may rely on existing public health infrastructure. Health care facilities within the Project area are limited, both in terms of capacity and resources. Consequently, the existing health institutions—which already operate with restricted access to diagnostic equipment, essential medicines, and trained personnel—may be unable to adequately respond to the increased demand generated by both the workforce and local population during the construction phase. This presents a risk of overburdening local health services, potentially compromising the delivery of timely and effective medical care

**Table 73. Exposure to and transmission of communicable diseases**

Aspect	Exposure to and transmission of communicable diseases				
Impact nature	Negative		Positive		Neutral
Impact type	Direct		Indirect		Induced
Impact duration	Temporary	Short-term	Long-term		Permanent
Impact extent	Local		Regional		International
Impact scale	Small		Medium		Large
Impact frequency	Infrequent		Frequent		Continuous
Impact Magnitude	Positive	Negligible	Small	Medium	Large
Receptor sensitivity	Low		Medium		High
Impact significance	Positive	Negligible	Minor	Moderate	Major

### Security and Public Safety

523. During the construction phase, various risks associated with public health, safety, and security require proactive management. Key concerns include the potential for public injury arising from increased road traffic, falling construction materials or equipment, and the improper handling or malfunction of construction machinery. The intensified movement of vehicles and use of heavy equipment may also contribute to public health risks, such as respiratory issues linked to prolonged vehicle idling and delays in emergency response due to increased strain on local medical and rescue services. Additionally, elevated ambient noise levels, particularly in areas near residential properties, pose a nuisance and potential health risk. Equipment such as crushers and generators, when operated near sensitive receptors, may significantly contribute to noise disturbances if not properly managed.

524. A further safety risk involves unauthorized access by local community members to active construction zones, which may result in accidents and injuries, particularly in high-risk work areas such as bridge sites, viaducts, and embankment construction zones. This risk is particularly pronounced in settlements located adjacent to the project corridor, where access roads and work fronts are in close proximity to residential areas. Children are considered the most vulnerable group, as their natural curiosity and lack of awareness regarding construction-related hazards significantly increase the risk of incident. Similar risks apply to construction camps and worker accommodation areas, which may also attract unauthorized access if not adequately secured.

- i. To mitigate these security-related risks, the Contractor shall be required to:
- ii. Establish clearly demarcated and secured work zones, with appropriate fencing, barriers, and warning signage;
- iii. Assign trained security personnel to monitor access to construction sites, camps, and sensitive work areas;
- iv. Implement a Community Safety Awareness Program, targeting local residents and school-aged children, to raise awareness about the risks of entering construction zones;
- v. Ensure that construction machinery is operated safely and all loads are securely fastened during transport and handling;
- vi. Monitor and manage vehicular emissions and idling, and provide noise suppression measures such as acoustic enclosures or buffers around heavy equipment operating near sensitive receptors

**Table 74. Community security**

Aspect	Community Security				
Impact nature	Negative		Positive		Neutral
Impact type	Direct		Indirect		Induced
Impact duration	Temporary	Short-term	Long-term		Permanent
Impact extent	Local		Regional		International
Impact scale	Small		Medium		Large
Impact frequency	Infrequent		Frequent		Continuous
Impact Magnitude	Positive	Negligible	Small	Medium	Large

Aspect	Community Security				
	Receptor sensitivity	Low		Medium	
Impact significance	Positive	Negligible	Minor	Moderate	Major

### Operational Phase Impacts

525. Upon completion and commencement of operations, the rehabilitated road is expected to function in a manner comparable to pre-construction conditions of the existing rural road network. While certain minor impacts on local communities may persist—such as routine traffic movement, noise, or dust—these are considered to be typical of rural road use and are not anticipated to be significant. No new or intensified adverse impacts are expected during the operational phase that would require additional mitigation beyond standard road maintenance practices

### Proposed Mitigation Measures

#### Construction Mitigation Measures

##### General

526. A comprehensive Community Health, Safety and Security Plan (CHSSP) shall be developed and implemented by the Contractor to safeguard the well-being of local communities during the construction phase. The CHSSP will detail site-specific health and safety procedures, including strict protocols to prevent unauthorized access to construction zones, work compounds, and worker accommodation areas. The plan will also incorporate a community-focused health and safety awareness campaign, with targeted measures aimed at educating children and other vulnerable groups on the risks associated with active construction sites. The CHSSP shall be cross-referenced with the Air Quality Management Plan to ensure integrated risk management related to dust, emissions, and public exposure.

527. An Emergency Preparedness and Response Plan (EPRP) will also be prepared, outlining the identification of potential construction-related emergencies (e.g., accidents, fires, hazardous material spills), along with procedures for incident response, reporting, documentation, and follow-up. The EPRP will include clearly defined roles and responsibilities, communication protocols, and coordination mechanisms with local emergency services.

##### Construction Traffic

528. The Contractor shall be responsible for timely and transparent communication with local communities regarding the nature, schedule, and expected impacts of construction activities. Information on traffic disruptions and access restrictions must be provided to affected communities at least 24 hours in advance of any activity that may cause disturbance. In areas where construction access roads coincide with local roads, the Contractor shall ensure that safe vehicle passing points are established at intervals of no more than 200 meters where roads are narrow, in order to maintain safe and continuous traffic flow.

529. A Construction Traffic Management Plan (CTMP) shall be developed to detail all necessary safety measures to manage traffic-related risks associated with construction activities. The CTMP will cover both on-site and off-site vehicle movements and include:

- i. Traffic diversion strategies, including routing and detours;
- ii. Access control measures, including road closures and restricted entry;
- iii. Traffic schedules, especially for heavy vehicles to minimize peak-hour disruption;
- iv. Temporary traffic signaling modifications;
- v. Provision of clear signage, barricades, and lighting for safety of motorists, non-motorized users, and pedestrians;
- vi. Emergency access provisions and coordination with local traffic enforcement authorities to maintain safety and mobility along the Project alignment.

The CTMP shall be implemented in coordination with the Community Health, Safety and Security

Plan to ensure integrated management of community risk throughout the construction phase

### **Exposure to Diseases and Health Infrastructure**

530. If left unaddressed, the spread of communicable diseases among construction workers and local communities can lead to long-term, and in some cases, permanent health impacts. These include not only physical health deterioration but also associated social and economic burdens on affected individuals and families.

531. The existing healthcare facilities in the Project area are limited in their capacity to handle a significant increase in disease transmission and public health demand, particularly in rural and underserved locations. To mitigate these potential negative impacts on community health, the following measures shall be implemented:

- i. Preparation and implementation of a Health and Safety Management Plan, specifically for construction camps and local communities. This shall include an information and education campaign focused on sexually transmitted infections (STIs), including HIV/AIDS. Awareness activities shall be delivered through seminars, meetings, and outreach sessions, using gender-sensitive publications and informational materials, as stipulated under the civil works contract.
- ii. Consultation and coordination with local authorities, health institutions, and communities to develop appropriate strategies to manage potential demand on local health infrastructure arising from the presence of non-local workers. Communication protocols and stakeholder engagement mechanisms shall be defined in the Community Relations Management Plan (CRMP).
- iii. A Workforce Code of Conduct shall be enforced, including specific clauses that address and prohibit antisocial or inappropriate behavior, to maintain harmony between workers and local residents.
- iv. The Contractor shall ensure that adequate and appropriate healthcare services are available on-site and within worker accommodation camps, including the provision of primary health care, first aid, disease screening, and protocols for managing worker illnesses and injuries

### **Security**

532. To mitigate potential negative impacts on community safety and security during the construction phase of the Project, the following measures shall be implemented:

- i. Ensure the development and enforcement of a Project Code of Conduct, applicable to all personnel, including security staff. The Code shall be supported by mandatory training for security personnel and site workers, emphasizing best practices in site security management and promoting behavior that avoids, de-escalates, and prevents the use of excessive force in conflict situations. The Code of Conduct must be aligned with international standards, including the Voluntary Principles on Security and Human Rights.
- ii. Ensure the full implementation of a Community Health, Safety and Security Plan, which will outline site-specific procedures for safeguarding the health and safety of local communities. This includes preventing unauthorized access to active construction areas, construction camps, and storage facilities through the use of fencing, signage, access controls, and community awareness measures.

### **Operation Mitigation Measures**

533. To reduce the risk of road accidents and traffic-related injuries during the operational phase of the Project, the following key mitigation measures shall be implemented:

- i. Conduct public awareness campaigns to inform local residents about applicable road regulations, including speed limits, pedestrian crossings, and road signage. These campaigns shall utilize accessible information disclosure channels such as local newspapers, radio, and television.
- ii. Consult and notify affected communities regarding the commencement of road operations,

- 
- including the exact operational start date, to ensure public preparedness and minimize disruption.
- iii. Install appropriate traffic safety infrastructure, including road signage, markings, and traffic lights at critical locations such as junctions and intersections, in accordance with national road safety standards.
  - iv. Establish a routine road maintenance and inspection schedule to ensure the road remains in safe operational condition, addressing issues such as signage visibility, road surface integrity, drainage, and hazard removal.

## **Residual Impacts**

### **Construction Phase**

534. While the potential severity of accidents and safety-related incidents during the construction phase is recognized, the implementation of the prescribed mitigation measures—including traffic management, community safety protocols, and emergency preparedness—will effectively reduce the likelihood and consequences of such events. Therefore, the residual impact, post-mitigation, is assessed as Minor.

### **Operation Phase**

535. During the operational phase, no significant residual impacts are anticipated. The rehabilitated road is expected to function within the parameters of existing rural road infrastructure, with standard safety and maintenance measures in place.

## **D. Occupational Health and Safety**

### **Introduction**

536. Occupational Health and Safety (OHS) encompasses the identification, assessment, and management of health and safety risks faced by workers due to physical, chemical, biological, and radiological hazards during the construction and operational phases of the Project. Effective OHS risk management is essential to ensure compliance with national labor and safety regulations, as well as Good International Industry Practice (GIIP), including standards such as those outlined by the International Labor Organization (ILO) and the Asian Development Bank (ADB) Safeguard Policy Statement (2009).

537. Typically, OHS management extends to all work environments, including associated facilities such as concrete batching plants, bitumen plants, quarries, construction camps, and maintenance depots. However, ADB has confirmed that no associated facilities will be established under this Project. Accordingly, OHS planning and implementation will focus exclusively on activities within the designated construction corridors and project footprint.

### **Approach and Methodology**

538. The assessment of occupational health and safety (OHS) risks has been undertaken using an impact significance evaluation framework based on the relationship between the sensitivity or importance of the receptor (i.e., the worker) and the magnitude of the anticipated impact. This methodology is consistent with the approach outlined in Section 6 of this report and aligns with international best practices. The evaluation process draws upon technical expertise, professional judgment, and relevant guidance from institutions such as the International Labor Organization (ILO) and Asian Development Bank (ADB), ensuring a comprehensive and context-specific assessment of OHS-related impacts.

### **Construction Phase Impacts**

#### **Construction Worker Conditions**

539. Although construction activities have not yet commenced, the Project shall ensure that labor

and working conditions are fully aligned with the Labor Code of the Republic of Uzbekistan, the national Constitution, and international labor standards, including relevant International Labor Organization (ILO) conventions ratified by the country. Key aspects to be addressed in contractor employment practices include, but are not limited to:

- i. Wages, bonuses, and salary increments;
- ii. Provision of medical and life insurance;
- iii. Transport and housing allowances;
- iv. Annual leave and rest days;
- v. Mandatory provision and use of personal protective equipment (PPE);
- vi. Assurance of access to emergency medical care and routine health services for all workers.

540. Potential adverse impacts on working conditions may arise due to labor influx and diversity within the workforce, which could lead to:

- i. Conflicts or tension between different categories of workers (e.g., skilled vs. unskilled);
- ii. Gender-based disparities in treatment, roles, and opportunities;
- iii. Language barriers leading to communication difficulties and safety concerns;
- iv. Social friction between non-local and local workers due to cultural differences or competition for resources and jobs.

541. The key occupational health and safety (OHS) and labor condition risks identified for the Project include:

- i. Elevated risk of occupational accidents and injuries associated with construction site activities;
- ii. Potential for emergency situations such as fires, chemical spills, or explosions at construction camps, particularly due to unsafe handling and storage of fuel and hazardous materials, as well as the risk of natural hazards such as earthquakes;
- iii. Insufficient provision or enforcement of appropriate PPE for all workers;
- iv. Workplace discrimination based on gender, race, ethnicity, nationality, religion or belief, union affiliation, disability, age, sexual orientation, marital or family status, or political opinion;
- v. Risk of child labor or use of displaced or vulnerable labor;
- vi. Risk of forced labor or modern slavery practices;
- vii. Increased exposure of female employees to Gender-Based Violence (GBV), including harassment in the workplace;
- viii. Inequities in wages, social benefits, pensions, and parental leave, particularly for female or non-local workers;
- ix. Security and safety risks for workers—especially women—both within the workplace and during commutes to and from work sites.

These risks must be proactively managed through robust contractor management systems, enforcement of the Labor Management Plan, and ongoing monitoring by the Employer and Independent Monitoring Consultants in accordance with ADB's Safeguard Policy Statement (2009) and relevant national labor legislation

**Table 75. Construction worker conditions**

Aspect	Construction Worker Conditions				
	Negative	Positive		Neutral	
Impact nature	Negative	Positive		Neutral	
Impact type	Direct	Indirect		Induced	
Impact duration	Temporary	Short-term	Long-term	Permanent	
Impact extent	Local	Regional		International	
Impact scale	Small	Medium		Large	
Impact frequency	Infrequent	Frequent		Continuous	
Impact Magnitude	Positive	Negligible	Small	Medium	Large
Receptor sensitivity	Low	Medium		High	
Impact significance	Negligible	Minor	Moderate	Major	

### Construction Workers' Accommodation

542. Construction workers' accommodation will be provided as part of the Project. In the event that adequate infrastructure and essential services (e.g., water supply, sanitation, electricity, and waste management) are not available within the designated accommodation facilities, reliance on existing local social infrastructure may increase. This could result in overburdening local resources, such as healthcare services and utilities, potentially leading to social tensions between the host community and the project workforce, and posing safety risks to workers residing in substandard or overcrowded conditions.

543. Poorly designed, inadequately ventilated, or improperly maintained worker accommodation facilities may expose residents to a range of health and safety risks, including environmental hazards (e.g., excessive cold, dampness, lack of insulation) and increased vulnerability to the transmission of communicable diseases. Ensuring the health, safety, dignity, and well-being of construction workers requires that accommodation facilities meet minimum living standards, consistent with national regulations, ILO guidelines, and international best practice, such as the IFC/EBRD Guidance Note on Workers' Accommodation (2009).

### **Operational Phase Impacts**

544. Following the completion of construction, the Project will generate limited employment opportunities, primarily related to road operation and maintenance. While occupational health and safety (OHS) risks may persist during the operational phase—such as those associated with routine maintenance, traffic management, and infrastructure inspections—these risks are expected to be significantly lower in magnitude and frequency compared to those encountered during the construction phase. Nevertheless, appropriate OHS protocols must be maintained to safeguard workers engaged in operational activities, in line with national labor regulations and international best practices

### **Proposed Mitigation Measures**

#### **Construction Mitigation Measures**

545. To mitigate the anticipated adverse impacts on Occupational Health and Safety (OHS) and working conditions during the construction phase, the Contractor shall develop and implement a comprehensive Occupational Health and Safety Plan (OHSP), aligned with national legislation, ADB Safeguard Policy Statement (2009), and international best practices. The OHSP shall include, but not be limited to, the following measures:

- i. On-Site Health Care and Emergency Services: Provision of adequate medical facilities, including first aid stations on all construction sites.
- ii. Safety Training Program: Initial Safety Induction: Mandatory for all workers and visitors within their first week on-site; Periodic Safety Training: To be held at least every six months; applicable to all levels of workers, subcontractors, and management staff, tailored to the nature and scale of work.
- iii. Personal Protective Equipment (PPE): Contractor must ensure timely supply of appropriate PPE and provide training on its proper use;
- iv. Safety Meetings: Monthly safety meetings must be held with attendance from all subcontractor safety representatives. Meetings must be recorded, and minutes submitted to the Construction Supervision Consultant (CSC) within seven days.
- v. Pre-Activity Risk Assessments: Prior to new activities, a site-specific risk assessment shall be carried out to identify hazards and evaluate associated risks, with controls implemented following the hierarchy of risk control.
- vi. Safety Inspections and Equipment Maintenance: Routine inspection, testing, and maintenance of safety equipment, including scaffolds, ladders, hoists, guardrails, signage, lighting, and access points. Obstructed or damaged equipment shall be repaired or replaced immediately
- vii. Worker Welfare and Site Safety: Provision of clean drinking water, adequate sanitation, and safety barriers to protect the public; Clear marking of hazardous areas.
- viii. Worker Grievance Redress Mechanism: Establishment of an anonymous grievance mechanism for workers to raise concerns confidentially; A Social Safeguards Specialist shall

- be appointed to address labor-related grievances.
- ix. Labor and Working Conditions Management: Development of a Labor Employment and Working Conditions Management Plan (LEWCMP) to safeguard workers' rights and prevent modern slavery, in line with guidance from the Ministry of Employment and Labor Relations (or MDH equivalent); Non-discriminatory labor policies and contracts to be enforced.
  - x. Gender-Based Violence (GBV) and Harassment Prevention: Integration of GBV prevention protocols and a Health and Safety Plan that includes sexual harassment prevention; Appointment of a Social Safeguards Expert on site to manage and respond to reported incidents; Measures to ensure safe and secure workplace access for female workers.
  - xi. Hazardous Materials Management: Contractors must develop a Hazardous Materials Management Plan, governing the storage, handling, and disposal of fuels, chemicals, and other hazardous substances.
  - xii. Emergency Preparedness and Response: Preparation of a site-specific Emergency Response Plan (ERP), as part of the Site-Specific Environmental Management Plan (SSEMP), to address:
    - Containment of hazardous materials;
    - Oil and fuel spill response;
    - Fire prevention and response;
    - Worksite accidents;
    - Earthquake-related hazards.
  - xiii. Construction Camp Management: Development and implementation of a Construction Camp Management Plan, ensuring:
    - Safe, clean, and secure accommodation;
    - Adequate space, water, sanitation, food, washing, clothing, and medical services;
    - Transportation between camps and work sites.
  - xiv. Worker Accommodation Impact Assessment: Conduct a detailed assessment of proposed worker accommodation arrangements to:
    - Minimize strain on local infrastructure and services;
    - Reduce the potential for community tensions and social conflict.

### Workers Accommodation

546. A comprehensive Construction Camp Management Plan (CCMP) shall be developed prior to the selection of camp locations and submitted to the Client for review and endorsement before implementation. The CCMP shall be fully aligned with the standards and procedures set out in the International Finance Corporation (IFC) Performance Standards Guidance Note: Workers' Accommodation: Processes and Standards (2009). The Plan will outline provisions for site selection, infrastructure, services, worker welfare, and community relations, ensuring that international best practices are adopted throughout the Project.<sup>10</sup>

547. As an integral component of the CCMP, a screening process for the selection of suitable sites for workers' accommodation will be undertaken prior to site development. This process will assess potential locations for environmental and social sensitivities, in addition to compliance with national regulations and the necessary permitting requirements. The screening will be conducted in parallel with consultations with local communities, ensuring transparency and early engagement. At a minimum, the construction workers' accommodation facilities shall be:

- i. Located at least 1 kilometer away from any residential dwellings to avoid disturbance and minimize social conflict; and
- ii. Located at least 2 kilometers away from any designated protected areas to prevent encroachment on ecologically sensitive zones

548. Any deviation from the minimum siting distances specified in paragraph 570 (i.e., 1 km from residential dwellings and 2 km from protected areas) must be supported by a comprehensive justification, including the results of environmental and social risk assessments. In such cases, additional mitigation measures shall be proposed and implemented to ensure that potential adverse impacts are effectively avoided or minimized.

<sup>10</sup> <https://www.ifc.org/en/insights-reports/2000/publications-gpn-workersaccommodation>

549. The construction workers' accommodation shall be adequately staffed and equipped with on-site healthcare facilities to meet the medical needs of all workers. This measure is intended to minimize reliance on local healthcare services, thereby avoiding additional pressure on the limited health infrastructure serving the host communities.

550. The Contractor shall be fully responsible for the operation, maintenance, and sanitary condition of the construction workers' accommodation throughout the duration of the construction phase. Upon completion of the construction works, the Contractor is required to dismantle the facilities and restore the land to its pre-construction condition, in accordance with approved site restoration procedures and environmental clearance requirements.

### **Operation Mitigation Measures**

551. No residual adverse effects are anticipated during the operational phase of the Project. All potential occupational and community health and safety risks are expected to be mitigated through standard operation and maintenance procedures.

### **Residual Impact**

#### **Construction**

552. Provided that the prescribed mitigation measures are fully and effectively implemented, the impacts related to Occupational Health and Safety (OHS) and working conditions of construction workers are expected to be of Minor Significance. Continuous monitoring and contractor compliance will be essential to maintaining this level of impact.

#### **Operation**

553. No residual adverse impacts are predicted during the operation phase of the Project.

## **X. CUMULATIVE IMPACTS**

### **A. Introduction**

554. This section of the Initial Environmental Examination (IEE) assesses the potential cumulative impacts on the environment, local communities, and cultural heritage that may arise from the simultaneous implementation of this Project in conjunction with other ongoing, planned, or reasonably foreseeable projects, activities, or development plans within the Area of Influence (Aol). These combined effects are herein referred to as cumulative impacts.

555. Cumulative impacts are defined as the successive, incremental, and/or combined effects of this Project in addition to other existing or reasonably anticipated future activities. The assessment focuses on impacts that are recognized as significant either from a scientific or regulatory standpoint, or based on expressed concerns from affected communities or stakeholders. For practical and methodological reasons, the scope of the cumulative impact assessment is restricted to those impacts that are identifiable, measurable, and relevant to the project's context, with due consideration for available baseline data and foreseeable regional developments.

### **B. Approach and Methodology**

556. While there is currently no universally accepted methodology for assessing cumulative impacts, a number of international guidance documents and good practices are available. For this assessment, the approach adopted draws upon the Consultant's professional experience, the type of receptors under consideration, the characteristics of the Project, and the nature and extent of other developments within the region, alongside the availability and quality of supporting information.

557. The cumulative impacts evaluated in this assessment include two principal categories:

- i. Interrelated impacts from various components of the Project on a single receptor; and
- ii. Impacts on a shared resource, ecosystem, or community, arising from this Project in combination with other existing, planned, or reasonably foreseeable developments.

558. The spatial scope of the cumulative impact assessment covers both the Project Area of Influence (Aol) and the broader Project Area. Specific Aols for environmental and social receptors are defined in Sections VI and VII of this report.

559. The temporal scope of the assessment includes the construction period (2023–2024) and the operational phase beginning in 2024, as per the Project implementation timeline.

560. The cumulative impact analysis considers combined effects from other "committed developments"—i.e., projects that are either under construction, approved, or reasonably foreseeable—that may exert combined or successive impacts on shared receptors, alongside this Project.

561. The assessment has been conducted topic by topic, based on the availability of relevant data for each environmental and social theme. Given the limitations of available information, a high-level qualitative appraisal has been undertaken to identify potential cumulative effects.

562. In the absence of confirmed timelines for certain surrounding developments, this assessment assumes a worst-case scenario, whereby the construction and operational phases of other projects overlap with those of this Project. This assumption ensures a precautionary approach in the identification of potential cumulative impacts

### **C. Determining Significant Effects**

563. There is currently no formalized international or national guidance that defines specific criteria for determining the significance of cumulative effects. As such, this assessment applies a reasoned and precautionary approach, using guiding principles established through international best practice

and informed by the context of the Project.

564. The significance of cumulative effects has been determined on a receptor-specific basis, taking into account:

- i. Findings from the individual impact assessments,
- ii. Available environmental and social baseline information,
- iii. Professional judgement of the assessment team, and
- iv. Methodologies outlined in Section VI of this report.

565. Significance levels have been defined based on the criteria and thresholds provided in that section, ensuring consistency across all impact categories.

566. Transboundary effects refer to potential impacts of the Project that could extend beyond the administrative boundaries of Tashkent regions. Based on the location, scope, and nature of the Project and the limited spatial extent of its anticipated impacts, transboundary effects are not expected. Accordingly, transboundary impacts have not been included in the scope of this cumulative impact assessment.

#### D. Common Receptors

567. The common receptors potentially affected by cumulative impacts—arising from this Project in combination with other existing or foreseeable developments—are identified and categorized by relevant environmental and social topics. These receptors represent shared environmental resources, human populations, and ecological features that may be exposed to combined or successive pressures. The relationship between these receptors and their corresponding environmental topics is presented in Table 76 below

**Table 76. Common Receptors for CIA**

Phase	Receptor	Environmental Topics
Construction	Construction Workers	<ul style="list-style-type: none"> <li>• Traffic;</li> <li>• Waste;</li> <li>• Geology and Soils;</li> <li>• Social</li> </ul>
Construction / Operation	Local Communities Residential Dwellings	<ul style="list-style-type: none"> <li>• Traffic;</li> <li>• Noise and Vibration;</li> <li>• Waste;</li> <li>• Groundwater;</li> <li>• Landscape and Visual; and</li> <li>• Geology and Soils</li> </ul>
Construction / Operation	Soil	<ul style="list-style-type: none"> <li>• Geology and Soils; and</li> <li>• Landscape and Visual</li> </ul>
Construction / Operation	Biodiversity	<ul style="list-style-type: none"> <li>• Biodiversity;</li> <li>• Noise and Vibration; and</li> <li>• Waste.</li> </ul>

#### E. Review of Schemes

568. At the time of this assessment, there are no identified past, ongoing, or reasonably foreseeable future projects within the Project's Area of Influence (AoI) that are expected to result in cumulative effects when considered in combination with the proposed Project. As such, no cumulative impacts have been identified for further evaluation

#### F. Cumulation of impacts during construction and operation

569. Cumulative impacts have been considered only where the Project is anticipated to result in residual effects of minor significance or greater, as identified in Sections IX and X of this report.

Where negligible residual effects are predicted, it is concluded that no cumulative effects are likely to occur. As such, negligible residual effects have been excluded from the cumulative impact assessment to maintain focus on meaningful and measurable interactions

### **G. Mitigation Measures**

570. A comprehensive cumulative impact assessment must not only identify potential combined effects but also propose concrete measures to avoid, minimize, or mitigate such impacts and associated risks to the greatest extent practicable. A key objective of this assessment is to understand how the potential impacts of the Project may interact cumulatively with other human activities or natural stressors, including climate-related events such as droughts, floods, or extreme weather conditions.

571. However, based on the current assessment, there are no existing or reasonably foreseeable surrounding projects or development schemes that are likely to contribute to compounding impacts with those of the Rural Roads Project. As such, no additional cumulative mitigation measures are deemed necessary at this time to address effects within the local area

## XI. ENVIRONMENTAL MANAGEMENT PLAN

572. This section presents the Project's Environmental Management Plan (EMP), along with the corresponding institutional arrangements required for its effective implementation. An indicative cost estimate for EMP execution is also provided.

573. The EMP establishes the overarching environmental management framework for the Project. It consolidates summary information on identified impact types, as detailed in the preceding sections of this Initial Environmental Examination (IEE). The EMP further outlines specific mitigation and monitoring measures, defines implementation responsibilities, and specifies reporting and compliance requirements.

### A. EMP Implementation Responsibilities

574. The Environmental Management Plan (EMP) defines the specific roles and responsibilities of key project stakeholders involved in the overall implementation and oversight of environmental management activities as follows:

- i. **Executing Agency:** The Committee for Roads will serve as the Executing Agency, holding overall responsibility for project implementation and management. The EA will oversee all aspects of the subproject to ensure its timely and effective completion. This includes ultimate accountability for the implementation of environmental mitigation measures outlined in the EMP and for ensuring full compliance with the loan covenants. The EA will coordinate closely with relevant government agencies and the Asian Development Bank (ADB) to address and resolve implementation issues in a timely manner.
- ii. **Project Management Unit:** The Project Management Unit, operating under the authority of the EA, will manage the day-to-day implementation of the project. Responsibilities include procurement, consultant recruitment, financial disbursement, contract administration, environmental monitoring, and reporting. The PMU will be led by a Project Manager and supported by full-time staff, including an Environmental Protection Officer. The PMU will ensure the integration of the IEE and EMP requirements into bidding documents and oversee compliance during project implementation. The PMU will consolidate and submit semi-annual Environmental Monitoring Reports (EMRs) in accordance with ADB guidelines for public disclosure.
- iii. **Design Institute:** A qualified Design Institute will be engaged to develop the detailed engineering design of the subproject. This includes incorporating all IEE/EMP provisions and obtaining State Expertise clearance for the final design documentation. The Design Institute will also provide designer's supervision throughout the construction phase to ensure that environmental provisions are adhered to during implementation.
- iv. **Supervision Consultants / Safeguard Specialist:** Supervision Consultants, including designated Safeguards Specialists, will be deployed at project sites to ensure day-to-day oversight of EMP implementation. Their responsibilities include supervising environmental mitigation and monitoring activities, providing technical support to the Contractor, and preparing semi-annual EMRs in line with ADB reporting requirements.
- v. **Contractor:** The Contractor will be responsible for preparing and implementing Site-Specific Environmental Management Plans (SSEMPs), including but not limited to.
  - Health and Safety Management Plan
  - Waste and Spoil Management Plan
  - Dust and Noise Control Measures
  - Biodiversity Protection Measures
- v. **Ecological Clerk of Works (ECoW):** The Contractor will engage a qualified Ecological Clerk of Works (ECoW) to perform specialized on-site biodiversity-related functions as stipulated in the EMP. ECoW responsibilities will include:
  - Conducting pre-construction ecological surveys
  - Providing contractor training and toolbox talks on ecological sensitivity
  - Overseeing fencing specifications and vegetation clearance activities
  - Supervising habitat restoration works
  - Ensuring proper implementation of biodiversity conservation measures.

**Table 77. Mitigation Measures During Pre-Construction, Construction and Operation**

Subject	Potential Impact	Mitigation Measures	Institutional Responsibility	
			Implement	Monitoring
Pre-construction				
Ecological Resources	During operation there is a risk of disturbance and direct mortality to protected and vulnerable species	<p>Collaboration with the engineering design team to ensure all the proposed infrastructure mitigation are optimally incorporated into the design.</p> <p>Pre-work checks for wildlife holes:</p> <ul style="list-style-type: none"> <li>• Before site clearance or excavation works begin, an ECoW should be recruited and who will then conduct a pre-clearance check. The ECoW must conduct a pre-clearance check for potential wildlife holes such as burrows. This should be carried out as early as possible in the project to avoid short notice stoppages. Any holes discovered must have an exclusion zone set up around them, determined by the ECoW, and excavation works prohibited within the exclusion zone until the appropriate next steps have been carried out.</li> <li>• Wildlife holes discovered during the recognised active season must be monitored via camera traps for species activity/usage, with the hole not being excavated until 30 clear days of no animal usage is signed off by the ECoW. If a hole is used repeatedly by species, then exclusion measures may be implemented such as non-fatal/humane trapping and translocation or exclusion gates/fencing prior to excavation.</li> <li>• Wildlife holes discovered during the recognised hibernation/torpor season of known species must be left undisturbed until the recognised active season commences, and the 30-day monitoring period can be undertaken by the ECoW. The ECoW is to determine the exclusion zone as appropriate to the potential species.</li> <li>• The ECoW is to check the depth of the potential</li> </ul>	Design Institute/ Supervision Consultant Contractor/ ECoW	PMU, CSC, PMC

Subject	Potential Impact	Mitigation Measures	Institutional Responsibility	
			Implement	Monitoring
		<p>wildlife hole and its suitability to support species. If a hole’s depth is too shallow to support species, then excavation works can commence as planned.</p> <ul style="list-style-type: none"> <li>The excavation of any wildlife holes must be supervised by an ECoW with the appropriate ecological licences in place. The hole must be excavated as per the licence conditions or if no licence is required then excavated in scrapes of 300mm in stages to allow the ECoW to check for any species that may still be present.</li> </ul> <p>Pre-work checks for nesting birds:</p> <ul style="list-style-type: none"> <li>The ECoW will carry out pre-work checks of the work site and Project Aol for nesting birds.</li> <li>Checks to involve trees, shrubs, and low-lying vegetation such as grasses and scrub.</li> <li>If nesting birds are found, they will not be moved/disturbed, and all works will cease within an exclusion zone determined by the ECoW based on the species sensitivities to disturbance until the juveniles have fledged and the nest signed off by the ECoW as inactive. Allow for potential 500m of the nest(s) until the young birds have fledged.</li> </ul> <p>Tree checks:</p> <ul style="list-style-type: none"> <li>Trees set to be cleared or disturbed as part of construction must be checked by the ECoW for habitat potential and potential presence of species. This may include checks of holes, gaps, and crevasses. Once signed off as clear of species the tree may be removed. Prioritise clearance outside of the recognised bird breeding season and hibernation season of species that inhabit trees.</li> </ul> <p>Risks from infrastructure:</p> <ul style="list-style-type: none"> <li>Any fencing to be used as part of the construction must be wildlife friendly with no barbed wire or sharp points exposed. Any fencing erected to be inspected by the ECoW based on the considerations above.</li> </ul> <p>Risks from pollution:</p> <ul style="list-style-type: none"> <li>Emergency spills response procedure must be in place.</li> </ul>		

Subject	Potential Impact	Mitigation Measures	Institutional Responsibility	
			Implement	Monitoring
		<ul style="list-style-type: none"> <li>No refuelling within 10m of a watercourse or surface drain.</li> <li>All refuelling to take place on hardstanding or over a plant nappy/drip tray.</li> <li>Sufficiently stocked spill kit to be easily accessible during refuelling activities.</li> <li>Sufficiently stocked spill kit to be in each plant and vehicle to control address spills and leaks.</li> </ul> <p>Design Issues</p> <ul style="list-style-type: none"> <li>Collaboration with the engineering design team to ensure all the proposed infrastructure mitigation are optimally incorporated into the design.</li> <li>All culverts of appropriate size should have a ledge to allow animal passage during times of water flow. Culverts or underpasses where water flow is expected to be minimal will not require these ledges.</li> <li>All culverts must be unobstructed (e.g. wire mesh or grates) and should be able to be entered by animals on both sides (no steep gradients, rocks etc., blocking access).</li> <li>If sand erosion barriers are installed temporarily, they should be designed to prevent small reptiles and mammals from accessing the road as much as possible. They should also be designed to funnel animals towards culverts and must not be placed in a way that blocks entry to culverts.</li> <li>The avoidance/minimisation of fencing being used during construction must be prioritised to reduce negative impacts on species movements. Any fencing to be used as part of the construction must be wildlife friendly with no barbed wire or sharp points.</li> <li>Construction traffic should not exceed 10mph as heavy plant movements are high risk to wildlife and people.</li> </ul>		
Climate Change		<ul style="list-style-type: none"> <li>Use of flexible and heat resistant pavement structures: Considering hot days are expected to increase and temperatures can soar to over 40 °C it is important to consider pavement structures</li> </ul>	Design Institute	PMU, CSC, PMC

Subject	Potential Impact	Mitigation Measures	Institutional Responsibility	
			Implement	Monitoring
		<p>that can withstand these conditions to avoid adverse road safety conditions and increased maintenance cost.</p> <ul style="list-style-type: none"> <li>• Increase in maintenance budgets and associated implementation plan: Although no maintenance budget is known at this stage, the increase in very hot days and heat waves in combination with low precipitation will most likely need more maintenance of pavement and associated road structures such as bridges and stopover locations.</li> <li>• Accident Report System: Given climate extremes and the remote nature of the road a breakdown of a vehicle can result in potentially dangerous situations when no nearby accident report systems are in place. At recurrent short intervals, a direct line to emergency services could be made available for people in need (with the accident report system in place, health and safety risk can be reduced, with people being able to call for assistance in case necessary. Damage to pavement and structures is imminent given the expected conditions, but with the additional maintenance budget and flexible/heat resistant pavement, the risk can be reduced to Low.)</li> </ul> <p>Flood Risk and Runoff study: Currently a set number of culverts have been included in the design; the number of culverts and other drainage options should be based on a flood risk and runoff. Flood consideration near settlements: Although settlements are present near the road, flood risk considerations should be increased at the areas where the road passes settlements, as these people are at most risk of asset damage in case of floods.</p>		
<b>Construction Phase</b>				
Traffic and Transport	<p>Traffic impairment through the following activities:</p> <ul style="list-style-type: none"> <li>• Increased movements of construction vehicles and heavy plant to and from sites</li> </ul>	<p>The Contractor is to complete a Construction Traffic Management Plan (CTMP) and will be developed and implemented in accordance with the project framework EMP, and will cover but not be limited to:</p> <ul style="list-style-type: none"> <li>• The risks assessments that will clearly identify all risks from the construction works to travellers, drivers, and workers will need to be developed.</li> </ul>	Contractor	PMU, CSC, PMC

Subject	Potential Impact	Mitigation Measures	Institutional Responsibility	
			Implement	Monitoring
	<ul style="list-style-type: none"> <li>• Transportation of materials, goods and workers to and from sites</li> <li>• Partial road closures to enable works to take place</li> </ul>	<ul style="list-style-type: none"> <li>• Identification of the new access roads for construction vehicles and safety measures used for pedestrian access and crossings minimizing.</li> <li>• Identification of all public roads and paths that will be affected and proposed for the transport routes during the construction (which sections will be closed and till when, where the traffic will be diverted).</li> <li>• Minimisation of the traffic disturbance and allow adequate traffic flow round construction areas.</li> <li>• Public notification of any traffic-related concerns, such as road closures.</li> <li>• The traffic flow through the site will be coordinated with the responsible traffic authorities (Traffic Police).</li> <li>• CTMP will be developed by the contractors for the safe use of vehicles on and off-site; safe access to construction sites with the minimum negative impact on the existing roads and in parallel for ensuring community safety and easy access to their properties (homes, land, etc).</li> <li>• For traffic control and safety, the information about the project activities and driving standards will be announced through local radio/TV. The Engineer and the Contractor/s will openly and transparently inform residents of the affected places and villages as a minimum on a weekly basis regarding the planned activities and safety measures to be employed.</li> </ul>		
		<ul style="list-style-type: none"> <li>• Design standards will apply GIIP where it can be incorporated in existing road design legislation.</li> <li>• Regular public consultation will be held with the local community and road users throughout the project cycle. These will report the results of additional studies as they are completed. A website/freephone telephone number will be provided so interested parties can access up to date information on the project and raise any concerns. During the construction phase, residents will be provided with details and timings of traffic management plans.</li> <li>• Timings for diversions, closures, and other measures which may have a detrimental impact on traffic flows will be programmed to occur where the</li> </ul>	Contractor	PMU, CSC, PMC

Subject	Potential Impact	Mitigation Measures	Institutional Responsibility	
			Implement	Monitoring
		<p>least impact on traffic will occur. This may necessitate completing some works overnight, or during weekends.</p> <ul style="list-style-type: none"> <li>• Effective speed management will be implemented throughout the project with clearly posted speed limits to be adhered to during works. Signs will be clearly marked and visible to road users and speeds will be appropriate for the conditions. Old, unneeded signs will be covered or removed. Upon completion of works clear and concise signage will be put in place to ensure road users are aware of the applicable speed limit and where changes in the posted speed occur.</li> <li>• The Contractor will be required to carefully plan site access and put in place relevant H&amp;S warning signage and provisions to minimise any risks to workers, local communities, users of the route/areas etc. The proposed location of the site should be selected on the basis that turning movements to and from the site can be conducted safely and without creating disadvantages to other roads users and local communities. Access to the site should be paved and wheel cleaning facilities installed so that debris is not taken from site vehicles onto the public roads.</li> </ul>		
Air Quality	<p>Dust deposition resulting in the soiling of surfaces and elevated PM<sub>10</sub> concentrations, because of dust generating activities on site (e.g., demolition and construction traffic track out). Dust soiling will arise from the deposition of dust in all size fractions i.e., up to PM<sub>10</sub>.</p>	<p>Air Quality Management Plan (AQMP) to be developed by the Principal Contractor in consultation with the competent authority and ADB and in accordance with GIIP. The AQMP will include the following:</p> <ul style="list-style-type: none"> <li>• Maintain records of dust and air quality complaints in the AQMP. Identify causes and measures taken to reduce emissions.</li> <li>• Record any exceptional incidents that cause dust or air emissions.</li> <li>• Additional measures to be implemented regarding specific managements activities and to be included in the AQMP are given below.</li> </ul>	Contractor	

Subject	Potential Impact	Mitigation Measures	Institutional Responsibility	
			Implement	Monitoring
		<p>Construction Monitoring Requirements:</p> <ul style="list-style-type: none"> <li>• Undertake regular off-site inspections, where sensitive receptors are nearby (within 50m of site boundary); and</li> <li>• Increase frequency of inspections when activities with a high potential to produce dust are being undertaken and during prolonged windy or dry conditions.</li> </ul>	Contractor	PMU, CSC, PMC
		<p>Site Arrangements:</p> <ul style="list-style-type: none"> <li>• Plan site layout so that machinery and dusty activities are located away from receptors where possible;</li> <li>• Keep site fencing, barriers, etc., clean using wet methods;</li> <li>• Bulk cement and other fine powder materials to be delivered in enclosed tankers and stored in silos with suitable control systems to prevent overfill.</li> </ul>	Contractor	PMU, CSC, PMC
		<p>Site vehicles and equipment:</p> <ul style="list-style-type: none"> <li>• Vehicle loading and movements to be optimised, with backfilling where possible, to minimise the number of journeys;</li> <li>• Journeys to be planned to avoid peak hours;</li> <li>• Maximum speed limits on surfaced and un-surfaced haul route and work areas to be specified;</li> <li>• Ensure all vehicles switch off engines when stationary; and</li> <li>• All onsite and on road vehicles and machinery to be appropriately maintained and to comply with relevant emission standards.</li> </ul>	Contractor	PMU, CSC, PMC
		<p>Construction Activities:</p> <ul style="list-style-type: none"> <li>• Construction equipment should be fitted with, or used in conjunction with, suitable dust suppression techniques such as water sprays or local extraction;</li> <li>• Drop heights to be minimised and fine water sprays to be used when appropriate; and</li> <li>• Ensure an adequate water supply on site for effective dust suppression / mitigation using non-potable water where possible.</li> </ul>	Contractor	PMU, CSC, PMC

Subject	Potential Impact	Mitigation Measures	Institutional Responsibility	
			Implement	Monitoring
		Vehicle Track out: <ul style="list-style-type: none"> <li>Haul routes and construction site to be damped down to minimise dust generation;</li> <li>Vehicles leaving the site to be covered; and</li> <li>Dry sweeping of large areas to be avoided.</li> </ul>	Contractor	PMU, CSC, PMC
Noise and Vibration	<p>Noise impact during construction: The impact associated with construction noise is characterized as negative in nature, direct in type, and local in extent, due to the limited propagation range of noise emissions. Although the construction activities will be transient at each specific location, the noise generated will be frequent and repetitive throughout the duration of works. The cumulative effect of these variables is assessed to result in an impact of medium magnitude.</p> <p>Residual Impact: For receptors situated in immediate proximity to the roadway, residual noise impacts may persist despite the identified reductions</p> <p>Vibration impact: Negligible.</p>	<p><i>During Construction:</i></p> <ul style="list-style-type: none"> <li>Stakeholder engagement with affected communities as well as with the Ministry of Tourism and Cultural heritage to determine preferred timeframes for construction works, minimizing potential disturbances, as well as for the ministry to provide proper guidance, which should be furthered considered if necessary;</li> <li>Restriction of construction activities during night-time hours to prevent elevated noise levels during periods of increased sensitivity;</li> <li>Deployment of low-noise machinery and installation of appropriate noise suppression devices, such as mufflers and acoustic enclosures, on construction equipment; and</li> <li>Routine noise monitoring to record actual noise levels at sensitive locations, with the preparation and implementation of adaptive management plans should noise thresholds be exceeded.</li> </ul> <p><i>Mitigation Strategy for Residual Impact:</i></p> <ul style="list-style-type: none"> <li>Continued community consultation, including the solicitation of feedback to identify practical approaches for minimizing perceived disruption. Where feasible, community-driven recommendations should be incorporated into the construction management plan to ensure impacts remain as low as reasonably practicable.</li> </ul>	Contractor	PMU, CSC, PMC
Geology and Soils	Deterioration of Soil quality through compaction and erosion	<ul style="list-style-type: none"> <li>Store removed soil materials in stockpiles <math>\leq 2m</math> in height to minimise losses by erosion and compaction. In case of wind erosion of the soil stockpiles: cover or keep wet. Where viable, use existing tarmac roads and existing dirt track networks as construction and borrow pit access roads after upgrade as appropriate.</li> </ul>	Contractor	PMU, CSC, PMC

Subject	Potential Impact	Mitigation Measures	Institutional Responsibility	
			Implement	Monitoring
	Contamination	<ul style="list-style-type: none"> <li>• Ensure the ground in the areas designated for storage of hazardous materials and fuels is impervious, flat and hard, where necessary these materials should be stored under cover.</li> <li>• Servicing of the construction equipment should be carried out in designated areas, equipped with means to prevent spills and leakages.</li> <li>• Re-fuelling should be strictly controlled and subject to formal procedures. Drip pans and spill response kits should be used at all times during refuelling in the field and in sites without drainage system.</li> <li>• Timely remediation of any hydrocarbon or other contamination leakages should be performed, and any wastes disposed of appropriately to prevent contamination.</li> <li>• Sanitary wastewater generated at operational sites should be collected. The wastewater from septic tanks should be transported by special vehicles for further appropriate treatment and disposal by licensed contractors approved by Company.</li> <li>• Appropriate waste management procedures should be in place for all construction and related wastes, and licensed contractors utilised for reuse / recycle / disposal. Rain and snowmelt water in the Project sites should be collected by a drainage system; if necessary, retention ponds should be used to accommodate excess rainwater and meltwater run off to allow settlement prior to discharge alternatively silt traps should be used before discharging of the drainage water.</li> </ul>	Contractor	PMU, CSC, PMC
Groundwater	Deterioration of Groundwater quality	<ul style="list-style-type: none"> <li>• Water abstraction sources are currently unknown and will be required for construction camps and concrete batching plant activities. Abstraction must be managed via an on-site water resource management plan to reduce the pressures on local water resources. Once the location of construction camps and concrete batching plants is known the project area needs to be studied.</li> <li>• The study shall include identification of the sources of groundwater supply in the Aol and assessment of how</li> </ul>	Contractor	PMU, CSC, PMC

Subject	Potential Impact	Mitigation Measures	Institutional Responsibility	
			Implement	Monitoring
		<p>the Project activities affect them. Special attention shall be paid to local communities identified and any other isolated dwellings where groundwater may be the only source of water supply.</p> <ul style="list-style-type: none"> <li>• Engagement with the local water supply agency to ensure water levels are not depleted to unacceptable levels from the construction activities. Contingency measures must be in place to temporarily stop works involving water usage should levels drop below acceptable levels to allow for water resources to replenish. This risk will be relatively higher during periods of low rainfall.</li> <li>• Ensure strict and regular control of the implementation of all measures intended for environmental protection in the Project.</li> </ul>		
	Contamination Minimisation	<p>The following measures shall be incorporated into the Waste and Hazardous Materials Management Plan (WHMMP) to mitigate pollution risks and ensure compliance with environmental regulations:</p> <ul style="list-style-type: none"> <li>• Potentially polluting activities shall be minimised at all times.</li> <li>• All sewage and wastewaters generated in the Project sites should be collected and treated as appropriate before discharging.</li> <li>• Formal solid and liquid waste management, collection and disposal procedures should be in place, and the waste disposal sites used by the project should be agreed with the authorities.</li> <li>• Wastewater from the washing of construction vehicles should be collected and reused after treatment.</li> <li>• Appropriately spill prevention and containment measures should be applied when storing and handling of fuels and other environmentally hazardous substances to prevent leaks and spills</li> <li>• The use and handling of fuel and lubricants onsite should be limited and monitored closely at all times. Drip trays shall be used when refuelling onsite or handling hazardous liquids. Further mitigation of contamination risk from spills are as follows: <ul style="list-style-type: none"> <li>- Establish an emergency response protocol</li> </ul> </li> </ul>	Contractor	PMU, CSC, PMC

Subject	Potential Impact	Mitigation Measures	Institutional Responsibility	
			Implement	Monitoring
		<p>and provide appropriate spill containment equipment to address accidental releases of hazardous substances.</p> <ul style="list-style-type: none"> <li>- Develop and implement standard operating procedures (SOPs) for fueling operations and the management of liquid and toxic material storage areas to ensure safe handling and regulatory compliance.</li> <li>- Site plans must specify the locations for the storage of liquid materials and toxic materials.</li> <li>- Fuelling operations shall occur only within containment areas. – All fuel and chemical storage (if any) must be sited on an impervious base within a bund and secured fencing. The storage area must be located away from any watercourse. The base and bund walls must be impermeable and of sufficient capacity to contain 110 percent of the volume of tanks.</li> <li>- Filling and refuelling must be strictly controlled and subject to formal procedures and will take place within areas surrounded by bunds to contain spills / leaks of potentially contaminating liquids.</li> <li>- All valves and trigger guns must be resistant to unauthorized interference and vandalism and be turned off and securely locked when not in use.</li> <li>- The contents of any tank or drum must be clearly marked. Measures shall be taken to ensure that no contaminated discharges enter any drain or watercourses.</li> <li>- Disposal of lubricating oil and other potentially hazardous liquids onto the ground or water bodies must be prohibited.</li> <li>- If accidental spills occur immediate clean up must be undertaken and all clean-up materials stored in a secure area for disposal to a site authorized to dispose of hazardous</li> </ul>		

Subject	Potential Impact	Mitigation Measures	Institutional Responsibility	
			Implement	Monitoring
		<p>waste</p> <p>Timely remediation of any hydrocarbon or other contamination leakages should be performed, and any wastes disposed of appropriately.</p>		
Surface Water	Reductions in water quality through pollution pathways	<p>A Waste and Hazardous Materials Management Plan should be implemented to reduce pollution incidences and include the following measures:</p> <ul style="list-style-type: none"> <li>• Specific hazardous waste collection and storage locations shall be in place; the waste disposal sites shall be designed to prevent waste materials reaching surface waters (e.g., located away from water features). Storage of hazardous wastes will be in watertight containers or under cover, stored on hard standing with a bund and drainage sump for the collection and subsequent disposal to Company-approved facilities for contaminated water. The base and bund walls will be impermeable and of sufficient capacity to contain 110% of the volume of tank (or one tank if more than one tank is located in the bund;</li> <li>• Strict rules and measures will be applied when storing and handling of fuels and hazardous substances to prevent leaks;</li> <li>• Fuelling of vehicles shall be at commercial refuelling facilities as far as practical;</li> <li>• On-site refuelling equipment will be inspected and approved by company. It will be in good repair with working level gauges, break away (self-closing) check valves, provision for static discharge. Refuelling operations will only be undertaken by competent personnel;</li> <li>• Drip trays shall be used for refuelling;</li> <li>• Spill response equipment will be available at refuelling, hazardous materials and hazardous waste storage sites;</li> <li>• Concrete and asphalt will be transported by specialised vehicles;</li> <li>• Timely remediation of leakages of and appropriate disposal of the residuals;</li> </ul>	Contractor	PMU, CSC, PMC

Subject	Potential Impact	Mitigation Measures	Institutional Responsibility	
			Implement	Monitoring
		<ul style="list-style-type: none"> <li>• Construction waste management and separate waste collection; and</li> <li>• Simultaneous reclamation of the temporary occupied lands and clearing of construction waste as the project progresses to the next road section.</li> </ul>		
	Alteration to river flow rates as result of extraction and crossing structures construction	<ul style="list-style-type: none"> <li>• Water abstraction sources are currently unknown and will be required for construction camps and concrete batching plant activities. Abstraction must be managed via an on-site water resource management plan to reduce the pressures on local water resources. Once the location of construction camps and concrete batching plants is known the project area needs to be studied.</li> <li>• The study shall include identification of the sources of surface water supply in the AoI and assessment of how the Project activities affect them. Special attention shall be paid to residential communities identified and any other isolated dwellings where groundwater may be the only source of water supply.</li> <li>• Engagement with local water supply agency to ensure water levels are not depleted to unacceptable levels from the construction activities. Contingency measures must be in place to temporarily stop works involving water usage should levels drop below acceptable levels to allow for water resources to replenish. This risk will be relatively higher during periods of low rainfall</li> </ul>	Contractor	PMU, CSC, PMC

Subject	Potential Impact	Mitigation Measures	Institutional Responsibility	
			Implement	Monitoring
Waste	Improper handling and disposal of non-hazardous and hazardous solid and food waste	<p>The Contractor should develop and implement a Waste Management Plan for the construction phase that will cover:</p> <ul style="list-style-type: none"> <li>• Key sources of waste</li> <li>• Waste types/streams</li> <li>• Non-hazardous or hazardous streams</li> <li>• Estimated annual waste volumes per type/stream (reviewed annually)</li> <li>• Waste Reduction Procedure describing the measures that shall be taken by Contractor to reduce the volume of waste it generates</li> <li>• Reuse and Recycling Procedure describing what opportunities Contractor shall adopt to reuse and/or recycle the waste it produces to reduce the amount of waste that has to be treated or disposed of off-site by a third party</li> <li>• Waste Collection, Segregation and Storage</li> </ul>	Contractor	PMU, CSC, PMC

Subject	Potential Impact	Mitigation Measures	Institutional Responsibility	
			Implement	Monitoring
		<p>Procedure describing the methods it shall implement for handling the waste it generates, prior to collection</p> <ul style="list-style-type: none"> <li>• Waste Training Procedure that addresses as a minimum:</li> <li>• General waste awareness training for workers during the General HES Induction</li> <li>• Specialist training for workers with specific waste management duties.</li> <li>• Use of safety data sheets (SDS)</li> <li>• PPE usage for handling types of waste</li> <li>• Proper storing techniques</li> <li>• Reporting requirements</li> </ul>	Contractor	PMU
Landscape and Topography	<p>The temporary alterations to the local topography, land use and to the existing road / Project alignment because of the Project construction and activities</p> <p>This includes the presence of workers, construction sites, machinery and materials and waste movements</p>	<p>The following mitigation measures will reduce adverse effects of the Project on surrounding landscape character during the construction phase:</p> <ul style="list-style-type: none"> <li>• Minimising the use of artificial lighting along the Project alignment and where needed, use directional lighting.</li> </ul>	Contractor	PMU, CSC, PMC
Ecological Resources	<p>Vegetation Clearance e.g., for the road corridor and site compounds</p>	<p>The removal of vegetation, including grasses, scrub, and trees will be avoided and/or minimised through the following measures:</p> <ul style="list-style-type: none"> <li>• Work areas will prioritise existing hardstanding, barren land, or areas devoid of surface vegetation where possible. This includes the siting of laydown</li> </ul>	Contractor	PMU, CSC, PMC

Subject	Potential Impact	Mitigation Measures	Institutional Responsibility	
			Implement	Monitoring
		<p>areas and compounds.</p> <ul style="list-style-type: none"> <li>Existing tracks or natural gaps in vegetation will be used as preferred access routes where practical.</li> <li>The workforce will utilise clearly demarcated access routes and working areas, which have been selected based on the principle of avoidance and/or minimisation of vegetation removal.</li> <li>Where vegetation is to be cleared, the following species mitigation measures will be in place:</li> <li>Prior to any vegetation clearance, areas shall be clearly marked out with posts and tape/rope prior to any clearance.</li> <li>All vegetation clearance, including of grasses, trees, shrubs, scrub etc. must prioritise being undertaken outside of the recognised bird breeding season (to be determined by the ECoW).</li> <li>Where work cannot take place outside of the bird breeding season, then a pre-clearance nesting bird check will be undertaken of the vegetation to be cleared by the ECoW.</li> <li>Should an active nest be identified, the ECoW will set up an appropriate exclusion zone around the nest and clearance within the exclusion zone will be deferred until the nest is confirmed as inactive/unused by the ECoW. The pre-checks and exclusion zone protocol applies to ground nesting birds which can nest in low vegetation such as ling grasses and low-lying scrub.</li> <li>The works must prioritise vegetation clearance during the recognised hibernation season of known reptiles, amphibians, and mammals in the Project area. If vegetation clearance is to take place outside of the recognised hibernation season, that being the active season, then suitable habitat including low-lying vegetation such as grasses and scrub must be cleared in a two-phase directional cut. First cut down to 150mm height in a direction which allows any species to escape to suitable and retained habitat. Allow 24 hours before the 150mm cut vegetation can then be cut down to ground</li> </ul>		

Subject	Potential Impact	Mitigation Measures	Institutional Responsibility	
			Implement	Monitoring
		<p>level. The site ECoW will determine whether habitat is suitable and therefore requires the two-phase directional cut. If unsuitable, then vegetation can be cut to ground level in one phase.</p> <ul style="list-style-type: none"> <li>Fires will not be used for vegetation clearance and the workforce will be educated on preventing bush fires. Processing and removal of vegetation arisings:                             <ul style="list-style-type: none"> <li>Where practical, grass cuttings and mulch arisings will be left in-situ. If the soil is to be removed, then arisings will form part of the soil stockpiles.</li> <li>Woody vegetation will be logged or chipped, as appropriate, and taken off-site to be composted or used as firewood. Where practical, hibernacula features can be created as log piles and topped with mulch and wood chippings for on-site habitat enhancement.</li> </ul> </li> </ul> <p>Reinstatement and compensation:</p> <ul style="list-style-type: none"> <li>Where vegetation has been cleared temporarily, it will be restored by reseeded or replanting using locally sourced seed mixes and saplings. Tree planting species will be like for like, where possible, or native species as a minimum.</li> <li>Topsoil and subsoils will be removed and stored separately for subsequent reinstatement.</li> <li>Fires will not be used for vegetation clearance and the workforce will be educated on preventing bush fires.</li> </ul>		
	Vehicle movements	<ul style="list-style-type: none"> <li>Single vehicle track policies and use of low-impact vehicles will be applied where practical. Off-road travel will be prohibited where practical. Natural breaks in vegetation will be used as preferred access routes where possible.</li> <li>The workforce will adhere to working corridors. All staff will be provided with environmental awareness training. The workforce will not deviate from approved clearance areas. Appropriate speed limits will be applied, and traffic will be restricted to</li> </ul>	Contractor	PMU, CSC, PMC

Subject	Potential Impact	Mitigation Measures	Institutional Responsibility	
			Implement	Monitoring
		existing and/or dedicated haul routes to reduce direct mortality and disturbance from vehicles during construction. Penalties for violation will apply. Pre-clearance site surveys will be conducted before the commencement of all works to prevent animals present in working area being killed or injured during works. Checks will be for all vertebrate species and will specifically include ground nesting birds and reptiles. Less noisy machinery and/or noise barriers will be used where appropriate (e.g., around static equipment in sensitive areas).		
	Fencing	<ul style="list-style-type: none"> <li>• In case fencing is erected, mitigation needs to take place. Fencing will be restricted to work compounds and associated areas (such as staff parking areas, fuelling areas, waste segregation, aggregate storage and delivery) to ensure that habitats are not fragmented by workforce activities unless this is for species protection measures. Temporary barriers will be used to prevent wildlife from accessing waste disposal areas and similar areas.</li> <li>• The avoidance/minimisation of fencing being used during construction must be prioritised to reduce negative impacts on species movements. Any fencing to be used as part of the construction must be wildlife friendly with no barbed wire or sharp points exposed. Recommend Heras fencing to be used as this is anti-climb for humans and will exclude large mammals from the work areas.</li> <li>• Relatively long distances of fencing erected must consider animal movements across the landscape and not block key large mammal migration routes during the migratory season or access to key water sources during periods of low rainfall or drought.</li> <li>• Any fencing erected to be inspected by the ECoW to check that it does not pose any welfare risks to wildlife, based on the considerations above.</li> </ul>	Contractor	PMU, CSC, PMC

Subject	Potential Impact	Mitigation Measures	Institutional Responsibility	
			Implement	Monitoring
	Waste and Pest Management	<ul style="list-style-type: none"> <li>Contractors will be required to conduct regular debris clean-up activities immediately upon possession of the work site and to maintain the assigned sections throughout project construction including by regular collection and hauling of wastes to government-approved landfill locations. Sign boards will be installed along the project road at 5km intervals to remind drivers not to throw garbage along the road. The estimated cost of collecting and hauling the waste along the road is assumed to be part of construction costs. Contractor (in coordination with regulators) will undertake rodent control in all camps.</li> </ul>	Contractor	PMU, CSC, PMC
	Construction of working compounds and camps	<ul style="list-style-type: none"> <li>Construction camps will be located away from areas of natural habitat (as determined by the ECoW) and a hunting ban will be enforced for all construction workers. Good site practice regarding the storage of waste and food will be implemented. Temporary barriers and covers will be used to prevent wildlife from accessing waste disposal areas and similar areas.</li> </ul>	Contractor	PMU, CSC, PMC
	Spread of non-native / invasive species	<ul style="list-style-type: none"> <li>Any invasive non-native species (INNS) will be identified, demarcated, and removed in accordance with GIP. GIP,</li> <li>e.g. cleaning of equipment before transport to site, will be applied to prevent accidental introduction of INNS. The project team will not intentionally introduce any new INNS (not currently established in the country or region of the project) unless this is carried out in accordance with the existing regulatory framework for such introduction. Notwithstanding the above, the project team will not deliberately introduce any INNS with a high risk of invasive behaviour regardless of whether such introductions are permitted under the existing regulatory framework. All introductions of INNS will be subject to a risk assessment (as part of the project's environmental and social risks and impacts identification process) to determine the potential for invasive behaviour. The project team</li> </ul>	Contractor	PMU, CSC, PMC

Subject	Potential Impact	Mitigation Measures	Institutional Responsibility	
			Implement	Monitoring
		will implement measures to avoid the potential for accidental or unintended introductions including the transportation of substrates and vectors <ul style="list-style-type: none"> <li>(such as soil, ballast, and plant materials) that may harbour INNS.</li> </ul>		
	Use of fuels and chemicals	<ul style="list-style-type: none"> <li>Use of GIP to minimize impacts associated with dust and pollution (e.g., use of drip trays understanding equipment, designated refuelling areas with hardstanding).</li> </ul>	Contractor	PMU, CSC, PMC
	Use of water during construction	<ul style="list-style-type: none"> <li>Water abstraction and wastewater management must be managed via an on-site water resource management plan to reduce the pressures on local water resources and maintain aquatic habitats at levels to support local ecology.</li> <li>Engagement with local water supply agency to ensure water levels are not depleted to unacceptable levels from the construction activities. Contingency measures must be in place to temporarily stop works involving water usage should levels drop below acceptable levels to allow for water resources to replenish. This risk will be relatively higher during periods of low rainfall.</li> <li>Water resource management plan must also contain measures to control contaminated water runoff from construction activities into local watercourses. Physical barriers must be in place to avoid contaminated surface water runoff into nearby watercourses.</li> <li>Contractors will be required to avoid water leakage and formation of permanent surface water at construction sites that can attract birds and mammals. As part of this, the roadbed must not have depressions where rainwater is accumulated.</li> <li>Pre-start checks must be carried out for all machinery and equipment involved in water usage during construction by an authorised and competent person. Service and inspection records must be kept on site to demonstrate the machinery is fit for purpose.</li> </ul>	Contractor	PMU, CSC, PMC

Subject	Potential Impact	Mitigation Measures	Institutional Responsibility	
			Implement	Monitoring
		<p>Wastewater and drainage systems:</p> <ul style="list-style-type: none"> <li>• For sites servicing a small number of employees (less than 150), septic tanks may be used.</li> <li>• For larger sites, liquid wastes at a minimum will receive primary treatment in anaerobic tank or pond preceded by a bar screen to remove large solid objects (e.g., sticks, rags). Primary treatment (also referred to as clarification, sedimentation or settling) is the process where wastewater can settle for a period (around 2 hours) in a settling tank. This leads to separation of a liquid effluent which includes oils and grease and sludge. Primary treatment leads to reduction in suspended solids, biological oxygen demand and removal of floating material (e.g., fences).</li> <li>• There will be no direct discharge of untreated sanitary or oily wastewater to surface water bodies.</li> <li>• Wastewater arising on the site must be collected, removed from the site via a suitable and properly designed temporary drainage system and disposed of at a location and in a manner that will not cause neither pollution nor nuisance. The site plan required by SEMP's must indicate the system proposed and the locations of related facilities in the site, including latrines, holding areas, etc. There must be no direct discharge of sanitary or wash water to surface water. Disposal of materials such as, but not limited to, lubricating oil and onto the ground or water bodies shall be prohibited. Liquid material storage containment areas must not drain directly to surface water. Liquid material storage containment areas equipped with drains must be valved, and the valve must be maintained locked in the closed position with supervisory control of the key. Lubricating and fuel oil spills must be cleaned up immediately and spill clean-up materials must be maintained at the storage area.</li> <li>• Specific contract provisions must ensure that construction camps and other potential sources of secondary impacts are properly sited and provided</li> </ul>		

Subject	Potential Impact	Mitigation Measures	Institutional Responsibility	
			Implement	Monitoring
		with drainage and wastewater facilities. An explanation of the proposed site drainage system must be indicated on the Site Environmental Management Plan Drainage. The site plan must be devised to ensure that rain run-off from the construction sites is collected in retention ponds and other facilities. Fuel, lubricating oil and chemical spills must be contained and cleaned-up immediately. Spill clean-up equipment must be maintained on site.		
	Construction Lighting	Works will not be lit where this is practical. Where lighting is required, it will be directional and non-UV lighting sources will be employed.	Contractor	PMU, CSC, PMC
	Contractor Behaviour	Biodiversity awareness will be included within the contractor’s site induction training. This will include roles and responsibilities, inventory of all critically endangered, endangered, and protected species using photographs,	Contractor	PMU, CSC, PMC
		behaviour training including bans on hunting, foraging, and trapping, national regulatory requirements, activities that should be observed in specific sections or periods/months to avoid or minimise the risk of disturbance, injury, or death of critically endangered and endangered, and protected wildlife species, and reporting and protection activities during chance encounter with specific mammals, reptile, amphibian, and bird species.		
Social Impacts	Community health and safety	<p>General</p> <ul style="list-style-type: none"> <li>A <u>Community Health, Safety and Security Plan</u> will outline health and safety procedures for the protection of the local community. Procedures will include the prevention of unauthorized access to the construction sites, construction compounds and the construction workers’ accommodation. The plan will also outline a health and safety campaign for the local communities, with measures to target the safety and risk education of children. The Community Health, Safety and Security Plan will cross reference the Air Quality Management Plan.</li> <li>An <u>Emergency Preparedness and Response Plan</u>,</li> </ul>	Contractor	Supervision Consultant (Social safeguards expert), PMU

Subject	Potential Impact	Mitigation Measures	Institutional Responsibility	
			Implement	Monitoring
		<p>which will include the identification of risks, a process for responding to and recording incidents and accidents.</p> <p>Construction Traffic</p> <ul style="list-style-type: none"> <li>• The Contractor shall provide information to the local communities about the scope and schedule of construction activities, expected disruption and access restrictions at least 24 hours before commencement. Construction site access roads which are also used by local traffic shall include safe passing places every 200 m where the roads are narrow.</li> <li>• A CTMP will provide details of safety measures which will be put in place to reduce effects associated with construction traffic. The plan will cover both on-site and off-site traffic movements. The Plan shall identify traffic diversions and management provisions, traffic schedules, signalling modifications, necessary closures, signage, lighting, and other provisions to ensure that adequate and safe access for motorists and other road users along the Project alignment.</li> <li>• Exposure to Diseases and Health Infrastructure If left untreated, communicable diseases can lead to long-term health issues and therefore the impact can be characterised as being long-term and, in some instances, permanent.</li> <li>• The existing local health care facilities have limited capacity to respond to a significant increase in the transmission of communicable diseases. The following measures to mitigate potential negative impacts on community health shall be undertaken:</li> <li>• Preparing and implementation of the health and safety plan at camp site (focusing on construction workers) and local communities in the project area including the information and education campaign in the form of awareness raising seminars and meetings on sexually transmitted diseases and HIV/AIDS (human immunodeficiency virus / acquired immunodeficiency syndrome) and with disseminating</li> </ul>		

Subject	Potential Impact	Mitigation Measures	Institutional Responsibility	
			Implement	Monitoring
		<p>relevant gender- sensitive publications and distribution materials as required under the civil works contract;</p> <ul style="list-style-type: none"> <li>• Consultations with local authorities, hospitals, and communities for identifying optimal solution in case of non-local workers’ needs in using the local health infrastructure. The communication methods will be described via Community Relations Management Plan;</li> <li>• A Workforce Code of Conduct shall provide clauses including measures that target anti-social behaviour; and</li> <li>• Ensure appropriate and adequate health care services are provided on site and at workers camps to address/ manage worker illnesses and injuries.</li> </ul> <p>Security</p> <ul style="list-style-type: none"> <li>• Ensure that a Project Code of Conduct and appropriate training for any security personnel are implemented to ensure best practice in running a secure site and implementing the Code of Conduct that fosters behaviours that help to avoid, eliminate, or minimise the use of excessive force in potential conflict situation; and Ensure the implementation of a Community Health, Safety and Security Plan that outlines health and safety procedures for the protection of the local community.</li> <li>• Procedures will include the prevention of unauthorised access to the construction sites</li> </ul>		
	<p>Operational Health and Safety (OHS) impacts caused by on site working conditions. Social issues between different levels of workers, gender issues, language issues and potentially disharmony with local workers as a result of labour influx.</p>	<p>Implementation of an <u>Occupational Health and Safety Plan</u> (OHS) which will include:                      Adequate health care facilities (including first aid facilities) within construction sites;                      Safety Training Program. A Safety Training Program is required and should consist of:</p> <ul style="list-style-type: none"> <li>• Initial Safety Induction Course. All workers should be required to attend a safety induction course within their first week on Site. The induction OHS trainings are mandatory for new staff and visitors; and</li> <li>• Periodic Safety Training Courses. Period safety</li> </ul>	Contractor	Supervision Consultant (Social safeguards expert), PMU

Subject	Potential Impact	Mitigation Measures	Institutional Responsibility	
			Implement	Monitoring
		<p>course should be conducted not less than once every six months. All Subcontractor employees will be required to participate in relevant training courses appropriate to the nature, scale and duration of the subcontract works. Training courses for all workers on the Site and at all levels of supervision and management.</p> <ul style="list-style-type: none"> <li>• Supplies of PPE need to be ensured by the employer and training on how to use PPE correctly must be provided.</li> <li>• Regular safety meetings will be conducted on a monthly basis and should require attendance by the safety representatives of Subcontractors unless otherwise agreed by the Contractors. The CSC will be notified of all safety meetings in advance. The CSC may attend in person or by representative at his discretion. The minutes of all safety meetings will be taken and sent to the PIU within seven days of the meeting.</li> <li>• Before new activities are commenced the Risk Assessment should be conducted including a thorough examination of the working site to identify situations,</li> <li>• processes, etc. that may cause harm, particularly to people. After identification is made, the probability and severity of the risks should be analyzed and evaluated. Based on the evaluation actions necessary to eliminate the hazard or control the risk using the hierarchy of risk control methods should be identified.</li> <li>• Safety Inspections. The Contractor should regularly inspect, test and maintain all safety equipment, scaffolds, guardrails, working platforms, hoists, ladders and other means of access, lifting, lighting, signing and guarding equipment. Lights and signs should be kept clear of obstructions and legible to read. Equipment, which is damaged, dirty, incorrectly positioned or not in working order, should be repaired, or replaced immediately.</li> <li>• Clean drinking water should be provided to all</li> </ul>		

Subject	Potential Impact	Mitigation Measures	Institutional Responsibility	
			Implement	Monitoring
		<p>workers; adequate protection to the general public, including safety barriers and marking of hazardous areas.</p> <ul style="list-style-type: none"> <li>• Put in place an effective anonymous grievance redress mechanism for workers to raise any concerns for resolution.</li> <li>• Labour Employment and Working Condition Management Plan must provide protections and safeguards for children. Social Safeguard expert to be employed and on hand to resolve any issues. Guidance from the MDH on Social and HR Assessment will also provide guidelines.</li> <li>• Labour Employment and Working Condition Management Plan must provide protections for people at risk of modern slavery. Social Safeguard expert to be employed and on hand to resolve any issues. There will also be Guidance from the MDH on Social and HR Assessment.</li> <li>• OHS Plan to prevent sexual harassment and GBV. Social Safeguards expert on site to handle issues.</li> <li>• Fair labour contracts and policies that do not discriminate against any individuals or groups.</li> <li>• Ensure adequate security for all workers and especially women so that they can access the workplace safely and securely and prevent sexual harassment and GBV. Health and Safety MP, and Labour Employment and Working Conditions MP will be used, in conjunction with</li> <li>• gender mainstreaming and GBV prevention action plans from the Gender and GBV Assessment Report.</li> </ul> <p>The Contractor will be responsible for preparation of an Emergency Preparedness Response Plan (ERP) as part of the SSEMP and which will include sections relating to:</p> <ul style="list-style-type: none"> <li>• Containment of hazardous materials;</li> <li>• Oil and fuel spills;</li> <li>• Fire and explosions;</li> <li>• Work-site accidents;</li> <li>• Earthquake hazards; and</li> </ul>		

Subject	Potential Impact	Mitigation Measures	Institutional Responsibility	
			Implement	Monitoring
		<ul style="list-style-type: none"> <li>• Emergency Response any global health issues.</li> <li>• A Construction Camp Management Plan (see Construction Camps below) to be developed to ensure all workers coming from outside the community must be given safe, secure, clean accommodation and that there is enough space, access to water, sanitation, food, clothes, washing facilities etc., and have transport to the workplace as well as medical facilities. A detailed assessment of the impacts of proposed arrangements for worker accommodation in dedicated camps should be conducted, and options selected to ensure minimum strain on local facilities and reduced community disturbance</li> </ul>		
	Construction Camps	<p>A Construction Camp Management Plan (CCMP) will be developed.</p> <p>Prior to the start of site works, an Environmental and Social Screening of potential camp locations will be undertaken to identify any sensitive environmental and social receptors and to ensure the camps are of sufficient distance from villages and local communities but are able to access the required utilities and services. Consultation with local communities organised and implemented by a Contractor before the construction camp is developed is required, covering:</p> <ul style="list-style-type: none"> <li>• Location of camps over one kilometre from any residential area and at least 50 m from any surface watercourse and not within 2 km of a protected area – any deviation from these separation distance must be supported by sufficient justification and additional mitigation measures, and the location and mitigations must be approved;</li> <li>• Coordination of all construction camp activities with neighbouring land uses;</li> <li>• Confirmation as to whether workers can be accompanied by families or whether rosters will enable locally engaged workers to go home daily or not;</li> </ul>	Contractor	Supervision Consultant (Social safeguards expert), PMO

Subject	Potential Impact	Mitigation Measures	Institutional Responsibility	
			Implement	Monitoring
		<ul style="list-style-type: none"> <li>The construction camps will be staffed and equipped with Accident &amp; Emergency/medical emergency facilities for all workers, to avoid straining the available health facilities that serve local communities;</li> <li>The Contractor will be responsible for maintenance and clean-up of campsites and respecting the rights of local land users;</li> <li>The plan will cover camp sites as well as any sites considered as associated facilities;</li> <li>The plan will set out best practice measures, with a particular focus on the prevention of gender-based violence and the promotion of a gender-sensitive working environment; and</li> <li>The construction camp shall be placed in compliance with all applicable national requirements and permits (e.g., environmental, water supply, wastewater discharge, electricity, access roads etc.).</li> </ul>		
Cumulative Impacts	Project construction activities in combination with the works related to other Projects in the vicinity will have a cumulative impact on the environment	<ul style="list-style-type: none"> <li>The Construction Contractor shall coordinate the construction activities with the operators of the infrastructures, crossed by the road to avoid simultaneous road construction and planned repairs of the existing in one and the same Project area. In case it is not possible to avoid such cases, the cumulative impacts shall be assessed, and mitigation measures proposed as appropriate prior to commencement of the works; and</li> <li>The Construction Contractors of the sister projects shall coordinate the construction works at the common Aol to minimize the impacts on environment and to ensure better health and safety conditions.</li> </ul>	Contractor	PMU, CSC, PMC
<b>Operation Phase</b>				
Climate Change	Increased hot days and heatwaves, drought conditions and wildfires also influence road integrity	As with increased hot days and heatwaves, drought conditions and wildfires also influence road integrity, therefore requiring additional maintenance budget to be considered. The additional maintenance budget will ensure that any damage to the road can be repaired, resulting in an overall Low risk after mitigation.	PMU	EA
Groundwater Quality	Reductions in water quality through alteration to river flow	The operating authority of the road should develop an oil spill contingency plan to provide emergency response in	PMU	EA

Subject	Potential Impact	Mitigation Measures	Institutional Responsibility	
			Implement	Monitoring
	rates and contamination.	the event of the road crash related loss of containment on the road.		
Waste	Improper handling and disposal of non-hazardous and hazardous solid and food waste.	Handling, treatment and disposal of waste in accordance with the Uzbekistan legislation. Hazardous and non-hazardous waste storage, collection and treatment/disposal methods should be identified and permanently controlled by the state authorities.	PMU	EA

**B. Institutional Responsibilities for the Environmental Management Plan****Table 78. Project management roles and responsibilities**

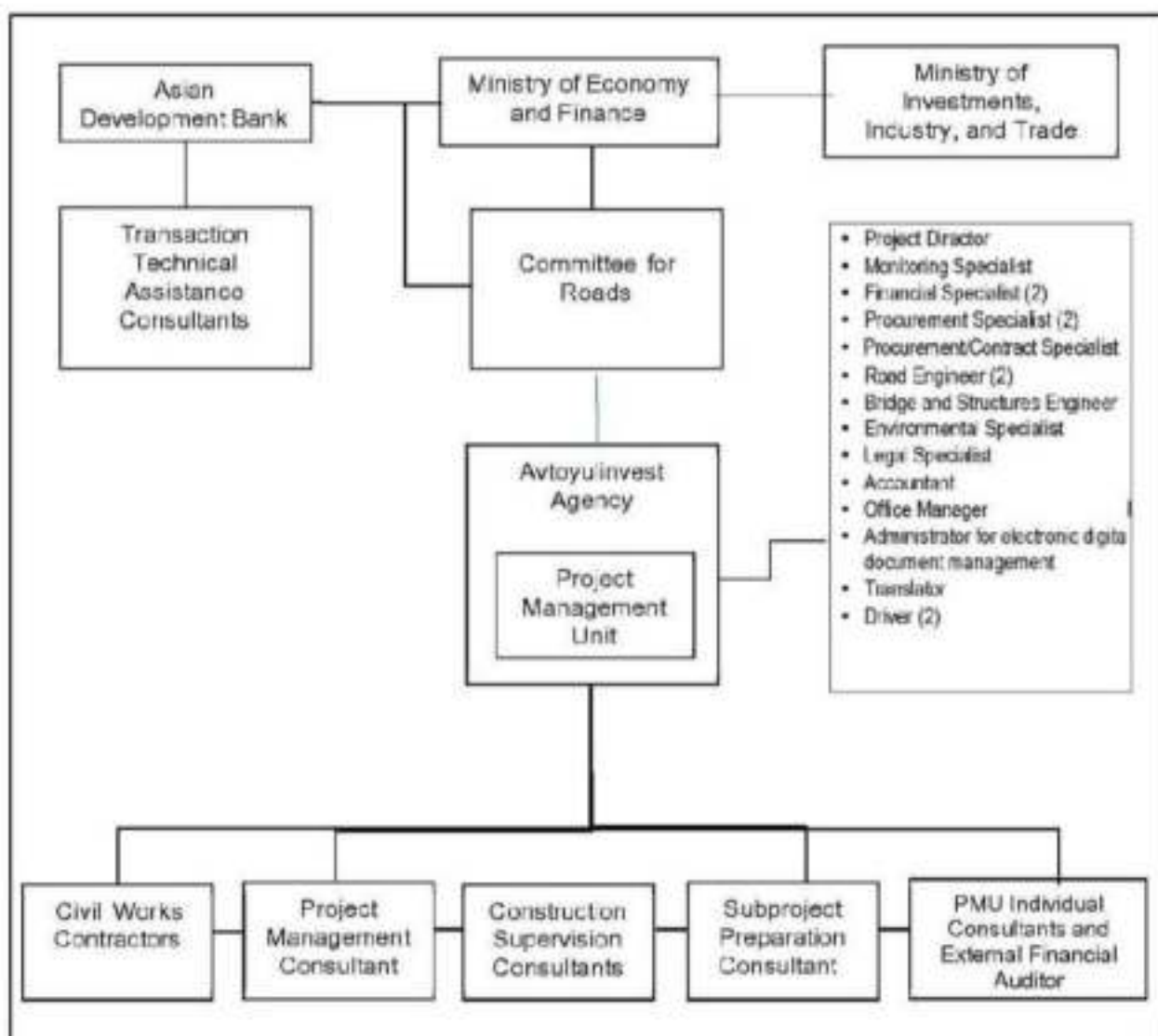
<b>Project Implementation Organization</b>	<b>Management Roles and Responsibilities</b>
Committee for Roads (executing agency) to be supported by Avtoyulinvest Agency (implementing agency) through its PMU in implementing the project	<p>Coordinate overall project implementation and ensure the timely submission of required reports to ADB.</p> <p>Oversee day-to-day project management activities.</p> <p>Undertake procurement of goods, works, and consulting services in accordance with ADB guidelines.</p> <p>Prepare and process withdrawal applications for loan disbursements.</p> <p>Compile and submit regular project progress reports.</p> <p>Maintain accurate project accounts and complete financial documentation related to the loan.</p> <p>Prepare financial statements and ensure the timely conduct of external audits.</p>
Ministry of Transport	Monitor project implementation progress and proactively facilitate the resolution of any implementation issues that may arise.
Ministry of Finance	<p>Oversee and monitor project implementation as well as the adequacy of overall project funding</p> <p>Allocation and release of counterpart funds</p> <p>Timely and efficiently review and endorse the government feasibility study</p> <p>Sign the loan agreement</p> <p>Endorse to ADB the authorized staff with approved signatures for processing of withdrawal applications</p> <p>Process and submit to ADB any request, when required for reallocating loan proceeds</p> <p>Monitor project implementation and provide respective coordination and facilitation</p> <p>Hold meetings as necessary but at least quarterly to discuss the overall status and project issues</p>
Ministry of Investment, Industry, and Trade	<p>Central focal point for cooperation with all international finance institutions and foreign government financial organizations, including ADB</p> <p>Timely and efficient review and endorsement of the government feasibility study</p> <p>Assistance in signing the loan and project agreements</p>
ADB	<p>Monitor and review overall project implementation in consultation with the executing and the implementing agencies, including</p> <ol style="list-style-type: none"> <li>1. the project implementation schedule;</li> <li>2. actions required in terms of poverty reduction, environmental impacts, and resettlement plans if applicable;</li> <li>3. timeliness of budgetary allocations and counterpart funding;</li> <li>4. project expenditures, progress with procurement and disbursement, and statement of expenditure when applicable;</li> <li>5. conduct periodic loan review, midterm review, and completion review missions;</li> <li>6. compliance with particular loan covenants; and</li> <li>7. the likelihood of attaining the project's immediate development objective</li> </ol>
Subproject preparation consultant	An international consulting firm will be competitively selected to assist the borrower in subproject preparation activities for batches 2 and 3 up to finalization of technical inputs to the bidding documents for works. These activities will include identification of subprojects, feasibility studies, safeguards assessments and planning, etc.
Project management consultant	An international consulting firm will be competitively selected to assist the borrower in all project management aspects starting from finalization of bidding documents for works and including assistance during bidding process, evaluation, contract negotiations (batches 2 and 3); coordination of supervision consultants; review/approval of the contractor's detailed design (to ensure consistency of the quality of the detailed design across all lots); certifying contractor's invoices and determination of claims; monitoring and evaluation; etc.

AA = Avtoyulinvest Agency; ADB = Asian Development Bank; CR = Committee for Roads; MIIT = Ministry of Investment, Industry, and Trade; MOF = Ministry of Finance; MOT = Ministry of Transportation.

Source: ADB.

575. The Committee for Roads shall serve as the Executing Agency (EA) and will be responsible for the overall implementation of the project. As the lead agency, the EA holds ultimate accountability for ensuring the effective implementation of the mitigation measures outlined in the Environmental Management Plan (EMP), as well as full compliance with applicable loan covenants. The EA will also provide strategic guidance and coordinate closely with relevant government agencies and the Asian Development Bank (ADB) to ensure the timely resolution of any project-related issues.

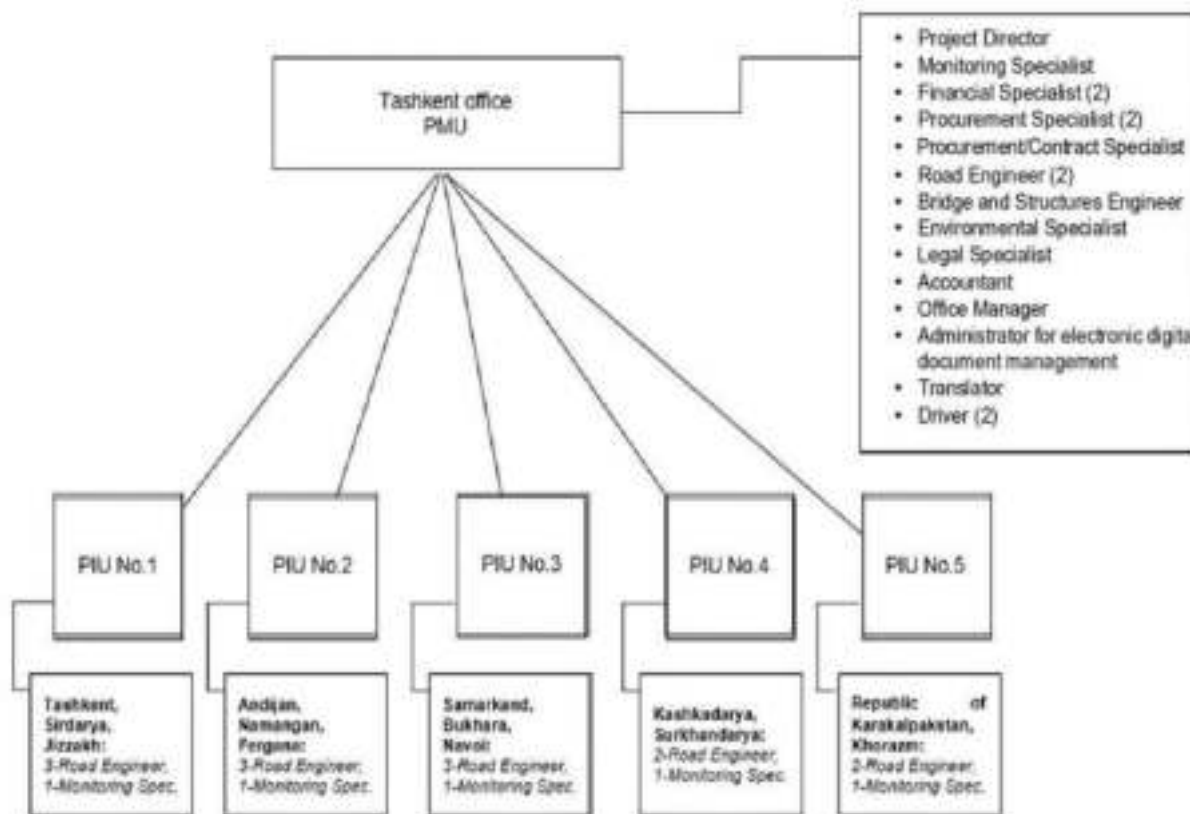
576. The Avtoyulinvest Agency (AA), under the Committee for Roads, acts as the Implementing Agency (IA) for the Rural Roads Resilience Sector Project. Project activities are being carried out through the designated Project Management Unit (PMU). Both the Executing Agency (EA) and IA have extensive experience in overseeing infrastructure projects funded by International Financial Institutions (IFIs), including the Asian Development Bank (ADB). Their institutional capacity is being further supported through Subproject Preparation Consultant (SPC) services, which include technical design review, safeguard due diligence, and procurement support for upcoming subprojects. These preparatory efforts aim to ensure quality assurance and strengthen implementation readiness across the clusters to be financed under Loan 4426-UZB, including the upgrade of 61.3 km of rural roads in the Tashkent region.



**Figure 67. Project organizational structure**

577. The Project Management Unit (PMU) will be responsible for the day-to-day management of the project and will coordinate and implement all project-related activities, including procurement, consultant and staff recruitment, financial disbursement, contract administration, progress

monitoring, and reporting. The PMU will be established under the Authorized Agency (AA) with a core team of staff, and will be further strengthened through the inclusion of in-house specialists in key areas such as environmental and social safeguards, gender, financial management, road safety, and climate change adaptation. The PMU's operations will be supported by five Project Implementation Units (PIUs), each assigned to manage a cluster of two to three regions (oblasts). Local government road units or relevant agencies will participate actively in the planning, detailed design, and construction supervision of road subprojects within their jurisdictions.



**Figure 68. Proposed project management unit structure**

578. Under the guidance of the Executing Agency (EA) and the Asian Development Bank (ADB), three categories of consultants will be engaged to support the PMU in effective project implementation.

- i. a Subproject Preparation Consultant (SPC)—an international consulting firm responsible for preparing technical and safeguard documentation for upcoming subprojects;
- ii. a Project Management Consultant (PMC)—an international firm providing oversight, coordination support, and technical advisory services to the PMU throughout the project lifecycle; and
- iii. five Construction Supervision Consultants (CSCs)—national consulting firms assigned to supervise civil works implementation across designated regional clusters.

579. PMU with support from the Consultants will be in charge for:

- iv. Review REA checklists and assign categorization based on ADB SPS (2009) and EARF;
- v. Submit IEE to ADB for approval and disclosure in ADB website;
- vi. Ensure IEEs are updated/revised based on detailed engineering design (DED) and recommendations of technical studies;
- vii. Ensure approved IEEs are disclosed in PMU websites and relevant information posted in public areas accessible and understandable by local people;
- viii. Ensure the draft IEE/EMP will be disclosed locally at a reasonable time prior to consultations in an accessible place;
- ix. Ensure IEEs and EMPs are included in the bid documents and contracts; ensure work

- contracts will include provisions for the project to abide by Uzbekistan’s labor legislation as well as ILO core labor standards ratified by the country;
- x. Ensure all necessary clearances, permits, consents, NOCs, etc. are obtained prior to commencement of works and in compliance to the provisions and conditions during implementation;
  - xi. Assist in addressing any grievances brought about through the GRM;
  - xii. Direct/instruct project consultants to document and develop good practice construction guidelines to assist the contractors in implementing the provisions of IEE and EMP;
  - xiii. Direct/instruct project consultants the review of the contractors’ implementation plans (including SSEMPs and corrective action plan [CAP]) to ensure compliance with ADB SPS and applicable government rules and regulations;
  - xiv. Coordinate the conduct of technical studies such vibration studies, noise level studies and/or biodiversity assessment;
  - xv. Coordinate the conduct of relevant public consultation and awareness;
  - xvi. Coordinate with national and state level government agencies;
  - xvii. Coordinate with consultants and contractors on mitigation measures involving the community and affected persons and ensure that environmental concerns and suggestions are incorporated and implemented. Review monthly monitoring reports submitted by project consultants and contractors, and prepare and submit the semiannual environmental monitoring reports (EMR) to ADB; and
    - If necessary, prepare CAP and ensure implementation of corrective actions to ensure no environmental impacts and noncompliance to ADB SPS requirements and loan assurances.

580. The Subproject Preparation Consultant (SPC)—comprising international and national experts (each engaged for a duration of 12 months)—will be responsible for identifying and preparing subprojects for Batch 2 and Batch 3 under this project. The SPC will lead the conduct of environmental and biodiversity screening to ensure the exclusion of Category A subprojects, in alignment with the ADB Safeguard Policy Statement (SPS, 2009). The SPC will also support the PMU in the preparation of Initial Environmental Examinations (IEEs), including submission to ADB for review and approval, and subsequent public disclosure via the ADB and Committee for Roads (CR) websites. In addition, the SPC will identify and outline applicable national environmental regulatory requirements and assist in determining the necessary environmental permits for each subproject. The SPC will also conduct capacity-building activities, including targeted training sessions for officials of the Committee for Roads on environmental assessment procedures and the implementation of mitigation measures.

581. A detailed Terms of Reference (TOR) for the SPC is provided separately.

582. The Project Management Consultant (PMC)—an international expert to be engaged for a period of 8 months—will provide strategic and technical support to the PMU in the overall implementation of the project. Key responsibilities include assisting in the preparation of bidding documents, ensuring the effective integration of the Initial Environmental Examination (IEE) and Environmental Management Plan (EMP) into the bidding packages. The PMC will oversee the environmental monitoring of all subprojects, including the preparation of monitoring checklists for pre-construction, construction, and post-construction phases. The PMC will consolidate quarterly and semi-annual Environmental Monitoring Reports (EMRs) prepared by the Construction Supervision Consultants (CSCs) and submit them to the PMU for further transmittal to ADB. Upon approval, these reports will be disclosed on the ADB website in accordance with transparency and public disclosure requirements. The PMC will also assist the PMU and PIUs in ensuring full compliance with the ADB Safeguard Policy Statement (SPS, 2009) and all relevant national environmental regulations of Uzbekistan.

- i. Review Environmental Assessment and Review Framework (LARF) and two IEEs as well as future IEEs as necessary and understand project specific environmental safeguards requirements.
- ii. Update the EARF, as necessary.
- iii. Conduct screening for the road sections based on the detailed engineering designs and

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- check if IEEs and EMPs needs to be updated.
  - iv. Update the IEEs and EMPs based on the detailed engineering designs as required. Conduct public consultations as part of the IEEs and EMPs update processes.
  - v. Assist PMU/PIU to ensure that civil could work start only after updated IEEs and EMPs are cleared by ADB.
  - vi. Monitoring environmental safeguard compliance throughout the project implementation period and assist the PMU/PIU to prepare semi-annual environment safeguards monitoring report.
  - vii. Assist the PMU/PIU to establish project level Grievance Redress Mechanism (GRM) and to maintain the function throughout the project implementation period.
  - viii. Assist the PMU/PIU to address grievances filed to the project level GRM so the PMU/PIU could resolve the grievances as early as possible.

583. Construction Supervision Consultants (CSCs) (national 18 months) will undertake construction supervision to ensure conformity and quality of the works and compliance with the relevant procedures and provisions of contractual documents, and to serve as the Engineer for CR and other relevant agencies. CSC will be located at project sites, and thus will have immediate and direct supervision over daily EMP implementation, monitoring and reporting. A CSC will prepare regular quarterly and Environmental Monitoring Reports for submission to PMC and PMU. The detailed tasks of Environmental specialist is presented below:

- i. Approve and monitor the contractor's construction program and method statements, including the Site-specific Environmental Management Plan and Topic specific Environmental Management Plans in light of site conditions, verifying that they are consistent with the project implementation schedule and with the design solutions, the requirements of existing normative documents, technological sequence, and safety of construction, informing about it in a written form to CR. These documents will be subject to ADB review and guidance.
- ii. The Engineer shall issue notices to the contractor advising of any non-compliance with environmental mitigation measures, asset out in the contract documents. Copies of all notices should be provided to PMC and CR. Before issuing such notices, the CSC should, as appropriate, have advised the contractor of the noncompliance and given an opportunity to the contractor to make good any adverse impact prior to the notice being issued.
- iii. The CSC shall verify payments for the works as stipulated in the contract, prepare and submit for PMC verification and certification Interim Payment Certificates, the Final Payment Certificate and other certificates, including Taking Over Certificate, as required under the civil works contract as consistent with the requirements of the EMP for the contract.
- iv. The CSC shall include in their periodic (monthly/quarterly) report extent of compliance with the EMP stipulations that apply to that period. Particular attention should be paid to permanent features introduced for improved environment along the project road, including efficacy of their installation, for instance Noise Barriers and Water Harvesting structures.
- v. Contractor: The Contractor will be responsible for development of Site Specific EMPs (SSEMP) and Topic Specific EMPs (TSEMP), such as the Health and Safety Management Plan, Waste and Spoil Management Plan and etc. SSEMP will describe how they intend to implement the EMP, describing the precise locations of the required mitigation /monitoring, the persons responsible for the mitigation / monitoring, the schedule and reporting methodology.
- vi. All contractors will be responsible for implementing the mitigation measures during construction and commissioning under the direct supervision of the CSC, PMC and overall supervision of PMU. Each contractor will be required to work with PMC to finalize package specific SSEMP during construction, appoint an Contractor's Environmental Health and Safety (EHS) Specialist within its staff on full time basis and submit monthly progress reports on the implementation of the SSEMP / EMP. Contractors will also be engaged in project GRM via a GRM focal point person (PMU's Safeguard Specialist) and will be required to regularly co-ordinate with relevant stakeholders such as PAPs, households, Makhalla leaders, Hokimiyats to provide up to date information on project activities and address any issues that arise during project implementation during construction stage.

## Other Agencies

584. The provincial branches of the Ministry of Ecology, Environmental Protection, and Climate Change (MEEPCC) will play an active role in both project implementation and subsequent operations. MEEPCC is responsible for the review and approval of the Preliminary Environmental Impact Statement (PEIS), which will result in the issuance of an official Environmental Appraisal. This appraisal will outline specific mitigation measures and monitoring requirements, which are mandatory for implementation during the construction phase by the project proponent. These requirements must be integrated into the Environmental Management Plan (EMP) as part of the Initial Environmental Examination (IEE). Furthermore, MEEPCC inspectors from the respective provincial branches will conduct regular inspections to monitor the implementation and compliance with the Environmental Appraisal.

585. Under the supervision of the Executing Agency (EA) and in coordination with the Asian Development Bank (ADB), three categories of consultants will be engaged to support the Project Management Unit (PMU) in effective project implementation:(i) Subproject Preparation Consultant (SPC) – an international firm responsible for environmental and technical documentation of subsequent subprojects;(ii) Project Management Consultant (PMC) – an international firm tasked with project oversight, coordination, and safeguard monitoring; and(iii) Five Construction Supervision Consultants (CSCs) – national firms assigned to supervise civil works execution across designated regional clusters.).

586. The PMU, with support from the National Environmental Consultants, will be responsible for:

- i. Review REA checklists and assign categorization based on ADB SPS (2009) and EARF;
- ii. Submit IEE to ADB for approval and disclosure in ADB website;
- iii. Ensure IEEs are updated/revised based on detailed engineering design (DED) and recommendations of technical studies;
- iv. Ensure approved IEEs are disclosed in PMU websites and relevant information posted in public areas accessible and understandable by local people;
- v. Ensure the draft IEE/EMP will be disclosed locally at a reasonable time prior to consultations in an accessible place;
- vi. Ensure IEEs and EMPs are included in the bid documents and contracts; ensure work contracts will include provisions for the project to abide by Uzbekistan’s labor legislation as well as ILO core labor standards ratified by the country;
- vii. Ensure all necessary clearances, permits, consents, NOCs, etc. are obtained prior to commencement of works and in compliance to the provisions and conditions during implementation;
- viii. Assist in addressing any grievances brought about through the GRM;
- ix. Direct/instruct project consultants to document and develop good practice construction guidelines to assist the contractors in implementing the provisions of IEE and EMP;
- x. Direct/instruct project consultants the review of the contractors’ implementation plans (including SSEMPs and corrective action plan [CAP]) to ensure compliance with ADB SPS and applicable government rules and regulations;
- xi. Coordinate the conduct of technical studies such vibration studies, noise level studies and/or biodiversity assessment;
- xii. Coordinate the conduct of relevant public consultation and awareness;
- xiii. Coordinate with national and state level government agencies;
- xiv. Coordinate with consultants and contractors on mitigation measures involving the community and affected persons and ensure that environmental concerns and suggestions are incorporated and implemented. Review monthly monitoring reports submitted by project consultants and contractors, and prepare and submit the semiannual environmental monitoring reports (EMR) to ADB; and
- xv. If necessary, prepare CAP and ensure implementation of corrective actions to ensure no environmental impacts and noncompliance to ADB SPS requirements and loan assurances.

587. The Subprojects Preparation Consultant (SPC) will be responsible for the identification and selection of candidate subprojects under Batch 2 and Batch 3. The SPC shall undertake environmental and biodiversity screening to ensure exclusion of Category A subprojects, in

accordance with the ADB Safeguard Policy Statement (SPS, 2009). The consultant will assist the Project Management Unit (PMU) in the preparation of Initial Environmental Examinations (IEEs), and facilitate submission to ADB for review and clearance prior to public disclosure on both the ADB and Committee for Roads (CR) websites. The SPC shall define and validate applicable national environmental regulatory requirements, including the necessary environmental permits and clearances required for each subproject. The SPC will also conduct capacity building activities by delivering targeted training sessions to officials of the Committee for Roads, focused on environmental assessment processes and the implementation of mitigation measures.

588. The Project Management Consultant (PMC) will support the PMU in the preparation of procurement and bidding documents, ensuring the integration of IEE findings and Environmental Management Plan (EMP) provisions within the tender packages. The PMC shall conduct systematic environmental monitoring of all subprojects, including pre-construction, construction, and post-construction phases. This will involve the development and utilization of standardized monitoring checklists. The PMC will consolidate Environmental Monitoring Reports (EMRs) submitted by the Construction Supervision Consultants (CSCs) on a quarterly and semi-annual basis and will prepare consolidated submissions for PMU review and subsequent forwarding to ADB. Upon ADB approval, the reports shall be disclosed on the ADB website. The PMC will also provide technical support to the PMU and Project Implementation Units (PIUs) to ensure full compliance with ADB SPS (2009) and applicable national environmental legislation and standards.

- i. Review Environmental Assessment and Review Framework (LARF) and two IEEs as well as future IEEs as necessary and understand project specific environmental safeguards requirements.
- ii. Update the EARF, as necessary.
- iii. Conduct screening for the road sections based on the detailed engineering designs and check if IEEs and EMPs needs to be updated.
- iv. Update the IEEs and EMPs based on the detailed engineering designs as required. Conduct public consultations as part of the IEEs and EMPs update processes.
- v. Assist PMU/PIU to ensure that civil work start only after updated IEEs and EMPs are cleared by ADB.
- vi. Monitoring environmental safeguard compliance throughout the project implementation period and assist the PMU/PIU to prepare semi-annual environment safeguards monitoring report.
- vii. Assist the PMU/PIU to establish project level Grievance Redress Mechanism (GRM) and to maintain the function throughout the project implementation period.
- viii. Assist the PMU/PIU to address grievances filed to the project level GRM so the PMU/PIU could resolve the grievances as early as possible.

589. The Construction Supervision Consultants (CSCs), engaged for a duration of 18 months, will be responsible for overseeing construction activities to ensure that all works are executed in accordance with the specified quality standards, contractual provisions, and applicable procedures. The CSCs will act on behalf of the Engineer for the Client Representative (CR) and other relevant authorities. Stationed at the project sites, CSCs will have direct, on-site oversight of the day-to-day implementation, monitoring, and reporting of the Environmental Management Plan (EMP). They will also be tasked with preparing regular quarterly reports and Environmental Monitoring Reports to be submitted to the Project Management Consultant (PMC) and the Project Management Unit (PMU). The specific responsibilities of the Environmental Specialist are outlined below:

- i. Approve and monitor the contractor's construction program and method statements, including the Site-specific Environmental Management Plan and Topic specific Environmental Management Plans in light of site conditions, verifying that they are consistent with the project implementation schedule and with the design solutions, the requirements of existing normative documents, technological sequence, and safety of construction, informing about it in a written form to CR. These documents will be subject to ADB review and guidance.
- ii. The Engineer shall issue notices to the contractor advising of any non-compliance with environmental mitigation measures, asset out in the contract documents. Copies of all

- notices should be provided to PMC and CR. Before issuing such notices, the CSC should, as appropriate, have advised the contractor of the noncompliance and given an opportunity to the contractor to make good any adverse impact prior to the notice being issued.
- iii. The CSC shall verify payments for the works as stipulated in the contract, prepare and submit for PMC verification and certification Interim Payment Certificates, the Final Payment Certificate and other certificates, including Taking Over Certificate, as required under the civil works contract as consistent with the requirements of the EMP for the contract.
  - iv. The CSC shall include in their periodic (monthly/quarterly) report extent of compliance with the EMP stipulations that apply to that period. Particular attention should be paid to permanent features introduced for improved environment along the project road, including efficacy of their installation, for instance Noise Barriers and Water Harvesting structures.
  - v. Contractor: The Contractor will be responsible for development of Site Specific EMPs (SSEMP) and Topic Specific EMPs (TSEMP), such as the Health and Safety Management Plan, Waste and Spoil Management Plan and etc. SSEMP will describe how they intend to implement the EMP, describing the precise locations of the required mitigation /monitoring, the persons responsible for the mitigation / monitoring, the schedule and reporting methodology.
  - vi. All contractors will be responsible for implementing the mitigation measures during construction and commissioning under the direct supervision of the CSC, PMC and overall supervision of PMU. Each contractor will be required to work with PMC to finalize package specific SSEMP during construction, appoint an Contractor’s Environmental Health and Safety (EHS) Specialist within its staff on full time basis and submit monthly progress reports on the implementation of the SSEMP / EMP. Contractors will also be engaged in project GRM via a GRM focal point person (PMU’s Safeguard Specialist) and will be required to regularly co-ordinate with relevant stakeholders such as PAPs, households, Makhalla leaders, Hokimiyats to provide up to date information on project activities and address any issues that arise during project implementation during construction stage.

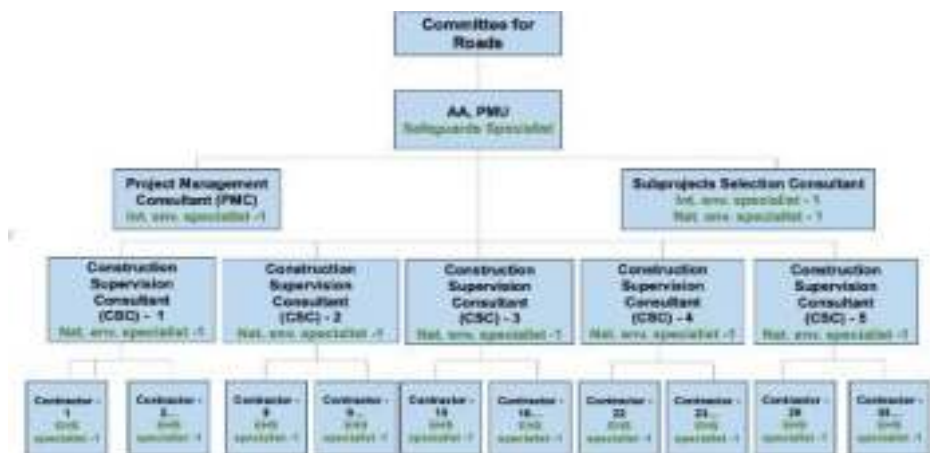


Figure 69. Institutional structure of environmental staffing

### Capacity Building Program

590. The proposed capacity-building program for the project’s environmental management will focus on three key areas:

- i. Strengthening PMU Capacity for EMP Implementation during Construction and Maintenance Phases: To improve the Project Management Unit’s (PMU) effectiveness in implementing the Environmental Management Plan (EMP), the Project Management Consultant (PMC) will conduct targeted training sessions for the PMU’s safeguard specialists. In addition, the PMC will provide ongoing technical support for monitoring Site-Specific Environmental Management Plan (SSEMP) implementation and will offer guidance to the Contractors’ Environmental Health and Safety (EHS) specialists as needed.
- ii. Enhancing Environmental Competence of Agroservis Operator, District Coordination Office, and Contractors during Maintenance and Operation Phases: In collaboration with the Project Implementation Unit – National Environmental Specialist (PIU-NES), the Implementation

- Support Consultant (ISC) will design and deliver a training program focused on compliance with national environmental regulations. This includes obtaining required permits, monitoring environmental performance, and preparing and submitting reports to the appropriate government authorities. Contractors will receive specific training on the development, implementation, and monitoring of SSEMPs and TSEMPs, including the Temporary Environmental Management Plan (TEMP).
- iii. Promoting Good Agricultural Practices (GAP), Including Safe Chemical Use, among Smallholder Farmers and Agroservis Operator: The ISC will develop and implement a training program tailored to smallholder farmers who will receive subplots within the project area. The training will cover various topics, including occupational and employee health and safety, risk assessment, identification of hazardous situations, first aid, proper use of personal protective equipment (PPE), waste management, environmental protection measures, and procedures under the Grievance Redress Mechanism (GRM). The Agroservis Operator will also be included in this capacity development effort to ensure sound environmental practices during project operations.

591. The proposed schedule and structure for the required training activities are outlined below.

**Table 79. Tentative training program for environmental management**

Type of Training	Content	Training Recipients	Duration of training	Organizer/ Responsible
Pre-construction Phase				
Preparation of IEE	<ol style="list-style-type: none"> <li>Requirement of ADB SPS (2009) for environmental safeguards</li> <li>National requirements for environmental compliance during projects design and implementation</li> <li>Consideration of biodiversity aspects during projects design and implementation</li> </ol>	PMU/PIUs' Managers and safeguards specialist	1 day	Project Management Consultant (PMC) Consultant (PMC)
Construction Phase				
Introductory training	<ol style="list-style-type: none"> <li>Roles and responsibilities of PMU/contractors/consultants towards protection of environment;</li> <li>Potential specific Environmental/Biodiversity issues during construction;</li> <li>Development of SEMP, TTSEMP and OHS Plan;</li> <li>Monitoring of SEMP and OHSP</li> <li>implementation;</li> <li>Reporting requirements;</li> <li>GRM requirements.</li> </ol>	PMU safeguards specialist, CSC env. specialists Contractors' Environmental/ Health and Safety Specialists	1.5 days	PMC
Training on SEMP implementation	Implementation of SEMP during construction phase Monitoring and reporting requirements Reporting requirements	Contractors' Environmental/ Health and Safety Specialists and Contractors' workers	1 day	CSC conducts training PMC monitors implementation
Regular training on EH&S	Training on SEMP and OHSP implementation	Contractors' workers	0.5 day	Contractors implement, PMC and CSC monitors implementation

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**Contract Permits**

592. Several permits will be necessary to facilitate construction activities. To manage this, the PMU shall develop a permit register and formally issue it to all Contractors. It will be the responsibility of each Contractor to secure and maintain all required permits before initiating any regulated activities—such as water abstraction for batching plants, establishment of construction camps, waste disposal, storage of hazardous substances, and compliance with fire safety requirements. The PIU will be responsible for monitoring and verifying contractor adherence to the permit register throughout the project duration.

## XII. ENVIRONMENTAL MONITORING PLAN

593. Environmental monitoring is a critical component in ensuring the effective implementation of the mitigation measures outlined in the IEE. To facilitate this, an Environmental Monitoring Plan (EMoP) has been developed to systematically track the performance of both the EMP and the overall Project.

594. An EMoP has been developed with the primary objective of conducting regular assessments of air quality, water quality, and noise levels in accordance with the national standards of Uzbekistan and the Environmental, Health, and Safety (EHS) Guidelines. Accordingly, the following shall be undertaken:

- i. Regular monitoring of air quality, water quality and noise levels against Uzbekistan and EHS
- ii. Guidelines will be carried out throughout the construction period. The party responsible for monitoring will be obliged to report to the PMU. During the operation period (until the issuance of ADB's Project Completion Report), such monitoring will be conducted by the executing agency. Table 80 provides the monitoring actions required during the pre-construction, construction and operation phase of the Project.
- iii. The IA through PMU will conduct the monitoring of implementation measures indicated in the EMP. Environmental monitoring shall be carried out the several levels. As contractors will be responsible for implementation of the EMP on construction sites, they will be required to conduct environmental audits on a daily base and submit environmental monitoring reports as part of the monthly progress reports to the CSCs. The CSC's environmental specialists will also conduct weekly audits of the construction sites, identify non-compliances, and reflect these activities in monthly environmental monitoring reports, which will be submitted to the PMC. Non-compliances observed during site visits, and required corrective actions with timelines for implementation, will be officially submitted to contractors. Contractors will be obligated to mitigate all observed non-compliances and report to the CSC once mitigated. CSC will report to PMC and PMU.
- iv. The PMC will also be involved in environmental monitoring through the implementation of quarterly site visits to verify EMP implementation. PMC environmental specialist will review quarterly reports on environmental performance prepared by CSC and will submit them to the PMU. The PMU's environmental specialist, on behalf of the IA, will prepare semi-annual environmental monitoring reports and submit them to the ADB for revision, approval and further publication on the ADB website. After approval, the PMU will ensure that EMRs are translated in local languages and published on appropriate websites. The template of biannual environmental monitoring report is presented in Appendix 10.
- v. Within three months after completion of all civil works, a report on the project's environmental compliance performance (including lessons learned that may help the PMU in their environmental monitoring of future projects) will also be prepared. This report will be part of the input to the overall project completion report. In addition to the above-mentioned reports, in case of any accident related to occupational and community health and safety, CSC's environmental specialist, through PMU, is expected to (i) report to ADB within 72 hours, and (ii) prepare and submit an incident report with action plan within 7 days of the occurrence.
- vi. To ensure adequate environmental assessment of all sub-projects has been carried out, IEE reports based on a representative sample of Environment Checklists will be prepared. Each IEE report will include a general and site-specific EMP.

**Table 80. Environmental Monitoring Measures During Construction and Operation**

Item	Parameter	Location	Method	Timing	Institutional Responsibility
Construction Phase					
Noise and Vibration	Noise and vibration level	At worksites or at locations specified by the Engineer	Routine noise monitoring by means of portable noise / vibration measurement device.	Quarterly basis during construction stage.	Contractor
Air Quality	Pollutants - Dust, NO <sub>x</sub> , NO <sub>2</sub>	At worksites or at locations specified by the Engineer.	By means of suitable portable measurement device. Undertake regular off-site inspections, when sensitive receptors are nearby (within 50m of site boundary).	Quarterly basis during construction stage. Upon receiving relevant complaint, as necessary. Increase frequency of inspections when activities with a high potential to produce dust are being undertaken and during prolonged windy or dry conditions.	Contractor
Operation Phases					
Biodiversity	Fauna movements	New and existing culvert locations along the project road segments.	This new culvert crossing structure, and the culvert at chainage 11+475, will be monitored using camera traps to assess their effectiveness. This will be undertaken by the biodiversity specialist	Monitoring of culverts for 3 years after construction	EA/Contractor

**Table 81. Cost of Monitoring Devices**

	<b>Cost per unit</b>	<b>Number of units</b>	<b>Total</b>
Noise measurements (devices)	200	2	400.0
Air quality (5 locations during 8 months weekly: $5 \times 8 \times 4 = 160$ )	100	160	16,000.0
Water quality (5 points during 8 month weekly: $5 \times 8 \times 4 = 160$ )	100	160	16,000.0
Soil (5 locations during 8 months monthly)	100	40	4,000.0
Acoustic screen	3000	1	3,000.0
Sub-total			39,400.0
Total for 4 contracts	39400	4	157,600.0

Note, cost of camera traps are unknown.

### XIII. SITE-SPECIFIC ENVIRONMENTAL MANAGEMENT PLAN

595. SSEMPs are essential documents that must be prepared by the Contractor (or Contractors, in the case of multiple contract packages) to detail how the EMP will be implemented at the site level. These plans ensure that all mitigation and monitoring measures are carried out in accordance with the implementation arrangements defined in the EMP.

596. Each SSEMP must specify the exact locations where mitigation and monitoring will occur, identify the individuals responsible for these activities, outline the implementation schedule, and define the reporting procedures. SSEMPs are to be submitted to the PMU for review and approval no later than 10 calendar days prior to the contractor's intended mobilization to any work site. Access to the site will be strictly prohibited until the SSEMP has been formally approved by the PMU.

597. Furthermore, the SSEMPs must reflect how the EMP will be operationalized under the specific conditions of each construction site, ensuring full compliance with the prescribed mitigation and monitoring requirements. The SSEMPs shall include, but not be limited to, the following components:

- i. Environmental management staff organizational structure, which should identify the personnel to be engaged environmental protection and the responsibilities of the participants;
- ii. Criteria for appointment of principal staff; and
- iii. Proposed interaction and communication procedures between the Contractor's construction personnel, CEO and CSO, including proposals for communication facilities.

598. The SSEMP should contain specific Annexes (Management Plans), relating to the following aspects:

- i. Construction Traffic Management Plan;
- ii. Air Quality Management Plan;
- iii. Waste and Spoil Management Plan;
- iv. Hazardous Waste Management as part of the Waste Management Plan;
- v. Community Health, Safety and Security Plan;
- vi. Community Relations Management Plan;
- vii. Labor Employment and Working Condition Management Plan;
- viii. Emergency Preparedness and Response Plan;
- ix. Occupational Health and safety Plan;
- x. Borrow Pits Management Plan;
- xi. On-site Water Management Plan;
- xii. Construction Camp Management Plan; and
- xiii. Relocation Plan.

599. The SSEMP should clearly define the following elements: Frequency, scope, and objectives of environmental management meetings; (ii) Schedule, content, and purpose of routine environmental reporting; (iii) Strategies and methods for raising environmental awareness.

600. The SSEMP should also define the authority granted to environmental management personnel, enabling them to take immediate, appropriate, and direct action to prevent or rectify any environmental disruption or non-compliance. In addition, it must outline the mechanisms through which environmental management requirements will be effectively communicated to all Subcontractors, at all tiers, to ensure consistent understanding and adherence to EMP obligations throughout the project.

601. The SSEMP should detail the procedures for supervising, monitoring, and auditing the environmental management systems to ensure alignment with the objectives and principles outlined in the EMP. These procedures must apply to all levels of construction and provide clear roles and responsibilities for environmental personnel to maintain consistent and effective oversight throughout the project duration.

602. The plan should also present specific proposals to ensure that the Contractor's construction

methods are compatible with, and do not compromise, the environmental management commitments. This includes adapting construction techniques, sequencing, and site operations to avoid or minimize environmental impacts in accordance with the approved EMP and relevant legal and regulatory requirements.

603. All areas associated with the contract, such as construction sites, material storage areas, plant and equipment yards, contractor offices, and worker accommodations, must be subject to routine inspections to confirm compliance with environmental standards. These inspections must address, but are not limited to, waste management practices, pollution control measures, health and safety provisions, hazardous material storage, and site restoration efforts. Specific issues include but not be necessary limited to:

- i. Dust control;
- ii. Waste handling and disposal;
- iii. Oil and diesel handling and storage;
- iv. Prevention of materials encroaching outside the Right of Way; and
- v. Temporary drainage.

#### XIV. COST ESTIMATE

604. The majority of environmental mitigation measures outlined in the Environmental Management Plan (EMP) are deemed standard contractual obligations and are expected to be incorporated within the overall project budget during the preparation of bidding and contract documents. These measures, though environmental in nature, are typically embedded within the general scope of works. For example, the installation of septic systems at construction camps is a critical environmental safeguard, yet it is commonly treated as part of the contractor's site establishment requirements rather than a separate line-item environmental expenditure. The Table 82 below outlines the proposed mitigation measures to be implemented by the contractor over an indicative construction duration of 18 months (including a 3-month preparatory period). It distinguishes between

- i. items that are to be included in the contractor's bid pricing and project cost estimates, and
- ii. measures that may be treated as incremental environmental expenditures, potentially requiring separate budget allocation beyond the standard contract provisions.

605. The total estimated cost for the preparation of Initial Environmental Examinations (IEEs) and the implementation of Environmental Management Plans (EMPs) amounts to USD 820,000.00. The majority of this budget is allocated to the remuneration of environmental specialists engaged through the Project Management Unit (PMU), Subprojects Preparation Consultant (SPC), Construction Supervision Consultants (CSCs), and Contractors. These personnel-related expenses are fully integrated into the overall PMU and Consultant remuneration budgets. Costs associated with environmental monitoring activities—both during the IEE preparation phase (prior to subproject selection) and throughout the construction period—are distributed accordingly. Pre-construction monitoring costs are accounted for under the subproject preparation budget, while construction-phase monitoring is incorporated within the Contractors' implementation budgets.

**Table 82. Indicative Cost Estimate for Contractor's Environmental Management**

Description	Unit	Quality	Rate	Amount (\$)
Ecological clerk of works (on site). Will conduct pre-clearance surveys, training, oversee vegetation clearance and restoration and the implementation of other biodiversity related mitigation.	1	240 days	\$100 per day	\$ 24,000
Social Safeguard expert to be employed and on hand to resolve any issues	1	1.5 years	\$ 20,000	\$ 30,000
H&S Specialist	1	1.5 years	\$ 20,000	\$ 30,000
Contractor's EO	1	1.5 years	\$ 20,000	\$ 30,000
Periodic Safety Training for Workforce	Assumed to be included within contractor costs.			
Health and safety tools to help shield and isolate/care for COVID-19 patients	1	1	\$ 65,000	\$ 65,000
Management Plans	Assumed to be included within the contractor costs.			
Monitoring conditions during	Assumed to be included within the contractor costs.			
Worker healthcare facilities on-site as part of the OHS Plan	Assumed to be included within the contractor costs (indicative budget \$90,000)			
Total	USD \$ 179,000			

\*Assumed that workforce sd.

606. The total estimated cost allocated for the contractor's environmental management tasks and responsibilities is USD 179,000. The environmental management costs for IEE preparation and implementation are distributed across various implementing entities as follows:

- i. Directly under the Contractor's contract USD 157,600 - covering required environmental management activities, including environmental monitoring during the construction phase;

- ii. Subprojects Preparation Consultant (SPC): USD 228,400
- iii. Project Management Consultant (PMC): USD 120,000
- iv. Construction Supervision Consultant (CSC): USD 300,000
- v. Project Management Unit (PMU): USD 14,000

The breakdown of these costs is itemized in the Table 83 below, with delineation of responsibilities and funding allocations corresponding to each institutional role in the environmental management framework.

**Table 83. Contractor and Subproject Preparation Consultant Budget**

<b>Contractor's budget (4 contracts)</b>			
	Cost per unit	Number of units	Total
Noise measurements (devices)	200	2	400.0
Air quality (5 locations during 8 months weekly: 5 x 8 x 4 = 160)	100	160	16,000.0
Water quality (5 points during 8 months weekly: 5 x 8 x 4 = 160)	100	160	16,000.0
Soil (5 locations during 8 months monthly)	100	40	4,000.0
Acoustic screen	3000	1	3,000.0
Sub-total			39,400.0
Total for 4 contracts	39400	4	157,600.0
<b>Subprojects Preparation Consultant</b>			
<b>Environmental Monitoring and Public Consultation*</b>			
	Cost per unit	Number of units	Total
Noise measurements (devices)	200	2	400.0
Air quality	100	30	3,000.0
Water quality	100	20	2,000.0
Soil quality	100	10	1,000.0
PC	200	30	6,000.0
Sub-Total			12,400.0
TOTAL			228,400.0
* number of measurements is calculated based on the cost used for the sub-projects under for Batch 1			
<b>Construction Supervision Consultants</b>			
<b>Remuneration</b>			
	Months	Rate/number	Total
National Env.Specialist	100	3000	300,000.0
Total			300,000.0
<b>Project Management Consultant</b>			
<b>Remuneration</b>			
	Months	Rate	Total
International Env.Specialist	8	15,000.0	120,000.0
Total			120,000.0
<b>Project Management Unit</b>			
<b>Remuneration</b>			
	Months	Rate	Total
Safeguards Specialist	8	1,800.0	14,400.0
Total			14,400.0

607. The total estimated cost for the preparation of Initial Environmental Examinations (IEEs) and implementation of Environmental Management Plans (EMPs) is USD 820,400.00. A significant portion of this budget is attributed to the remuneration of environmental specialists engaged under the Project Management Unit (PMU), Subprojects Preparation Consultant (SPC), Construction Supervision Consultant (CSC), and the Contractors. These personnel-related expenditures are embedded within the overall remuneration budgets of the PMU and associated consultants. The Costs associated with environmental monitoring are allocated based on project phase:

- i. Pre-construction monitoring (for IEE preparation and subproject screening) is covered under the subproject preparation budget.
- ii. Construction-phase monitoring is integrated into the Contractors' implementation budget.

608. This allocation framework ensures that environmental compliance measures are systematically resourced across all project stages.

## XV. GRIEVANCE REDRESS MECHANISM

### A. Objectives

609. In accordance with the Asian Development Bank's Safeguard Policy Statement (SPS, 2009), a Project-level Grievance Redress Mechanism (GRM) will be established and maintained throughout the implementation period of the Project. The primary objective of the GRM is to ensure the timely receipt, review, and resolution of grievances and concerns raised by Affected Persons (APs) and local communities. The mechanism aims to resolve complaints at the project level, thereby preventing the unnecessary escalation of disputes to national courts or to the ADB's Accountability Mechanism.

610. The GRM provides a structured platform through which any stakeholder—including APs and local villagers—can appeal any adverse decision, practice, or activity encountered during project implementation. All affected communities will be fully informed of their rights, as well as the available grievance procedures, whether submitted verbally or in writing, during public consultations and due diligence activities.

611. The GRM is designed to complement, and not restrict or replace, the right of individuals to access Uzbekistan's judicial or administrative systems. In addition to meeting ADB's requirements, the GRM will adhere to the national legal framework, specifically the Law of the Republic of Uzbekistan "On the Procedure for Submitting Appeals of Individuals and Legal Entities" (Law No. 378, dated 3 December 2014). Under this law:

- i. All written complaints must be reviewed within fifteen (15) calendar days from the date of receipt by the competent authority;
- ii. Where additional investigation or documentation is needed, the review period may be extended up to one (1) month.

612. The proposed GRM should be developed in consultation with local authorities and community stakeholders and presented during public consultation meetings as part of the due diligence process. Additionally, the finalized GRM procedure will be disseminated to local villagers in accessible formats to ensure broad awareness and accessibility.

### Grievance Redress Mechanism

613. The project-level Grievance Redress Mechanism (GRM) provides an accessible, transparent, and time-bound system for receiving, evaluating, and resolving grievances from local communities and affected persons (APs) in relation to the Project. It aims to ensure that concerns are addressed promptly and effectively, preventing unnecessary escalation to legal proceedings and avoiding potential delays in project implementation.

614. The GRM is designed to complement—not replace—statutory grievance procedures and the government's built-in redress mechanisms. It will ensure that social and environmental concerns related to the Project are resolved through a process that is accessible to all segments of the population, particularly vulnerable groups. The mechanism is scaled to the Project's potential risks and impacts, in line with ADB's safeguard requirements.

- i. The GRM will be capable of addressing complaints across a range of topics, including:
- ii. Involuntary resettlement and land acquisition;
- iii. Environmental impacts (e.g., dust, noise, water quality);
- iv. Health and safety concerns;
- v. Impacts on Indigenous Peoples (if any); and
- vi. Other project-related grievances expressed by local villagers or stakeholders.

615. Grievance Redress Committees (GRCs) will be established at the outset of Project implementation and will remain operational throughout the entire project lifecycle, including the defects liability period. GRCs will meet at least once a month during implementation, and on an as-

needed basis thereafter. GRCs will be responsible for reviewing all project-related grievances, including those concerning environmental and social impacts. Decisions rendered by the GRCs will be final, unless overturned by a court of law.

616. The Autoroadinvest Agency will be responsible for ensuring the effective and timely operation of the GRM, in coordination with the Construction Supervision Consultant (CSC), Contractors, and other relevant authorities. The Project will adopt a two-tier grievance resolution system:

- i. First-Level GRC: This level serves as the initial point of contact for grievance submission. It comprises the jurisdictional Road Engineer, Project Management Unit (PMU) representatives, and the Khokim (local government leader) of the relevant district(s). Upon receipt of a grievance, the First-Level GRC must convene and seek resolution within ten (10) working days. If unresolved, the grievance is escalated to the Second-Level GRC.
- ii. Second-Level GRC: This level is chaired by the Chief Representative (CR) and includes the Project Director (PMU), the Social Safeguards Officer (SSO) of the PMU, and the PMU Road Engineer. It reviews grievances that remain unresolved at the first level and is mandated to provide a resolution within twenty (20) working days of escalation.

617. If the grievance remains unresolved after both levels of GRC intervention, the complainant retains the right to pursue the matter through the appropriate court of law. Importantly, access to the judiciary is not precluded at any stage of the grievance redress process, and complainants may choose to submit their cases to the courts at any time.

618. Grievance registration logs will be maintained at both levels of the GRM. Each log shall record:

- i. Grievance description;
- ii. Dates of submission and GRC meetings;
- iii. Review outcomes and actions taken;
- iv. Communications with the complainant.

For grievances lodged in person or via phone, confirmation of registration will be provided immediately. For grievances submitted via email, fax, or post, confirmation will be sent within three (3) working days. Following each GRC hearing, the complainant will be notified of the resolution status.

619. The contact details of designated grievance focal points at the regional, district, and PMU levels will be clearly presented in the Project Information Brochure (PIB) and in the Safeguard Due Diligence Reports (SDDR) to ensure widespread public access to the GRM.

### **ADB Accountability Mechanism**

620. If attempts to resolve grievances through the project-level Grievance Redress Mechanism (GRM) remain unsuccessful or unsatisfactory, complainants may escalate their concerns directly to the Asian Development Bank (ADB). Concerns can be raised with the Transport and Communications Division of ADB's Central and West Asia Department (CWAD) via the ADB Uzbekistan Resident Mission at the following address:

- i. ADB Uzbekistan Resident Mission: 1 Qoratosh Street, Tashkent 100027, Uzbekistan; Telephone: +998 78 1401920; Fax: +998 78 1401976

621. Should the complainants remain dissatisfied following CWAD's response, they may submit a formal complaint to the Complaint Receiving Officer under ADB's Accountability Mechanism. Complaints may be lodged by mail, fax, email, or in person at:

- i. Complaint Receiving Officer of ADB Accountability Mechanism: 6 ADB Avenue, Mandaluyong City 1550, Metro Manila, Philippines; Telephone: (+632) 632-4444 ext. 70309; Fax: (+632) 636-2086; Email: amcro@adb.org

622. All grievance submissions and proceedings under the GRM will be free of charge. Complainants will not be subject to any administrative or complaint-related fees. In cases where a

complainant is illiterate or otherwise unable to complete a written grievance, the Project Implementing Agency or designated GRC representatives shall provide free assistance in preparing and submitting the complaint.

## **B. Framework**

623. During Project implementation, environmental and social issues may arise due to construction and operational activities. Examples include:

- i. Inconvenient or unsafe construction scheduling;
- ii. Traffic disruptions and poor coordination;
- iii. Waste generation, noise, dust, and air pollution;
- iv. Ecological disturbances (e.g., habitat disruption, fauna displacement);
- v. Cultural tensions or conflicts between local populations and non-local (migrant) workers.

To address such issues effectively, a Project-specific Grievance Redress Mechanism has been developed in line with the principles of ADB's Safeguard Policy Statement (2009). This mechanism aims to facilitate the timely and fair resolution of grievances from local communities, affected persons, and other stakeholders.

624. The GRM is designed to ensure the free, transparent, and accessible submission of grievances and the prompt redress of concerns related to the Project's environmental and social impacts. Its goal is to resolve complaints at the project level, fostering trust and minimizing the need for escalation to external or legal avenues.

## **C. Legal System**

625. If, following the intervention and efforts of the Grievance Redress Committees (GRCs) at both the local (first-level) and central (second-level) stages, a mutually satisfactory resolution cannot be reached, the complainant retains the right to refer the matter to the appropriate court for formal adjudication, in accordance with the legislation of the Republic of Uzbekistan.

626. It is important to emphasize that the Grievance Redress Mechanism (GRM) does not limit or restrict the legal rights of affected persons. At any point in the grievance process, including the initial stage, a complainant may choose to pursue legal remedies directly through the judicial system, should they wish to do so

## **D. Communication**

627. Prior to the commencement of construction works, the Contractor shall undertake the following actions to ensure the effective implementation and accessibility of the Grievance Redress Mechanism (GRM) within the Project's Area of Influence (Aoi):

- i. Inform and communicate the GRM process to all local communities within the Project Aoi through public meetings, printed materials, and visual displays;
- ii. Establish and maintain a 24-hour complaint hotline, dedicated to receiving and responding to project-related grievances in a timely manner; and
- iii. Display the names and contact information of designated Grievance Redress Committee (GRC) members and the Contractor's grievance focal point on information boards at each construction site, in both Uzbek and Russian languages where appropriate.

These measures are essential to ensure that the GRM is operational, visible, and accessible to all affected stakeholders from the outset of construction

## **E. Accountability Mechanism Policy, 2012**

628. In addition to the Project-level Grievance Redress Mechanism (GRM), the Asian Development Bank (ADB) has established an Accountability Mechanism (AM), governed by the Accountability Mechanism Policy (2012). The AM serves as a formal forum through which individuals or communities who believe they have been adversely affected by ADB-assisted projects may raise concerns, seek remedies, and report non-compliance with ADB's operational policies and

procedures. The AM operates through two distinct but complementary functions:

- i. Problem-Solving Function: Facilitates dialogue and mediation between complainants and project stakeholders to reach mutually acceptable solutions to project-related issues.
- ii. Compliance Review Function: Investigates alleged violations of ADB’s operational policies—particularly the Safeguard Policy Statement (2009)—to determine non-compliance and recommend corrective actions, where applicable.

The AM is intended to serve as a last-resort mechanism for individuals or groups who are not satisfied with the project-level GRM or local remedies. It reinforces ADB’s commitment to transparency, accountability, and responsiveness in the implementation of its development assistance.

## XVI. INFORMATION DISCLOSURE, CONSULTATION

629. In accordance with the Asian Development Bank (ADB) Safeguard Policy Statement (SPS, 2009), the Project is required to ensure:

- i. Meaningful consultation with affected persons and stakeholders, including their participation in project design and implementation;
- ii. Timely disclosure of relevant Project information in formats and languages accessible to affected communities; and
- iii. Establishment of a Grievance Redress Mechanism (GRM) to receive, address, and resolve complaints and suggestions from the public in a transparent and efficient manner.

630. These consultation activities enable both the Committee for Roads and ADB to improve project design and implementation by drawing upon local knowledge, experience, and expectations of the communities directly or indirectly affected by the Project.

631. A key objective of the Initial Environmental Examination (IEE) is to ensure inclusive stakeholder engagement throughout all stages of the project lifecycle—from pre-construction and construction to operation. In line with this objective, a series of public consultation meetings were held in Tashkent Province in 3~5 April, 2025 to gather feedback from community members and stakeholders and to align the Project's planned activities with community interests. The exact number of participants and signatories of the consultation attendance sheets is presented in the Appendix 4 & 7.

632. A total of nine (9) public consultation meetings were conducted in rural settlements situated in close proximity to the road sections proposed for reconstruction under the Project. These meetings were attended by 188 participants, comprising 136 men and 52 women. Attendees included local residents, representatives from the cadastral office, district khokimyats, chairpersons of mahalla committees, and officials from the Territorial Administrations of the Local Department of the Committee for Roads.

633. During the consultations, stakeholders were briefed on the conceptual design for the proposed 61.3 kilometers of rural road sections in Tashkent Region. Discussions covered potential land acquisition and resettlement impacts, the presence (or absence) of Indigenous Peoples within the project area, the project-level Grievance Redress Mechanism (GRM), and the tentative implementation timeline.

634. The outcome of the consultations revealed strong community support for the road rehabilitation initiative. Participants confirmed that the road reconstruction activities would not affect any privately owned land, residential or commercial structures, crops, trees, or sources of income and livelihood. Furthermore, it was confirmed that there are no existing or historical safeguard concerns related to involuntary resettlement or Indigenous Peoples within the project site that would necessitate further action.

635. Comprehensive details of the information disclosure and stakeholder consultation activities undertaken under the Project are provided in Appendix 4 & 7 and the previously submitted Social Due Diligence Report (SDDR).

## XVII. CONCLUSIONS AND RECOMMENDATIONS

636. The Project involves the upgrade of an existing rural road, and in line with the ADB Environmental Safeguards Policy Statement (2009), it is classified as Category B for Environmental Safeguards. This classification reflects the limited and site-specific nature of residual environmental impacts, which are generally reversible and can be mitigated effectively. No road sections with the potential to cause significant environmental or social impacts—i.e., those warranting a Category A classification—are included in the project scope. As per the findings of this Initial Environmental Examination (IEE), the Project is not expected to generate any significant adverse environmental impacts.

637. Provided that all prescribed mitigation and enhancement measures are properly implemented, the Project is not expected to result in any residual significant adverse environmental impacts throughout its lifecycle—from site selection and design to construction and operation. Rather, the Project is anticipated to generate positive impacts, particularly in relation to economic growth and environmental performance. Since the intervention consists of road resurfacing rather than new road construction, consideration of alternative alignments was deemed unnecessary.

638. The Project does not trigger the Critical Habitat requirements of ADB's Safeguard Policy. Although some nationally and internationally endangered species may be present in proximity to the project area, the design and application of the mitigation hierarchy are expected to sufficiently avoid, minimize, or restore any potential significant residual impacts. Where unavoidable, these will be addressed through offsets and additional conservation actions.

639. During the construction phase, project activities will alter existing traffic patterns and may exacerbate congestion at known bottlenecks. These temporary disruptions may affect road users and adjacent communities along the road corridor and associated haul routes. The extent of these impacts will depend on current road conditions, traffic volumes, and existing traffic safety issues.

640. Upon completion of the construction phase, the Project is expected to result in improved travel conditions—specifically reduced travel times, smoother traffic flow, and enhanced road safety. However, over time, increased traffic may erode these operational benefits. A robust Construction Traffic Management Plan (CTMP) will be implemented to minimize impacts on road users and surrounding communities, particularly in relation to delays, connectivity, and safety.

641. Construction activities are expected to result in temporary air quality degradation. These impacts will be mitigated through effective site management measures, including equipment maintenance, dust suppression, and air quality monitoring. Since the Project entails road upgrades rather than construction of new roads, it is not anticipated to induce significant increases in traffic volume; as such, only minor beneficial residual impacts are expected during the operational phase. Similarly, construction-related noise will be temporary. Mitigation strategies will include avoiding nighttime operations, engaging with local communities, deploying quieter equipment, and conducting noise monitoring with adaptive measures if threshold limits are exceeded.

642. No highly sensitive contamination features have been identified within the project footprint. While construction activities may pose a contamination risk, standard good practices will be adopted to manage this. The area's soils are not particularly sensitive and are generally of poor fertility. Operational impacts on soil are expected to be minimal but could include localized erosion and contamination. These will be mitigated through proper management of hazardous substances, fuels, and waste, as well as careful planning of ancillary construction activities.

643. The most sensitive potential groundwater receptors are local water supply sources. Prior to construction, the Contractor should undertake a hydrogeological study to assess current surface water use and determine potential risks to sensitive groundwater sources.

644. Improper handling of construction waste could pose risks to wildlife, water resources, and public health. Waste will be managed in accordance with the waste management hierarchy, and a

Waste and Hazardous Materials Management Plan will be developed to address the handling, containment, and disposal of hazardous substances and materials.

645. As no extensive groundworks are planned, the risk to buried or below-ground cultural heritage assets is minimal. Temporary impacts may occur to the setting of nearby cultural resources; however, no relocation or physical disturbance to these assets is anticipated.

646. The Project will follow the biodiversity mitigation hierarchy to ensure no net loss of biodiversity. This includes prioritizing impact avoidance, minimizing habitat degradation, and identifying opportunities for habitat enhancement. The Project will not significantly convert or degrade any natural habitats and will take measures to preserve modified habitats.

647. All required mitigation measures—including those embedded in the project design—should be documented in the Environmental Management Plan (EMP). Construction activities should align with Good Industry Practice (GIP) and should adopt the mitigation hierarchy to reduce environmental impacts. Where sensitive receptors are present, tailored measures should be applied. From a community health and safety perspective, contractors must prepare and implement plans to inform local communities of any disruptions due to the works.

648. The EMP, as outlined in the IEE, serves as the Project's environmental management framework. It details the required mitigation and monitoring measures, implementation responsibilities, and reporting procedures. The EMP will ensure regular monitoring of air and water quality, and noise levels, against Uzbek and international standards (including EHS Guidelines). Site-Specific Management Plans will be developed, covering topics such as: health and safety, labour and working conditions, hazardous materials, camp management (if needed), and emergency response.

649. A Critical Habitat Assessment has also been developed to confirm whether further biodiversity actions are necessary to ensure no net loss or net gain outcomes. All contractors should be briefed on the implications of biodiversity considerations and required to comply with the EMP and its accompanying Environmental Monitoring Plan (EMoP).

650. The EMP, along with its mitigation and monitoring programs, should be integrated into the Bidding Documents and Construction Contracts. The Contractor should be contractually obligated to implement all EMP provisions through Site-Specific Management Plans, ensuring that environmental compliance is a legal requirement under the contract.

651. In the event that unanticipated environmental impacts are identified during implementation, the Contractor should be required to revise and update the EMP and EMoP accordingly. This will include evaluating alternatives, updating mitigation measures, and allocating the necessary resources to address the emerging issues.

APPENDICES of IEE  
for Rural Road Sector Project  
(Tashkent Region)

**Appendix 1. Air and Water Quality Results**

**Air Quality Result**

**10V065 (4K768) (Okkurgan district) (Mosque Namozboy)**



**10V068 “b” (4K771 б) (Okkurgan district) (School #34)**



**10V087(4K783) (Bekabad district) (Mosque)**



**10V130d (4K715 r) (Quichirchiq district) (School №31)**



10V061 (4H716) (Quichirchiq district) (School №15)



10V060 "a" (4K742a) (Quichirchiq district) (Courthouse)



10V085 (4K781) (Bekabad district) (School №29, Market local)



10V091 (4H731) (Bekabad district) (Buzuruk ota mausoleum)







**Appendix 2. Laboratory Accreditation**



# AKKREDITATSIYA TO'G'RISIDA GUVOHNOMA

Ushbu hujjat

**O'ZBEKISTON RESPUBLIKASI EKOLOGIYA, ATROF-MUHITNI  
MUHOFAZA QILISH VA IQLIM O'ZGARISHI VAZIRLIGI HUZURIDAGI  
ATROF-MUHITNI MUHOFAZA QILISH SOHASIDA  
IXTISOSLASHTIRILGAN ANALITIK NAZORAT MARKAZI  
sinov laboratoriyasi (majmuasi)**

(Yuridik va joylashgan manzili: 100052, Toshkent shahri, Yunusobod tumani, Bodomzor yo'li 1-tor ko'cha, 72.)

ilovada keltirilgan akkreditatsiya sohasiga asosan sinovlarni amalga oshirish uchun  
"O'zbekiston akkreditatsiya markazi" DM tomonidan O'z DST ISO/IEC 17025:2019 standart  
talablariga muvofiq baholanganligini va akkreditatsiya qilinganligini tasdiqlaydi

*Akkreditatsiya sohasi ushbu akkreditatsiya to'g'risida guvohnomaning  
ajratmas qismi hisoblanadi*



A. Zakirov

Milliy reyestrda ro'yxat raqami O'ZAK.SL.0178  
Ilk akkreditatsiyadan o'tgan sana: 09.03.2022 yil  
Takroriy akkreditatsiyadan o'tgan sana: 31.10.2024 yil  
Guvohnoma rasmiylashtirilgan sana: 31.10.2024 yil  
Amal qilish muddati: 30.10.2029 yil



Akkreditatsiya to'g'risida guvohnomaning amaldagi holati haqida ma'lumot Markazning rasmiy veb-saytida [www.ozak.uz](http://www.ozak.uz) kiritilgan

## Приложение к свидетельству об аккредитации (страница 1 из 11)

## ОБЛАСТЬ АККРЕДИТАЦИИ

	<p><b>Центр специализированного аналитического контроля в области охраны окружающей среды при Минэкологии Республики Узбекистан</b> (специализированный юридический центр стандарта/объекта аккредитации)</p> <p><b>НОМЕР ГОСУДАРСТВЕННОГО РЕЕСТРА:</b> _____</p> <p>Редакция области аккредитации: № 1 от «11» октября 2024 года</p> <p>(наименование органа оценки соответствия)</p> <p>Стандарт по аккредитации: O'z DS ISO/IEC 17025:2019</p>
	<p>Юридический адрес: г. Ташкент, <del>Бухарийский</del> район, 1-й пр. Чкалова Айматов, 72</p> <p>Местонахождение, адрес объекта аккредитации: г. Ташкент, <del>Бухарийский</del> район, 1-й пр. Чкалова Айматов, 72</p> <p>Телефон: (+99871) 267-62-69 Эл. почта: <del>ozakk@ozakk.uz</del> веб-сайт: <del>www.ozakk.uz</del></p>



1	2	3	4	5	6
Код позиции	Наименование определяемых характеристик (параметров)/виды проводимых работ	Обозначение метода испытаний/отбора образцов, с указанием пунктов	Наименование объекта испытаний	Код вида испытания	
	<p>Сточные воды (очищенные, неочищенные, хозяйственно-бытовые, ливневые, промышленные), Природные воды (поверхностные, подземные, в т.ч. источников водоснабжения, грунтовые, талые, атмосферные осадки) Питьевая вода</p>				
1.	q-1	Отбор, транспортирование и подготовка к хранению проб	ГОСТ 31861-2012	сточные воды природные воды питьевая вода	Y.06/SL05
2.	q-2	Массовая концентрация ионов аммония (азот аммонийный)	O'z O'U 07.0682:2015	сточные воды природные воды	Y.06/SL04/7
3.	q-3		ГОСТ 33045-2014 п.5	питьевая вода	Y.06/SL04/7
4.	q-4	Массовая концентрация нитратов (азот нитратный)	O'z O'U 07.0705:2016	сточные воды природные воды	Y.06/SL04/7
5.	q-5		ГОСТ 33045-2014 п.9	питьевая вода	Y.06/SL04/7
6.	q-6	Массовая концентрация нитритов (азот нитритный)	O'z O'U 07.0265:2005	сточные воды природные воды	Y.06/SL04/7
7.	q-7		ГОСТ 33045-2014 п.6	питьевая вода	Y.06/SL04/7
8.	q-8	Массовая концентрация кальция	O'z O'U 07.0597:2013	сточные воды природные воды коллекторно-дренажные воды	Y.06/SL04/2
9.	q-9	Массовая концентрация азотона	O'z O'U 07.0748:2016	сточные воды природные воды	Y.06/SL04/7
10.	q-10	Массовая концентрация алюминия	O'z O'U 07.0413:2009	сточные воды природные воды	Y.06/SL04/7
11.	q-11		ГОСТ 18165-2014 п.6	питьевая вода	Y.06/SL04/7
12.	q-12	Массовая концентрация биологической потребности в кислороде до и после n-дневной инкубации (БПК <sub>полн</sub> )	O'z O'U 07.0746:2016	сточные воды природные воды	Y.06/SL04/7
13.	q-13	Массовая концентрация химического потребления кислорода (ХПК)	O'z O'U 07.0147:2000	сточные воды природные воды	Y.06/SL04/7
14.	q-14		O'z O'U 07.0816:2020	сточные воды природные воды питьевая вода	Y.06/SL04/6
15.	q-15	Массовая концентрация растворенного кислорода	O'z O'U 07.0746:2016	сточные воды природные воды	Y.06/SL04/2
16.	q-16	Массовая концентрация бария	O'z O'U 07.0508:2010	сточные воды природные воды	Y.06/SL04/3
17.	q-17	Массовая концентрация бензола	O'z O'U 0669:2015	сточные воды природные воды	Y.06/SL04/7
18.	q-18	Массовая концентрация бора	O'z O'U 07.0538:2011	сточные воды природные воды	Y.06/SL04/7



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**Appendix 3. Tashkent Rapid Biodiversity Assessment Results**

652. As a result of road construction, minor impacts on habitats and flora are expected in the project implementation areas. Construction works will cause slight degradation of the local ecology, primarily in areas designated for workers, machinery, and auxiliary facilities, due to the clearing of vegetation and removal of fertile topsoil. However, trees and shrubs along the construction route will be preserved under the Project, and no flora or fauna of special conservation status have been identified in the surrounding areas, including bypass sections that may potentially be affected.

653. Potential direct impacts on biodiversity within the project construction corridor have been taken into account.

654. Loss of habitat – All works under the Project will be carried out within the existing road corridor. Any potential impacts on habitats during the construction process will either be mitigated or require mitigation within the approval process. Consultations were held with the Ministry of Ecology, Environmental Protection and Climate Change, the Forestry and Water Management Committees, regional environmental departments, and local executive authorities.

655. No plant or animal species listed in the Red Book of Uzbekistan were identified within the project construction corridor in Tashkent region. This facilitates road construction activities in the region.

**Habitat Fragmentation**

656. Habitat fragmentation occurs when a road crosses through an ecosystem, breaking it into smaller, weaker ecological units, which reduces the overall habitat area.

657. In this case, the following factors minimize any risk of fragmentation:

- i. the proposed construction works will take place along existing road sections;
- ii. all improvement measures will be implemented within the road boundaries where construction is to occur;
- iii. these zones are not critical habitats for wildlife found in Uzbekistan, especially in the Tashkent region area (e.g., saiga, wild boar, goitered gazelle, argali, Bukhara deer, bears, etc.).

Therefore, the possibility of habitat fragmentation is minimized.

**Forests and Protected Areas**

658. There are no protected areas or forests in the immediate vicinity of the Project site.

- i. Mitigation measures required – Not required.
- ii. Further mitigation actions – Not required.

659. The results of the walk and observation of the site are presented in the following below

**10V065 (4K768) km 11–26 section of the Oqqo‘rg‘on city – Mamut village – Oqqo‘rg‘on district road**



Figure above: Observed Road 10V065 (4K768)

Table below: Results of observation on project road 10V065 (4K768)

Flora	Fauna
Poplar	Rock Pigeon
Fraxinus / Ash	House Sparrow
Ulmus / Elm	Eurasian Tree Sparrow
maple	White Wagtail
birch	Eurasian Magpie
fruit trees	Crested Lark
	Carrion Crow
	Saker Falcon
	White-tailed Eagle

**10V068 “b” (4K771 6) km 0–7 section of the road from D024 road junction to Hosildorlik village (starting from km 53)**

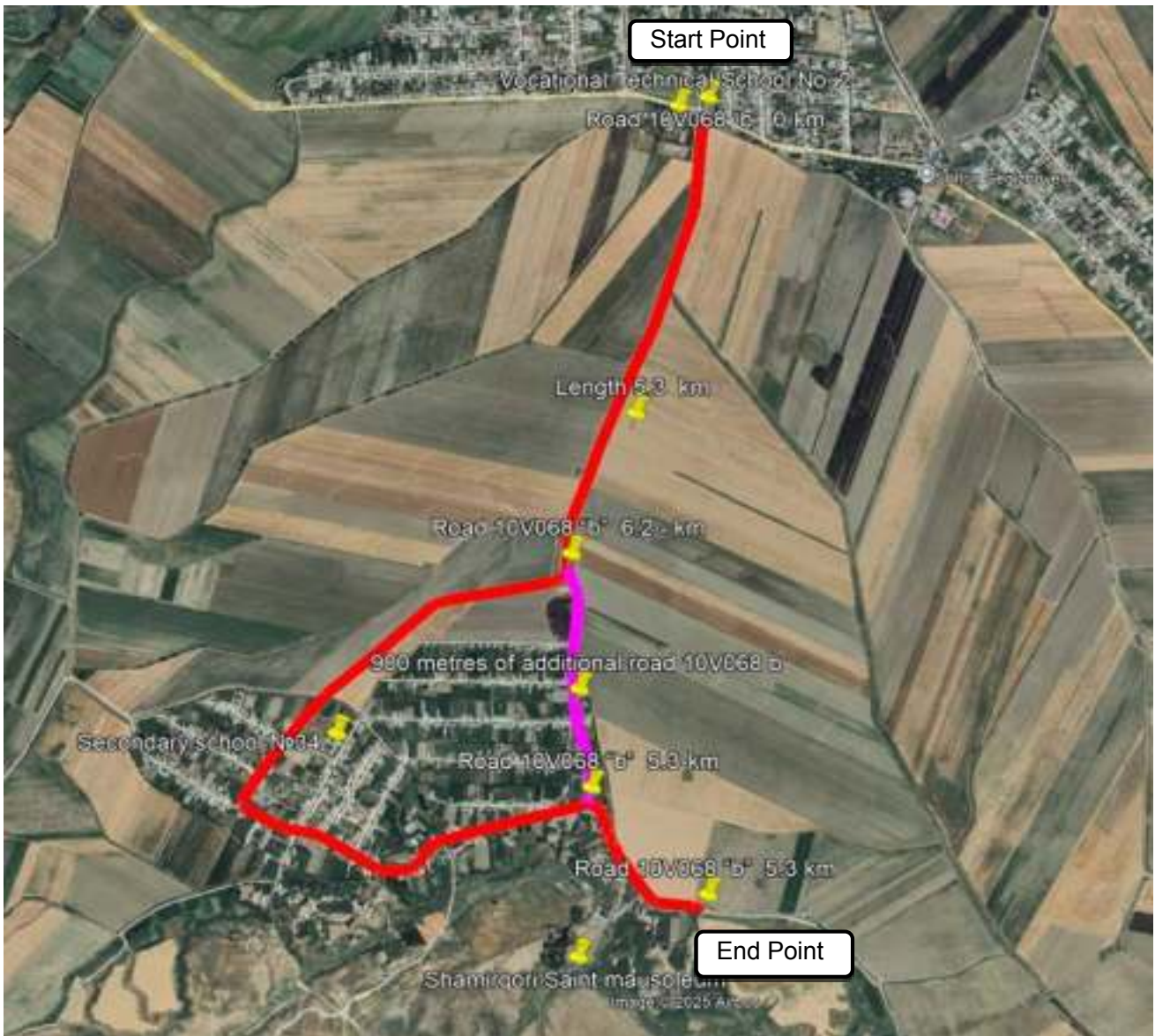


Figure above: Observed road 10V068 “b” (4K771 6)

Table below: Results of observation on project road 10V068 “b” (4K771 6)

Flora	Fauna
Poplar	Rock Pigeon
Fraxinus / Ash	House Sparrow
Ulmus / Elm	Eurasian Tree Sparrow
maple	White Wagtail
birch	Eurasian Magpie
fruit trees	Crested Lark
	Carrion Crow
	Saker Falcon
	White-tailed Eagle

**10V085 (4K781) km 0–5 section of the road from D020 road (starting from km 88) to Jumabozor village and Qushchi village**

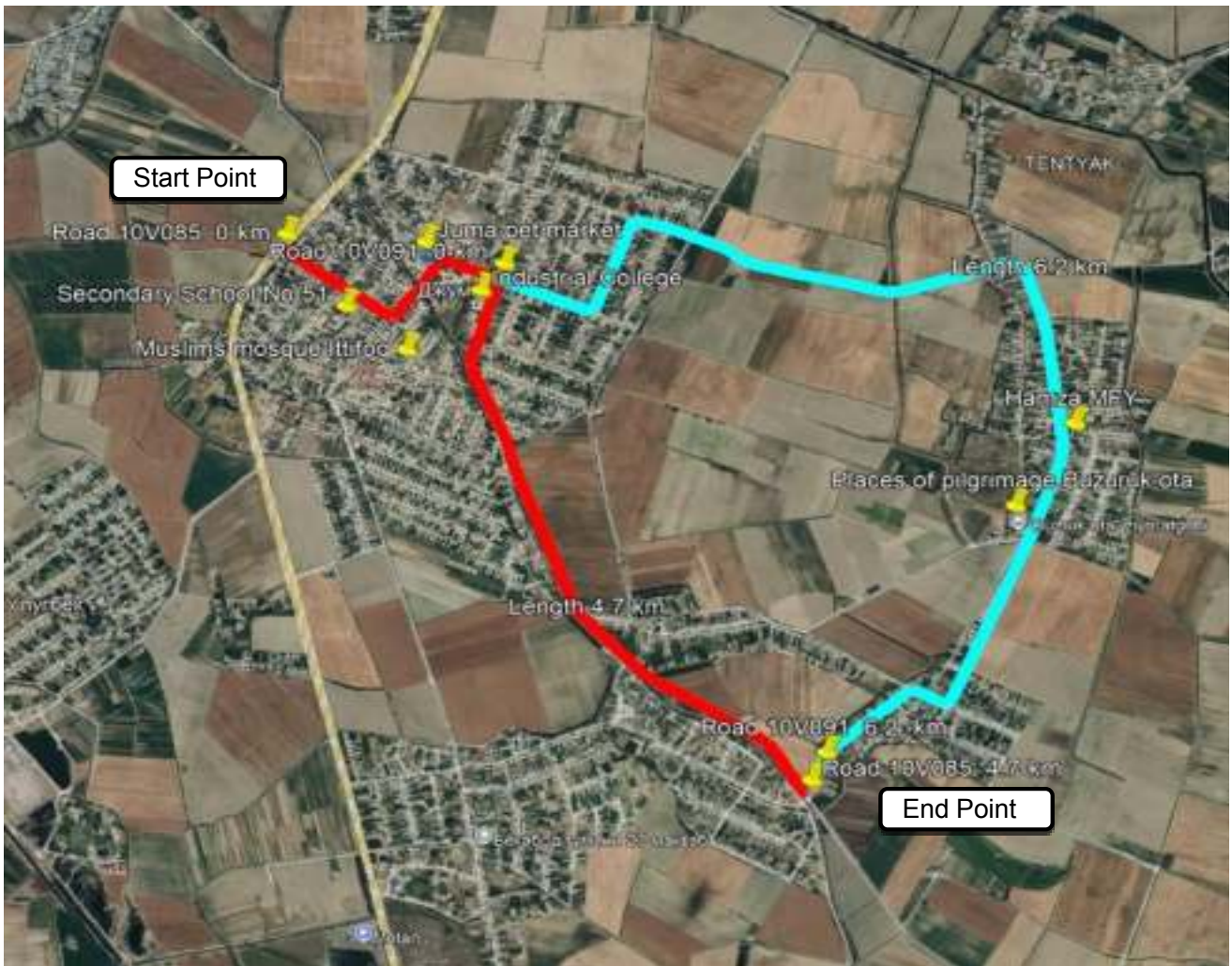


Figure above: Observed road 10V085 (4K781)

Table below: Results of observation on project road 10V085 (4K781)

Flora	Fauna
Poplar	Rock Pigeon
Fraxinus / Ash	House Sparrow
Ulmus / Elm	Eurasian Tree Sparrow
maple	White Wagtail
birch	Eurasian Magpie
fruit trees	Crested Lark
	Carrion Crow
	Saker Falcon
	White-tailed Eagle

**10V087(4K783) km 2–7 section of the road from D020 road (starting at km 95) to Qo’rg’on village**

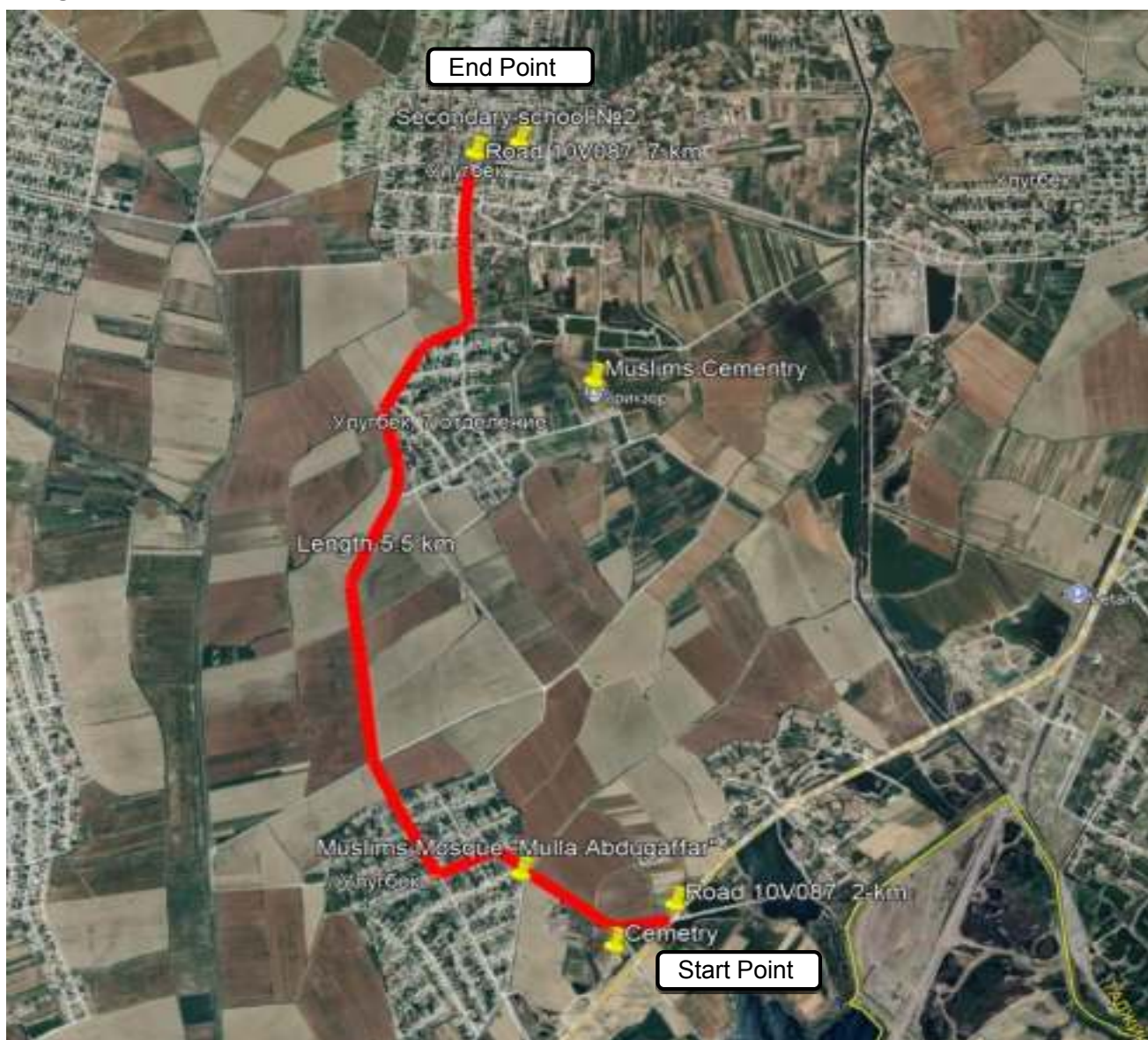


Figure above: Observed road 10V087(4K783)

Table below: Results of observation on project road 10V087(4K783)

Flora	Fauna
Poplar	Rock Pigeon
Fraxinus / Ash	House Sparrow
Ulmus / Elm	Eurasian Tree Sparrow
maple	White Wagtail
birch	Eurasian Magpie
fruit trees	Crested Lark
	Carrion Crow
	Saker Falcon
	White-tailed Eagle

**10V091 (4H731) km 0–6 section of the road from D020 road (starting at km 91) to Jumabozor, Xamza, and O’rtabo’z villages**



Figure above: Observed road 10V091 (4H731)

Table below: Results of observation on project road 10V091 (4H731)

Flora	Fauna
Poplar	Rock Pigeon
Fraxinus / Ash	House Sparrow
Ulmus / Elm	Eurasian Tree Sparrow
maple	White Wagtail
birch	Eurasian Magpie
fruit trees	Crested Lark
	Carrion Crow
	Saker Falcon
	White-tailed Eagle

**10V060 “a” (4K742a) km 0–6 section of the road branching from the Do‘stobod – Gul – Qo‘rg‘oncha road (starting at km 4) to Kushek village**



Figure above: Observed road 10V060 “a” (4K742a)

Table below: Results of observation on project road 10V060 “a” (4K742a)

Flora	Fauna
Poplar	Rock Pigeon
Fraxinus / Ash	House Sparrow
Ulmus / Elm	Eurasian Tree Sparrow
maple	White Wagtail
birch	Eurasian Magpie
fruit trees	Crested Lark
	Carrion Crow
	Saker Falcon
	White-tailed Eagle

**10V130 “d” (4H715 r) km 0–4 section of the road branching from D022 road (at km 31) to G’allabotir village**



Figure above: Observed road 10V130 “d” (4H715 r)

Table below: Results of observation on project road 10V130 “d” (4H715 r)

Flora	Fauna
Poplar	Rock Pigeon
Fraxinus / Ash	House Sparrow
Ulmus / Elm	Eurasian Tree Sparrow
maple	White Wagtail
birch	Eurasian Magpie
fruit trees	Crested Lark
	Carrion Crow
	Saker Falcon
	White-tailed Eagle

**10V061(4H716) km 0–7 section of the Gul – Sattarobod road**

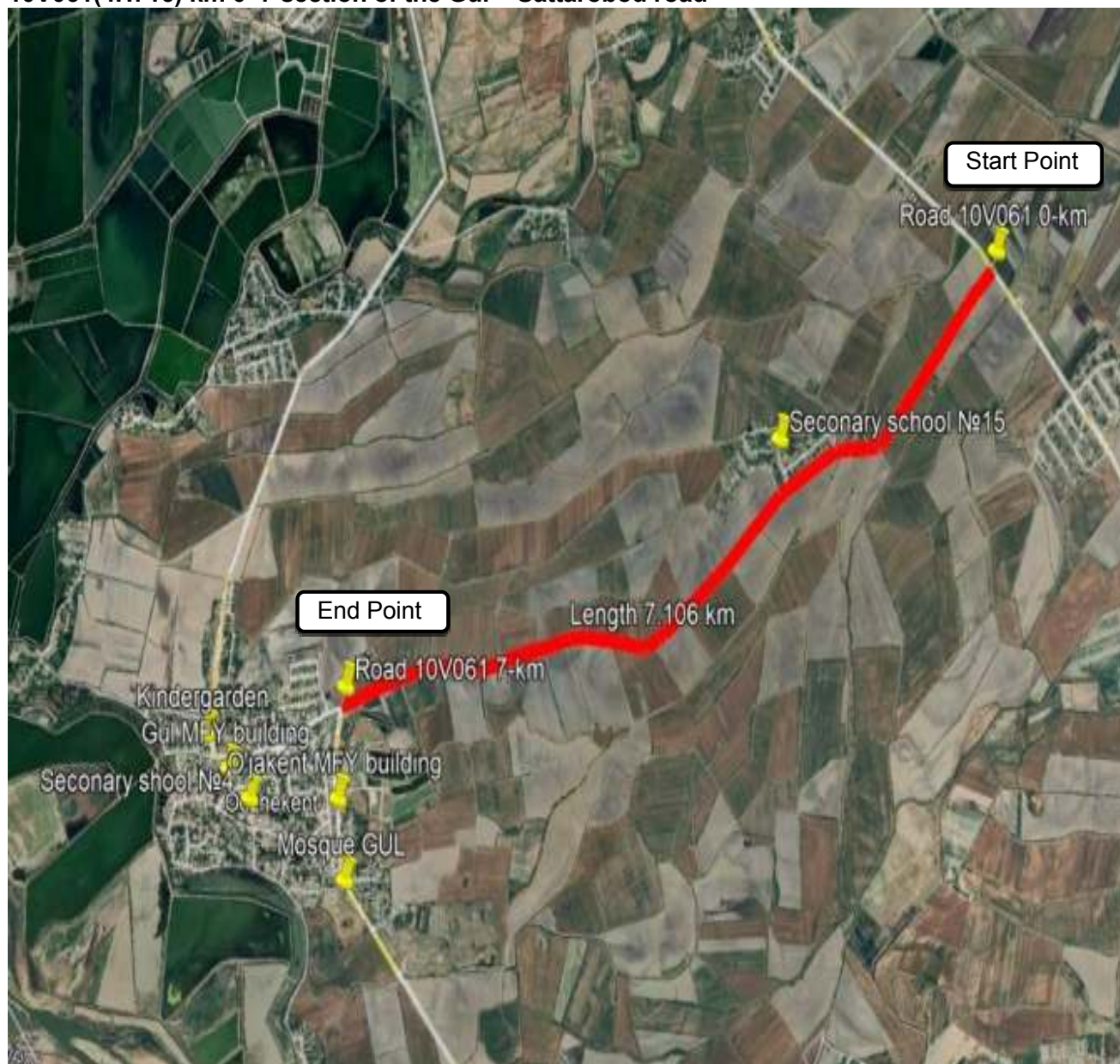


Figure above: Observed road 10V061(4H716)

Table below: Results of observation on project road 10V061(4H716)

Flora	Fauna
Poplar	Rock Pigeon
Fraxinus / Ash	House Sparrow
Ulmus / Elm	Eurasian Tree Sparrow
maple	White Wagtail
birch	Eurasian Magpie
fruit trees	Crested Lark
	Carrion Crow
	Saker Falcon
	White-tailed Eagle

**10V138 (4K721) km 0–6 section of the Kangli – Qursoy road**

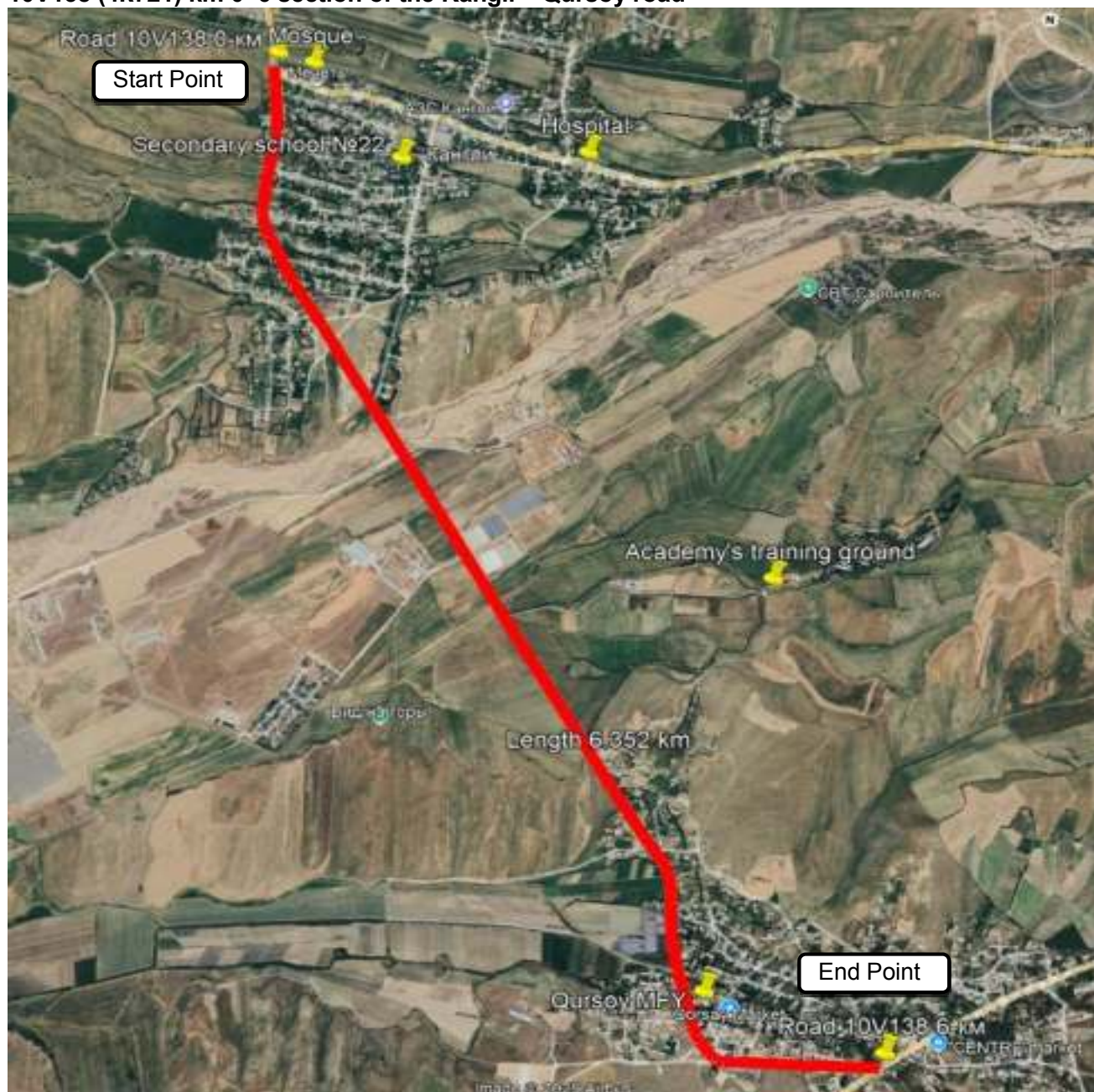


Figure above : Observed road 10V138 (4K721)

Table below: Results of observation on project road 10V138 (4K721)

Flora	Fauna
Poplar	Rock Pigeon
Fraxinus / Ash	House Sparrow
Ulmus / Elm	Eurasian Tree Sparrow
maple	White Wagtail
birch	Eurasian Magpie
fruit trees	Crested Lark
	Carrion Crow
	Saker Falcon
	White-tailed Eagle

Appendix 4. Public Consultation Leaflet

RURAL ROADS RESILIENCE SECTOR PROJECT

Indicative Outputs

Rural Roads Resilience Sector Project is financed by a loan from the Asian Development Bank. The total length of roads to be repaired is 61.3 km

- Tashkent Region – 61.3 km:
  - Choppogon – 22.1 km
  - Bekobod – 16.3 km
  - Quyichiroq – 16.9 km
  - Yukon-Chirchiq – 6.4 km

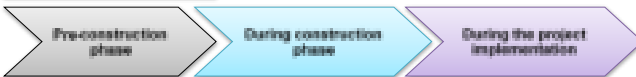


The Preliminary Environmental Assessment (PEA) and Environmental Impact Statement will be conducted in accordance with the Asian Development Bank (ADB) Safeguard Policy Statement (2009) and national environmental legislation.

The purpose of the EIA statement is to identify and mitigate the types of impacts of the project during the construction and operation phase, and to develop measures.

MAIN TYPES OF ENVIRONMENTAL IMPACT

Stages of the project phases



CONTACT DETAILS FOR INQUIRIES

Information PIU: Committee for Roads of the Republic of Uzbekistan  
 Address: Yulovlar Bo'limi, Mustaqillik maydoni, 100  
 Tel: +99871 238-0250  
 Fax: +99871 238-0100  
 Email: yulbo'limi@mail.ru

ҚИШЛОҚ ЙўЛЛАРИНИ ЯХШИЛАШ ЛОЙИХАСИ

Намунавий натижа

Қишлоқ йўллари яхшилаш лойиҳаси Осиё тараққиёт банки томонидан бериладиган кредит маблағлари ҳисобига молиялаштирилади. Қайта таъмирланадиган йўлларнинг умумий узунлиги: 61,3 км

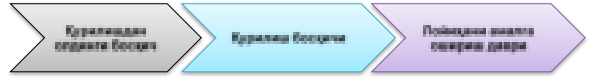
- Тошкент вилояти – 61,3 км:
  - Чопқўтон – 22,1 км
  - Бекобод – 16,3 км
  - Қуйичиқ – 16,9 км
  - Юқон-Чирчиқ – 6,4 км



Дастлабки экологик баҳолаш (ДЭБ) ва Атроф муҳитга таъсир кўрсатиши туғрисидаги баёноти Осиё Тараққиёт Банки (ОТБ)нинг ҳимоя чоралари бўйича сиёсати ҳақидаги Низоми (2009й.) ва экология соҳасига оид миллий қонун ҳужжатларига мувофиқ ўтказилади. АМТК туғридаги баъзи таъсир кўрсатиш турларини аниқлаш ва таъсирларини юмшатиш, чора-таъбирларни яқин келгудек яратиб...

ЛОЙИХАНИНГ АТРОФ МУҲИТГА ТАЪСИР КўРСАТИШИ

Лоийҳа Болаичлари



МУВОСАДАТ ТУРНИ МАЪЛУМОТЛАР

ПАО "АМТК" ширкати, Ўзбекистон Республикаси Автономия, Ўзбекистон Республикаси (Миллий) Телефон рақами: 000000 Миллий телефон рақами: 00  
 Tel: +99871 238-0250  
 Fax: +99871 238-0100  
 Elektron pochta: yulbo'limi@mail.ru

RURAL ROADS RESILIENCE SECTOR PROJECT

The objects on which the effects have been studied:



To mitigate negative impacts, the Project will develop an Environmental Management Plan (EMP) and an Occupational Health and Safety Management and Monitoring Plan (OHSMP).

CONTACT DETAILS FOR INQUIRIES

Information PIU: Committee for Roads of the Republic of Uzbekistan  
 Address: Yulovlar Bo'limi, Mustaqillik maydoni, 100  
 Tel: +99871 238-0250  
 Fax: +99871 238-0100  
 Email: yulbo'limi@mail.ru

ОСИЁ ТАРАҚҚИЁТ БАНКИ ИШТИРОКИДА ЎЗБЕКИСТОНДА ҚИШЛОҚ ЙўЛЛАРИНИ ЯХШИЛАШ ЛОЙИХАСИ

Таъсирларни ўлчамлаш ва таъмир чоралари



To mitigate negative impacts, the Project will develop an Environmental Management Plan (EMP) and an Occupational Health and Safety Management and Monitoring Plan (OHSMP).

МУВОСАДАТ ТУРНИ МАЪЛУМОТЛАР

ПАО "АМТК" ширкати, Ўзбекистон Республикаси Автономия, Ўзбекистон Республикаси (Миллий) Телефон рақами: 000000 Миллий телефон рақами: 00  
 Tel: +99871 238-0250  
 Fax: +99871 238-0100  
 Elektron pochta: yulbo'limi@mail.ru

RURAL ROADS RESILIENCE SECTOR PROJECT

SOCIAL PROTECTION MEASURES IN THE IMPLEMENTATION OF THE PROJECT

Land acquisition and resettlement project tasks:

The land acquisition and resettlement project includes the following:

- Physical aspect: Land acquisition, land use, and resettlement.
- Business aspect: Land use, land acquisition, and resettlement.

The purpose of the acquisition and resettlement project is:

Implementation of the project will ensure that the project area is developed in a sustainable manner, taking into account the needs of the local population and the environment.

What is compensated for the impact and losses	Compensation impacts and losses
<ul style="list-style-type: none"> <li>Loss of land and other assets</li> <li>Loss of crops and other assets</li> <li>Loss of income and other assets</li> <li>Loss of social and cultural assets</li> <li>Loss of other assets</li> </ul>	<ul style="list-style-type: none"> <li>Compensation for land and other assets</li> <li>Compensation for crops and other assets</li> <li>Compensation for income and other assets</li> <li>Compensation for social and cultural assets</li> <li>Compensation for other assets</li> </ul>

**CONTACT DETAILS FOR REQUEST**

Information for the project is available at the following addresses:

Address: 100000, Tashkent, Uzbekistan

Phone: +7 7072 222 222

Email: info@uzbroadbank.com

OSIYE TARAQIYIET BANKI ISHTIROKIDA O'ZBEKISTONDA QIYSHLOK YUQLARINI YAXSHILASH LOYIHASI

LOYIHA NI AMALGA OSHIRISH DAVRIDA KIRIQLINIV HUKMLAR TADBIQLARI

Er xizmat va qiziqish to'lovlarini o'z ichiga oladi:

The land acquisition and resettlement project includes the following:

- Physical aspect: Land acquisition, land use, and resettlement.
- Business aspect: Land use, land acquisition, and resettlement.

The purpose of the acquisition and resettlement project is:

Implementation of the project will ensure that the project area is developed in a sustainable manner, taking into account the needs of the local population and the environment.

Te'vlar va xizmatlar uchun zarurlar xizmatlari to'lovlari	Zarar ko'rganlarning qiziqish va xizmatlari
<ul style="list-style-type: none"> <li>Land and other assets</li> <li>Crops and other assets</li> <li>Income and other assets</li> <li>Social and cultural assets</li> <li>Other assets</li> </ul>	<ul style="list-style-type: none"> <li>Compensation for land and other assets</li> <li>Compensation for crops and other assets</li> <li>Compensation for income and other assets</li> <li>Compensation for social and cultural assets</li> <li>Compensation for other assets</li> </ul>

**LOYIHA NI AMALGA OSHIRISH DAVRIDA KIRIQLINIV HUKMLAR TADBIQLARI**

Information for the project is available at the following addresses:

Address: 100000, Tashkent, Uzbekistan

Phone: +7 7072 222 222

Email: info@uzbroadbank.com

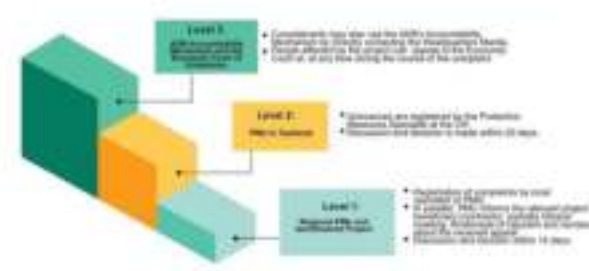
RURAL ROADS RESILIENCE SECTOR PROJECT

CONSULTATION AND PARTICIPATION	ENTITLEMENTS
<ul style="list-style-type: none"> <li>Meeting with project implementing bodies</li> <li>Public meetings by subsector</li> <li>Individual meetings with land users / farmers</li> <li>Introduction into entitlement and compensation system</li> <li>Introduction into grievance redress mechanisms</li> <li>Benefits and needs of subgroups</li> </ul>	<ul style="list-style-type: none"> <li>Affected land user rights holders</li> <li>There is a need to verify address records of private land users in village registers</li> <li>Identification of affected households and estimate impacts on use of land</li> <li>Compensation entitlements will follow national laws and regulations</li> <li>Contractor requirements of the World Development Bank (WDB)</li> <li>Be based on agreed and correct established entitlement records</li> <li>Pay compensation prior to establishing land use entitlements</li> <li>Include inventory of lost and lost-in-transit surveys</li> </ul>

**CARIFICATION REQUEST & COMPLAINTS**

- Contacted and consulted persons have knowledge of the proposed subprojects.
- Individual, group, and public meetings on social safeguards are part of the information dissemination including introduction on grievance redress mechanisms (GRM).
- GRM will be administered and managed by PMU with its SOCs.

DISCLOSURE OF INFORMATION AND GRIEVANCE MECHANISM



**CONTACT DETAILS FOR REQUEST**

Information for the project is available at the following addresses:

Address: 100000, Tashkent, Uzbekistan

Phone: +7 7072 222 222

Email: info@uzbroadbank.com

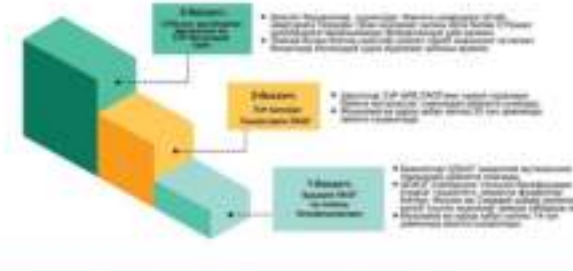
OSIYE TARAQIYIET BANKI ISHTIROKIDA O'ZBEKISTONDA QIYSHLOK YUQLARINI YAXSHILASH LOYIHASI

KONSULTATSIYA VA ISHTIROK	YUQLAR
<ul style="list-style-type: none"> <li>Meeting with project implementing bodies</li> <li>Public meetings by subsector</li> <li>Individual meetings with land users / farmers</li> <li>Introduction into entitlement and compensation system</li> <li>Introduction into grievance redress mechanisms</li> <li>Benefits and needs of subgroups</li> </ul>	<ul style="list-style-type: none"> <li>Affected land user rights holders</li> <li>There is a need to verify address records of private land users in village registers</li> <li>Identification of affected households and estimate impacts on use of land</li> <li>Compensation entitlements will follow national laws and regulations</li> <li>Contractor requirements of the World Development Bank (WDB)</li> <li>Be based on agreed and correct established entitlement records</li> <li>Pay compensation prior to establishing land use entitlements</li> <li>Include inventory of lost and lost-in-transit surveys</li> </ul>

**TU'ZILTVIRUV VA SHIKOYATLAR MEKANIZMI**

- Contacted and consulted persons have knowledge of the proposed subprojects.
- Individual, group, and public meetings on social safeguards are part of the information dissemination including introduction on grievance redress mechanisms (GRM).
- GRM will be administered and managed by PMU with its SOCs.

DISCLOSURE OF INFORMATION AND GRIEVANCE MECHANISM



**LOYIHA NI AMALGA OSHIRISH DAVRIDA KIRIQLINIV HUKMLAR TADBIQLARI**

Information for the project is available at the following addresses:

Address: 100000, Tashkent, Uzbekistan

Phone: +7 7072 222 222

Email: info@uzbroadbank.com

**Appendix 5. Traffic Data Tashkent**

<b>Road Name 10V065 (4K-768)</b>											
Year	Cars	Buses	Commercial vehicle up to 2.0 t	Commercial vehicle up to 2.0-5.0 t	Commercial vehicle up to 5.0-8.0 t	Commercial vehicle up to 8.0-12.0 t	Commercial vehicle more than 12 t	Auto trains	Agricultural vehicle/ others	2 - wheels	Total Vehicles per day
2025	308	100	119	233	152	206	167	76	90	19	1470
2	379	123	146	287	187	254	206	94	111	23	1811
2	463	150	178	350	228	310	252	114	136	29	2210
2040	565	183	218	427	278	378	307	139	165	35	2696
2045	689	223	266	521	340	461	375	170	202	43	3289
2	840	272	324	636	414	563	457	208	246	52	4012

<b>Road Name 10V068b (4K-771b)</b>											
Year	Cars	Buses	Commercial vehicle up to 2.0 t	Commercial vehicle up to 2.0-5.0 t	Commercial vehicle up to 5.0-8.0 t	Commercial vehicle up to 8.0-12.0 t	Commercial vehicle more than 12 t	Auto trains	Agricultural vehicle/ others	2 - wheels	Total Vehicles per day
2025	215	136	80	156	87	86	137	74	86	20	1079
2	265	168	99	192	108	107	169	91	107	24	1329
2	324	205	120	234	131	130	207	111	130	30	1621
2040	395	250	147	286	160	159	252	135	159	36	1978
2045	482	305	179	349	196	193	307	165	193	44	2413
2	588	373	218	425	239	236	375	201	236	54	2944

<b>Road Name 10V085 (4K-781)</b>											
Year	Cars	Buses	Commercial vehicle up to 2.0 t	Commercial vehicle up to 2.0-5.0 t	Commercial vehicle up to 5.0-8.0 t	Commercial vehicle up to 8.0-12.0 t	Commercial vehicle more than 12 t	Auto trains	Agricultural vehicle/ others	2 - wheels	Total Vehicles per day
2025	201	41	114	96	138	197	43	37	167	9	1042
2030	247	51	141	118	170	243	53	45	206	11	1284
2	301	62	171	144	207	296	65	55	252	13	1567
2040	368	76	209	175	253	361	79	67	307	16	1912
2045	449	93	255	214	309	441	96	82	375	19	2332
2	547	113	311	261	377	537	117	100	457	23	2845

<b>Road Name 10V087 (4K-783)</b>											
Year	Cars	Buses	Commercial vehicle up to 2.0 t	Commercial vehicle up to 2.0-5.0 t	Commercial vehicle up to 5.0-8.0 t	Commercial vehicle up to 8.0-12.0 t	Commercial vehicle more than 12 t	Auto trains	Agricultural vehicle/ others	2 - wheels	Total Vehicles per day
2025	185	86	86	93	150	44	52	76	151	4	926
2030	228	106	105	115	185	54	63	94	186	5	1142
2	278	129	129	140	226	66	77	114	227	6	1393
2040	340	157	157	171	276	81	94	139	277	7	1699
2045	414	192	191	209	336	99	115	170	338	8	2073
2	506	234	234	254	410	121	141	208	412	10	2529

<b>Road Name 10V091 (4H-731)</b>											
Year	Cars	Buses	Commercial vehicle up to 2.0 t	Commercial vehicle up to 2.0-5.0 t	Commercial vehicle up to 5.0-8.0 t	Commercial vehicle up to 8.0-12.0 t	Commercial vehicle more than 12 t	Auto trains	Agricultural vehicle/ others	2 - wheels	Total Vehicles per day
2025	105	57	92	81	109	50	62	213	188	4	961
2030	129	70	113	100	134	61	77	263	231	5	1184
2035	158	85	138	122	164	75	94	321	282	6	1444
2040	192	104	169	148	200	91	114	391	344	8	1762
2045	235	127	206	181	244	111	139	478	420	10	2150
2050	286	155	251	221	297	136	170	583	512	12	2623

<b>Road Name 10V060a (4K-742a)</b>											
Year	Cars	Buses	Commercial vehicle up to 2.0 t	Commercial vehicle up to 2.0-5.0 t	Commercial vehicle up to 5.0-8.0 t	Commercial vehicle up to 8.0-12.0 t	Commercial vehicle more than 12 t	Auto trains	Agricultural vehicle/ others	2 - wheels	Total Vehicles per day
2025	124	48	36	17	34	9	161	64	48	3	543
2030	153	59	44	21	42	11	198	79	59	4	670
2035	186	71	54	26	51	14	242	96	72	5	817
2040	227	87	66	31	62	17	295	117	88	6	997
2045	277	106	80	38	75	21	360	143	107	8	1216
2050	338	130	98	47	92	25	439	174	131	9	1483

<b>Road Name 10V130d (4H-715d)</b>											
Year	Cars	Buses	Commercial vehicle up to 2.0 t	Commercial vehicle up to 2.0-5.0 t	Commercial vehicle up to 5.0-8.0 t	Commercial vehicle up to 8.0-12.0 t	Commercial vehicle more than 12 t	Auto trains	Agricultural vehicle/ others	2 - wheels	Total Vehicles per day
2025	85	41	19	11	37	17	36	25	18	2	292
2030	104	51	24	14	45	20	45	30	23	3	359
2035	127	62	29	17	55	25	55	37	28	4	438
2040	155	76	35	20	67	30	67	45	34	4	535
2045	189	93	43	25	82	37	82	55	41	5	653
2050	231	113	53	30	100	45	100	67	50	7	796

<b>Road Name 10V061 (4H-716)</b>											
Year	Cars	Buses	Commercial vehicle up to 2.0 t	Commercial vehicle up to 2.0-5.0 t	Commercial vehicle up to 5.0-8.0 t	Commercial vehicle up to 8.0-12.0 t	Commercial vehicle more than 12 t	Auto trains	Agricultural vehicle/ others	2 - wheels	Total Vehicles per day
2025	54	44	28	18	32	61	67	20	178	4	506
2030	67	55	34	23	40	75	82	24	220	5	623
2035	81	67	41	28	48	91	100	30	268	6	760
2040	99	82	51	34	59	111	122	36	327	7	927
2045	121	99	62	41	72	136	149	44	399	8	1131
2050	147	121	75	50	88	166	182	54	487	10	1380

<b>Road Name 10V138 (4K-721)</b>											
Year	Cars	Buses	Commercial vehicle up to 2.0 t	Commercial vehicle up to 2.0-5.0 t	Commercial vehicle up to 5.0-8.0 t	Commercial vehicle up to 8.0-12.0 t	Commercial vehicle more than 12 t	Auto trains	Agricultural vehicle/ others	2 - wheels	Total Vehicles per day
2025	458	57	408	147	520	438	487	115	195	7	2833
2030	564	70	503	181	640	540	600	142	240	9	3490
2040	688	85	614	221	781	658	733	173	293	11	4258
2045	839	104	749	270	953	803	894	211	358	13	5195
2050	1024	127	914	329	1163	980	1090	258	436	16	6338
2050	1249	155	1115	402	1419	1195	1330	315	532	20	7732

## Appendix 6. Air Quality Methodology

1. The Outline methodology for assessment of construction impacts on air quality is described herewith.
2. The assessment methodology classifies construction-phase activities into four operational categories—demolition, earthworks, construction, and trackout—reflecting the differentiated emission profiles and associated potential air quality impacts characteristic of each category.
3. The potential for dust emissions is analyzed for each planned activity, considering three discrete categories of dust-related impacts: nuisance (amenity) dust, human health-related particulate matter, and ecological receptor deposition effects:
  - i. annoyance due to dust soiling;
  - ii. the risk of health effects due to an increase in exposure to PM<sub>10</sub>; and
  - iii. harm to ecological receptors
4. The sensitivity of the area is determined through an integrated assessment of receptor density, receptor sensitivity, and proximity to the emission source. For example, in the context of dust soiling, an area with over 100 high-sensitivity receptors situated within 50 meters of the source would be classified as high sensitivity, whereas the same number of high-sensitivity receptors located beyond 100 meters would warrant a low sensitivity classification.
5. The principal stages of the assessment are as follows:
  - i. Screening to identify the requirement for assessment
  - ii. Assessment of the risk of dust impacts, which is undertaken separately for each of the four activities listed above and which takes account of the scale and nature of the work and the sensitivity of the area.
  - iii. Description of the risks of dust impacts, classified as low, medium or high and development of site-specific mitigation measures, proportionate to the degree of risk.

### Dust emission magnitude

6. Dust emission magnitude is determined according to the scale and nature of the proposed works, and is classified into three categories: Small, Medium, or Large. Representative examples of dust emission magnitudes for various activities are provided below; however, this list is not exhaustive, and alternative criteria may be applied if appropriately justified based on project-specific conditions.

**Table 84. Dust emission magnitude**

Activity	Magnitude		
	Large	Medium	Small
Demolition	Total building volume >50,000 m <sup>3</sup> , potentially dusty construction material (e.g. concrete), on-site crushing and screening, demolition activities >20 m above ground level.	Total building volume 20,000 m <sup>3</sup> – 50,000 m <sup>3</sup> , potentially dusty construction material, demolition activities 10-20 m above ground level.	Total building volume <20,000 m <sup>3</sup> , construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <10 m above ground, demolition during wetter months.
Earthworks:	Total site area >10,000 m <sup>2</sup> , potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size), >10 heavy earth moving vehicles active at any one time, formation of	Total site area 2,500 m <sup>2</sup> – 10,000 m <sup>2</sup> , moderately dusty soil type (e.g. silt), 5-10 heavy earth moving vehicles active at any one time, formation of bunds 4 m – 8 m in height, total material moved 20,000	Total site area <2,500 m <sup>2</sup> , soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <4 m in height, total material moved <20,000 tonnes, earthworks

	bunds >8 m in height, total material moved >100,000 tonnes.	tonnes – 100,000 tonnes	during wetter months.
Construction	Total building volume >100, 000 m <sup>3</sup> , on site concrete batching, sandblasting.	Total building volume 25,000 m <sup>3</sup> – 100,000 m <sup>3</sup> , potentially dusty construction material (e.g. concrete), on site concrete batching.	Total building volume <25,000 m <sup>3</sup> , construction material with low potential for dust release (e.g. metal cladding or timber).
Trackout	Large: >50 HDV (>3.5t) outward movements 16 in any one day 17, potentially dusty surface material (e.g. high clay content), unpaved road length >100 m.	10-50 HDV (>3.5t) outward movements 16 in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 m – 100 m.	<10 HDV (>3.5t) outward movements 16 in any one day, surface material with low potential for dust release, unpaved road length <50 m.

### The sensitivity of the area

7. The sensitivity of the area is evaluated by considering multiple factors, including:
- the specific sensitivities of receptors in the area
  - the proximity and number of those receptors
  - in the case of PM<sub>10</sub>, the local background concentration
  - site-specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of wind-blown dust.

### Sensitivity of people to dust-soiling effects

8. The sensitivity of receptors to dust soiling effects is classified as high, medium or low as follows:
- High sensitivity receptor – land where users can reasonably expect enjoyment of a high level of amenity, or the appearance, aesthetics or value of their property would be diminished by soiling; and the people or property would reasonably be expected to be present continuously, or at least regularly for extended periods. Examples include dwellings, museums and other culturally important collections, medium and long term car parks and car showrooms.
  - Medium sensitivity receptor - users would expect to enjoy a reasonable level of amenity, but not to the same level as their home, users would not reasonably be expected to be present regularly for extended periods. Examples include parks and places of work.
  - Low sensitivity receptor - enjoyment of amenity would not reasonably be expected, there is only transient exposure with users generally only present for limited periods. Examples include playing fields, most farmland and roads.

### Sensitivity of people to health effects of PM<sub>10</sub>

9. In evaluating receptor sensitivity to the health effects of PM<sub>10</sub>, three sensitivity levels are defined based on the likelihood of exposure to elevated 24-hour average concentrations, as follows:
- High sensitivity receptor - locations where individuals may be exposed for eight hours or more in a day) such as residential properties, hospitals, schools and residential care homes.
  - Medium sensitivity receptor - locations where workers may be exposed for eight hours or more in a day).
  - Low sensitivity receptor - locations where human exposure is transient such as footpaths, playing fields, parks and shopping streets.

10. The assessment also takes into account background levels of PM<sub>10</sub>.

### Sensitivity of receptors to ecological effects

- High sensitivity receptor

- 
- locations with an international or national designation and the designated features may be affected by dust soiling; or
  - locations where there is a community of a particularly dust sensitive species
  - indicative examples include a Special Area of Conservation (SAC) designated for acid heathlands or a local site designated for lichens adjacent to the demolition of a large site containing concrete buildings.
- ii. Medium sensitivity receptor
- locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown; or
  - locations with a national designation where the features may be affected by dust deposition.
- iii. Low sensitivity receptor
- locations with a local designation where the features may be affected by dust deposition.

**Appendix 7. Record of public consultations (list of the participants and photos from the meetings)**

Public consultation meeting about the 10V068 “b” road, Oqqorgon district, Hosildor mahalla

СТАРКОК  
участником общественного слушания  
«Строительство и ремонт дорог с асфальтобетонным покрытием  
за счет средств международных финансовых институтов  
Ташкентской области *Оqqorgon* район.

№№А *Оqqorgon* *427915* \_\_\_\_\_ 202\_г.

№	Ф.И.О.	Подпись	Тел.
1	<i>Илоркизов Б</i>	<i>[Signature]</i>	<i>99-915-26-99</i>
2	<i>Рохитовуллов М</i>	<i>[Signature]</i>	<i>99-139-08-60</i>
3	<i>Замбаров Ш</i>	<i>[Signature]</i>	<i>90-334-74-21</i>
4	<i>Витязов Т</i>	<i>[Signature]</i>	<i>90-141-38-04</i>
5	<i>Шарипов А</i>	<i>[Signature]</i>	<i>90-353-72-91</i>
6	<i>Рисов В</i>	<i>[Signature]</i>	<i>99-329-69-23</i>
7	<i>Витязов Ш</i>	<i>[Signature]</i>	<i>99-919-22-60</i>
8	<i>Рохитовуллов Х</i>	<i>[Signature]</i>	<i>9926-92-26</i>
9	<i>Илоркизов Р</i>	<i>[Signature]</i>	<i>90-941-97-97</i>
10	<i>Рохитовуллов Б</i>	<i>[Signature]</i>	<i>99-137-39-74</i>
11	<i>Илоркизов Р</i>	<i>[Signature]</i>	<i>90-941-97-97</i>
12	<i>Келдиоркулов</i>	<i>[Signature]</i>	<i>90-942-98-45</i>
13	<i>Шарипов В</i>	<i>[Signature]</i>	<i>90-406-46-00</i>
14	<i>Самовуллов Ф</i>	<i>[Signature]</i>	<i>90-046-95-90</i>
15	<i>Уайиткулов</i>	<i>[Signature]</i>	<i>99-392-24-02</i>
16	<i>Шарипов Ш</i>	<i>[Signature]</i>	<i>99-910-40-10</i>
17	<i>Витязов В</i>	<i>[Signature]</i>	<i>99-134-63-93</i>
18	<i>Витязов Ш</i>	<i>[Signature]</i>	<i>99-060-17-60</i>





Public consultation meeting about 10V085 and 10V091 roads, Bekobod district, Uzbekobod mahalla

СПИСОК  
участников общественного слушания  
«Строительство внутренних дорог с цементобетонным покрытием»  
за счет средств международных финансовых институтов,  
Ташкентская область Бекободский район.

МФН Узбекистон 4#731.      «   »      202\_г.

№	ФИО	Подпись	Тел.
1	Алимов С.А	Алимов	90 010-44-24
2	Исмаилов Н	Исмаилов	94 918 658
3	Алимурастов А	Алимурастов	94 402 21 52
4	Алимурастов В	Алимурастов	94 914 76 06
5	Маммамурастов М	Маммамурастов	90 928 81 05
6	Салтаев Н	Салтаев	94 986 55 52
7	Бозиров Т	Бозиров	90 395 10 42
8	Парвизов С	Парвизов	99 721 06 17
9	Маммамурастов М	Маммамурастов	99 326-31-58
10	Алимурастов К	Алимурастов	53-304-5861
11	Шегиев Ю	Шегиев	99-102-2055
12	Салтаев Т	Салтаев	90 631 14 62
13	Алимурастов М	Алимурастов	94 821 14 87
14	Беркурастов А	Беркурастов	94 402 21 62
15	Самитов Н	Самитов	90 975-08-69
16	Бекмурзаев У	Бекмурзаев	99 432 09 65
17	Алиев Х	Алиев	041652266
18	Избосов К	Избосов	94 402 21 52
	Олимурастов А	Олимурастов	



Public consultation meeting about 10V091 road, Bekobod district, Hamza mahalla

СПИСОК  
участников общественного слушания  
«Строительство внутренних дорог с цементобетонным покрытием»  
за счет средств международных финансовых институтов.  
Ташкентская область, Вокзалский район.

МФЙ: Вокзал Ч.Н 731. « » \_\_\_\_\_ 202\_г.

№	Ф.И.О.	Подпись	Тел.
1	Исмаилов Абдувахи Исмаилович	<i>[Signature]</i>	919 50 02
2	Исмаилов Абдувахи Исмаилович	<i>[Signature]</i>	99-014-73-58
3	Исмаилов Мерис	<i>[Signature]</i>	31 002 94 02
4	Исмаилов Рахматов	<i>[Signature]</i>	98 405 71 60
5	Исмаилов Фархад	<i>[Signature]</i>	94 351 04-54
6	Исмаилов Турмурад	<i>[Signature]</i>	94 319 31-55
7	Исмаилов Мерис	<i>[Signature]</i>	94 981-38-61
8	Исмаилов Фархад	<i>[Signature]</i>	99 303 02 66
9	Исмаилов Рахматов	<i>[Signature]</i>	35-012 21 22
10	Исмаилов Абдувахи	<i>[Signature]</i>	94 431-61-59
11	Исмаилов Фархад	<i>[Signature]</i>	33-191-0-14
12	Исмаилов Фархад	<i>[Signature]</i>	95 000 31-65
13	Исмаилов Фархад	<i>[Signature]</i>	95 018 20 66
14	Исмаилов Фархад	<i>[Signature]</i>	90 066 25 09
15	Исмаилов Фархад	<i>[Signature]</i>	94 003 12 33
16	Исмаилов Фархад	<i>[Signature]</i>	99 001 71 02
17	Исмаилов Фархад	<i>[Signature]</i>	96 930 09 66
18	Исмаилов Фархад	<i>[Signature]</i>	94 413 19 56
	Исмаилов Фархад	<i>[Signature]</i>	99 003 02 56
	Исмаилов Фархад	<i>[Signature]</i>	94 005 14 34



Public consultation meeting about 10V087 road, Uzbekistan roads Bekobod district, Isfara mahalla



СПИСОК  
участников общественного слушания  
«Строительство внутренних дорог с цементобетонным покрытием»  
за счет средств международных финансовых институтов.  
Ташкентская область, Бекободский район.

МФН Исфара 4Н.78.3 «  »    202 г.

№	Ф.И.О.	Подпись	Тел.
1	Алимов Юсуф	Алимов	909045262
2	Алимов Насир	Алимов	996516650
3	Тохтаманов Мух	Тохтаманов	9092122653
4	Туронов Эралим	Туронов	998680597
5	Маматов Мирзам	Маматов	998811918
6	Алимов Мирзам	Алимов	9952113452
7	Алимов Мирзам	Алимов	995555109
8	Алимов Мирзам	Алимов	921631454
9	Эралим Эралим	Эралим	335466626
10	Алимов Эралим	Алимов	997195547
11	Алимов Мирзам	Алимов	992556464
12	Мирзам Мирзам	Мирзам	90904291
13	Алимов Мирзам	Алимов	99-346-08-54
14	Алимов Мирзам	Алимов	951193091
15	Алимов Мирзам	Алимов	926088000
16	Алимов Мирзам	Алимов	997982153
17	Алимов Мирзам	Алимов	958081254
18	Алимов Мирзам	Алимов	998162091

Public consultation meeting about 10V085road, Bekobod district, Bunyodkor mahalla

СВИДОК  
участников общественного слушания  
«Строительство внутренних дорог с цементобетонным покрытием»  
за счет средств международных финансовых институтов,  
Ташкентская область, Бекободский район.

МФН Бунёдкор 40781      «\_\_» \_\_\_\_\_ 202\_г.

№	Ф.И.О.	Подпись	Тел.
1	Турсунов Б	<i>[Signature]</i>	996351223
2	Норमतова О	<i>[Signature]</i>	909177006
3	Аблярова Р	<i>[Signature]</i>	996420065
4	Содиқов У	<i>[Signature]</i>	972756130
5	Содиқов Т	<i>[Signature]</i>	903341775
6	Қўздощев Ш	<i>[Signature]</i>	991605770
7	Аширов Э	<i>[Signature]</i>	941655875
8	Бекмуродов С	<i>[Signature]</i>	
9	Ҳайдуллаев А	<i>[Signature]</i>	931500175
10	Абдураҳимов Б	<i>[Signature]</i>	994031583
11	Маматқулов К	<i>[Signature]</i>	946683848
12	Ҳирзаев А	<i>[Signature]</i>	935670586
13	Ҳалиев М	<i>[Signature]</i>	939196989
14	Абдулқодиров Ф	<i>[Signature]</i>	941620882
15	Ҳаттамов А	<i>[Signature]</i>	949410975
16	Ширзаева Ш	<i>[Signature]</i>	931221383
17	Алибоев Ш	<i>[Signature]</i>	993872766
18			



Public consultation meeting about 10V130 "d" road, Quyichiirchiq district, Gullabotir mahalla

СПИСОК  
участников общественного слушания  
«Строительство внутренних дорог с цементобетонным покрытием»  
за счет средств международных финансовых институтов.  
Ташкентская область, Қуйчиқирчиқ - Қуллобтир маҳалла.

МФЙ Қуйчиқирчиқ ЧН7152 «\_\_» \_\_\_\_\_ 202 г.

№	Ф.И.О.	Подпись	Тел.
1	Уришбаева Ф.	<i>[Signature]</i>	99 7532 51
2	Ғайдуллаева О.	<i>[Signature]</i>	99 005 40 83
3	Қостайид Умарқожа	<i>[Signature]</i>	93 296 45 41
4	Ғайнозаров Ш.	<i>[Signature]</i>	99 336 50 43
5	Айтибаева Ш.	<i>[Signature]</i>	90-976-76-80
6	Зурақулва Ғайфу	<i>[Signature]</i>	99 775 90 77
7	Қўсманқўзи Мақсуд	<i>[Signature]</i>	90 990 93 55
8	Умарова Қўрсанов	<i>[Signature]</i>	90 931 33 85
9	Ғайзуллоева Қ	<i>[Signature]</i>	94 846 79 87
10	Умарова Д.Қўзи	<i>[Signature]</i>	90 133 24 98
11	Умарова Қўзи	<i>[Signature]</i>	90 029 15 48
12	Саидбетова Д	<i>[Signature]</i>	90 014 98 30
13	Қўллоқанова Ш.	<i>[Signature]</i>	90 122 37 93
14	Қўспатаева Ғайду	<i>[Signature]</i>	90 134 43 67
15	Қўзғисалиева Қўспул	<i>[Signature]</i>	833 252 40 01
16	Қўрсанов Қўмилан	<i>[Signature]</i>	97 540 02 12
17	Қўдураманова Қўсида	<i>[Signature]</i>	99 193 85 15
18	Қўзғисалиева Қўлқина	<i>[Signature]</i>	90 871 29 10
19	Қўзғисалиева Қўлқина	<i>[Signature]</i>	90 143 46 43
20	Қўзғисалиева Қўлқина	<i>[Signature]</i>	90 038 06 12



Public consultation meeting about 10V060 "a" road, Quyichiirchiq district, Dustlik mahalla

**СВИСОК**  
 участников областного слушания  
 «Строительство внутренних дорог с цементобетонным покрытием»  
 за счет средств международных финансовых институтов,  
 Ташкентская область, *Quyichiirchiq* район.

МФП *Quyichiirchiq* - 1 40742 и = \_ \_ \_ \_ \_ 202 г.

№	Ф.И.О.	Подпись	Тел.
1	<i>Abuzoi D.</i>	<i>[Signature]</i>	97 411 15 12
2	<i>Samatov A.B.</i>	<i>[Signature]</i>	97 410 07 25
3	<i>Adilbekov K.T.</i>	<i>[Signature]</i>	97 925 23 62
4	<i>Samizod D.</i>	<i>[Signature]</i>	99 471 71 52
5	<i>Imanov Zahir</i>	<i>[Signature]</i>	94 400 35 05
6	<i>Alimov, Raximov</i>	<i>[Signature]</i>	97 549 64 65
7	<i>Yusefov, Murod</i>	<i>[Signature]</i>	94 627 89 21
8	<i>Mirajonova, Gulnara</i>	<i>[Signature]</i>	97 990 31 29
9	<i>Yusupov, Murod</i>	<i>[Signature]</i>	97 490 03 48
10	<i>Yusupov, Zahir</i>	<i>[Signature]</i>	93 512 85 19
11	<i>Malozov, Bekiyev</i>	<i>[Signature]</i>	99 827 79 98
12	<i>Yusupov, Bekiyev</i>	<i>[Signature]</i>	95 023 39 30
13	<i>Yusupov, Bekiyev</i>	<i>[Signature]</i>	95 025 08 85
14	<i>Yusupov, Bekiyev</i>	<i>[Signature]</i>	95 641 37 85
15	<i>Yusupov, Bekiyev</i>	<i>[Signature]</i>	99 824 75 10
16	<i>Yusupov, Bekiyev</i>	<i>[Signature]</i>	99 605 05 24
17	<i>Yusupov, Bekiyev</i>	<i>[Signature]</i>	99 618 10 54
18	<i>Yusupov, Bekiyev</i>	<i>[Signature]</i>	99 600 91 11
19	<i>Yusupov, Bekiyev</i>	<i>[Signature]</i>	93 600 36 41
20	<i>Yusupov, Bekiyev</i>	<i>[Signature]</i>	99 409 39 26
21	<i>Yusupov, Bekiyev</i>	<i>[Signature]</i>	99 604 31 31



Public consultation meeting about 10V061, Quyichiirchiq district, Gul mahalla

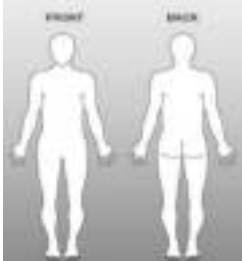
СТИСОС  
участков общественного слушания  
«Строительство внутренних дорог с асфальтобетонным покрытием  
из средств международных финансовых институтов,  
Ташкентская область, Quyichiirchiq район,  
MOK Quyichiirchiq 44716 ... 2021 г.

No	Ф.И.О.	Подпись	Тел.
1	Umarova Ravshan	Uji	99 210 2553
2	Ukravskaya	Uji	99/955-23-70
3	Imamat Jamang	Uji	99/959-56-95
4	Muhametova	Uji	95 530 2566
5	Galipova Kamisa	Uji	99 012 453
6	Karimova Z	Uji	92 011 1968
7	Ushirova M	Uji	90 219 2114
8	Majidova Saodat	Uji	93 40 62 41
9	Pichayeva Inas	Uji	98 110 2153
10	Ergasheva Q	Uji	99 503 2555
11	Kishonova Nabla	Uji	993 214 430
12	Gajumova Dilbar	Uji	99 941 62 92
13	Gorodclina K	Uji	97 540 67 72
14	Kozlova Tamar	Uji	95 165 74-7 34
15	Kobayeva M	Uji	95 955 20 17 69
16	Maysudova N	Uji	95 535 03 81
17	Qoriboyeva Tokir	Uji	94 952 44 37
18	Kaligova T	Uji	95 353 74 63
19	Orinboeva Z	Uji	88 013 21 10
20	Abdugajirova R	Uji	97 115 01 30



**Appendix 8: Incident Notification Form**

Project:		Incident Date:	
Location:		Incident Time:	
Equipment Involved:		Operation in Progress:	
Weather: <input type="checkbox"/> Clear <input type="checkbox"/> Dark <input type="checkbox"/> Rain <input type="checkbox"/> Snow <input type="checkbox"/> High Winds <input type="checkbox"/> Other (describe): Visibility: <input type="checkbox"/> Artificial Light <input type="checkbox"/> Dark <input type="checkbox"/> Dawn <input type="checkbox"/> Daylight <input type="checkbox"/> Dusk			
Reporting Level of Incident:			
<input type="checkbox"/> Fatality <input type="checkbox"/> Lost Time <input type="checkbox"/> Restricted Work <input type="checkbox"/> Medical Aid <input type="checkbox"/> First Aid	<input type="checkbox"/> Near Miss <input type="checkbox"/> Equipment Damage <input type="checkbox"/> Property Damage <input type="checkbox"/> Fire/Explosion	<input type="checkbox"/> Business Interruption <input type="checkbox"/> Security/Trespass/Theft <input type="checkbox"/> Mobile Equipment <input type="checkbox"/> Vehicle <input type="checkbox"/> Spill/Release	<input type="checkbox"/> Government Reportable <input type="checkbox"/> Non-reportable <input type="checkbox"/> Contravention <input type="checkbox"/> Public Complaint
Contractor Incident: <input type="checkbox"/> Yes <input type="checkbox"/> No    Contractor name:			
Report Prepared by:		Supervisor's Name:	
Signature:	Date:	Tel. No.	Date:
AFFECTED PERSONS (Worker Positions)			
DESCRIPTION OF INCIDENT (Describe what, when, why, who and how. Use separate pages if required. Attach photos if applicable.)			
WITNESSES- Provide separate witness reports			
Name		Position	Contact Information
NOTIFICATIONS			
What internal notifications have been made?		What external notifications have been made?	
INJURY INFORMATION (if applicable)			

Position:	Current condition:
Was injured person(s) taken to hospital?    Yes <input type="checkbox"/> No <input type="checkbox"/> (If yes, provide name and location of the hospital)	
Indicate the area of injury, if applicable, on the diagram to the right, and describe the injury in the space below:	
<b>VEHICLE INFORMATION (if applicable)</b>	
Driver's Name:	Driver's License No.:
Year, Make & Model:	Driver's Phone Number:
License Plate or Serial Number:	Insurer and Policy No.:
Was seat belt done up? <input type="checkbox"/> Yes <input type="checkbox"/> No	Was a cell phone being used? <input type="checkbox"/> Yes <input type="checkbox"/> No
Were police notified? Yes <input type="checkbox"/> No <input type="checkbox"/>	Name of police officer:
Road conditions: <input type="checkbox"/> Dry <input type="checkbox"/> Gravel <input type="checkbox"/> Wet <input type="checkbox"/> Icy	Other Info/Attachments:
<b>Spill/Release Information (if applicable)</b>	
Product:	Volume:                      Quantity Recovered:
<b>Initial Causal Analysis of Incident:</b>	
Direct Cause: (what / how)	
Root Cause: (why)	
Corrective Actions to Prevent Recurrence:	

Note: Refer to the "Root Cause Investigation & Corrective Action Form" for further detail.

**Appendix 9: Incident Root Cause Investigation and Corrective Action Form**

Project:		Incident Date:	
Location:		Incident Time:	
Incident Title:			
Has the Incident Notification Form been completed? <input type="checkbox"/> Yes <input type="checkbox"/> No If not, complete the incident notification form before completing this form.			
<input type="checkbox"/> Fatality <input type="checkbox"/> Lost Time <input type="checkbox"/> Restricted Work <input type="checkbox"/> Medical Aid <input type="checkbox"/> First Aid	<input type="checkbox"/> Near Miss <input type="checkbox"/> Equipment Damage <input type="checkbox"/> Property Damage <input type="checkbox"/> Fire/Explosion	<input type="checkbox"/> Business Interruption <input type="checkbox"/> Security/Trespass/Theft <input type="checkbox"/> Mobile Equipment <input type="checkbox"/> Vehicle <input type="checkbox"/> Spill/Release	<input type="checkbox"/> Government Reportable <input type="checkbox"/> Non-reportable <input type="checkbox"/> Contravention <input type="checkbox"/> Public Complaint
Report Prepared by:		Supervisor's Name:	
Signature: _____	Date: _____	Signature: _____	Date: _____
This form is used to help analyze incident root causes and contributing factors. Incidents rarely arise due to one single cause, and there are often multiple contributing factors that are involved in an incident. A cause is a condition that produces an effect. If a cause is eliminated, the effect is eliminated. A contributing factor is a condition that influences the effect but does not cause the effect. If the contributing factor is eliminated, the effect is not necessarily eliminated but may be influenced in other ways, such as being less severe, less likely, proceeding more slowly, or other similar effects.			
DESCRIPTION OF INCIDENT (Use separate pages if required. Attach photos if applicable.)			
Root Cause and Contributing Factor Analysis (add more pages if necessary for any section)			
LEADING EVENTS ANALYSIS (Describe the events leading up to the incident that were different to a normal sequence of events for this activity. Consider whether changes from normal sequences of events were causes or contributing factors to the incident.) (Refer to Chapter 6 of the ADB OCHS Guide for detail)			
Were the proper safe work practices and procedures being used by the workers in the events leading up to the incident? If not, why not?			

Were relevant legislation and standards being followed by the workers in the events leading up to the incident? If not, why not?
Were there any mechanical failures or defects that led to the incident? If yes, describe below:
Were the proper safety devices in place and being used? Were workers using proper personal protective equipment (PPE)? If not, why not?
Did the actions or lack of actions of anyone at the worksite contribute to the incident? If yes, describe below:
Were there any unusual conditions that contributed to the incident, such as (but not limited to) weather, other activities in the area, or anything else that was not typical for the task?
Did the workers present at the incident respond in a safe and appropriate way? Describe below:

Were the workers adequately trained to respond to the incident? If not, what training would have helped to lead to a better outcome?

Are there adequate procedures in place to respond to similar incidents? If not, what procedures need to be developed?

Check any causes and contributing factors from the following list. If necessary, add additional causes and contributing factors.

- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li><input type="checkbox"/> Operating equipment without training</li> <li><input type="checkbox"/> Operating equipment without proper care</li> <li><input type="checkbox"/> Operating equipment without safety devices in place or with inoperable safety devices</li> <li><input type="checkbox"/> Inadequate warning to workers of a safety issue</li> <li><input type="checkbox"/> Inadequate barriers or barricades</li> <li><input type="checkbox"/> Using defective tools or equipment</li> <li><input type="checkbox"/> Proper equipment unavailable</li> <li><input type="checkbox"/> Improper loading</li> <li><input type="checkbox"/> Poor housekeeping practices</li> <li><input type="checkbox"/> Repetitive action injury</li> <li><input type="checkbox"/> Poor maintenance of tools/equipment</li> <li><input type="checkbox"/> Hazardous conditions (gas, dust, fumes)</li> </ul> | <ul style="list-style-type: none"> <li><input type="checkbox"/> Inadequate site security</li> <li><input type="checkbox"/> Inadequate worker protection from toxic substances</li> <li><input type="checkbox"/> Inadequate PPE</li> <li><input type="checkbox"/> Improper use of PPE</li> <li><input type="checkbox"/> Inadequate lighting</li> <li><input type="checkbox"/> Inadequate ventilation</li> <li><input type="checkbox"/> Inadequate supervision</li> <li><input type="checkbox"/> Inadequate training</li> <li><input type="checkbox"/> Fatigue</li> <li><input type="checkbox"/> Worker(s) under the influence of substances such as alcohol or medications</li> <li><input type="checkbox"/></li> <li><input type="checkbox"/></li> <li><input type="checkbox"/></li> </ul> |
|---|--|

List the contributing factors and their involvement as a cause of the incident.

Contributing Factors	Involvement
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Describe the root cause (s) below:

**Corrective Action Analysis**

List the corrective actions already taken or planned to prevent a similar incident from occurring. Indicate whether the corrective action is already complete and who is responsible for implementing it.

Corrective Action	Person Responsible	Status?

Summarize any further information learned from this root cause and contributing factor analysis, including any information that needs to be shared with the workers or worksite management.

## Appendix 10: Environmental Management Plan for the Tashkent Region

1. This section of the report provides the Project's Environmental Management Plan (EMP) and the necessary institutional requirements to implement the EMP. In addition, the approximate costs of the EMP are outlined.
2. The EMP herewith provides the overall Project environmental management framework. It provides summary information of the types of impacts which are described in detail in this initial environmental examination (IEE). It also provides detailed information about the required mitigation and monitoring measures, the implementation arrangements, and the reporting requirements.

### EMP Implementation Responsibilities

3. The EMP specifies the roles and responsibilities of key project stakeholders in the overall environmental management:
  - (i) **Executing Agency:** The Committee for Roads will be the executing agency (EA) for the project and will oversee overall project implementation and management activities to ensure smooth and timely implementation and completion of subproject activities. The EA has overall responsibility for the project and therefore is ultimately responsible for ensuring the implementation of the mitigation in the EMP and for ensuring compliance with loan covenants. The EA will guide and coordinate closely with other government agencies and the ADB for timely resolution of any issues.
  - (ii) **Project Management Unit:** On behalf of the executing agency, the Project Management Unit (PMU) will assume day-to-day management of the project and will be responsible for coordinating and implementing project activities, including procurement, recruitment, disbursement, contract administration, monitoring and reporting. The PMU will be headed by a Project Manager and will comprise full-time core staff, including an Environmental Protection Officer. The PMU consultants will be recruited under the guidance of the EA and ADB. PMU will prepare bidding documentation and will ensure incorporation of IEE / EMP into the bidding package. The PMU will consolidate regular quarterly and semi-annual Environmental Monitoring Reports as per ADB requirements and submit them for disclosure on ADB website.
  - (iii) **Design Institute:** A design institute will be hired to prepare a detail design of the subproject, incorporating the IEE / EMP and acquiring State Expertise clearance for the design documentation package. The design institute will provide designer supervision for the construction period.
  - (iv) **Supervision Consultants / Safeguard Specialist:** Supervision Consultants will be mobilised and located at project sites, and thus will have immediate and direct supervision over daily EMP implementation, monitoring and reporting. A Supervision Consultant will prepare regular quarterly and semi-annual Environmental Monitoring Reports.
  - (v) **Contractor:** The Contractor will be responsible for development of Site Specific EMPs, such as the Health and Safety Management Plan, Waste and Spoil Management Plan, and implementation, monitoring and reporting of all environmental mitigation measures during
  - (vi)
  - (vii) the construction period. The Contractor will prepare monthly monitoring reports on the implementation of EMP.
  - (viii) **Ecological Clerk of Works (ECoW):** The Contractor will procure the services of a suitably qualified and experienced ECoW to carry out the on-site responsibilities outlined in the EMP. This will include, but is not limited to, conducting pre-work ecological checks/surveys, contractor training and briefings, fencing spec inspection, vegetation clearance and restoration watching brief, and the implementation of other biodiversity related mitigation.



Table 1: Rural Roads Resilience Sector Project: Mitigation Measures During Pre-Construction, Construction and Operation

Subject	Potential Impact	Mitigation Measures	Institutional Responsibility	
			Implement	Monitoring
Pre-construction				
Ecological Resources	During operation there is a risk of disturbance and direct mortality to protected and vulnerable species	<p>Collaboration with the engineering design team to ensure all the proposed infrastructure mitigation are optimally incorporated into the design.</p> <p>Pre-work checks for wildlife holes:</p> <ul style="list-style-type: none"> <li>• Before site clearance or excavation works begin, an ECoW should be recruited and who will then conduct a pre-clearance check. The ECoW must conduct a pre-clearance check for potential wildlife holes such as burrows. This should be carried out as early as possible in the project to avoid short notice stoppages. Any holes discovered must have an exclusion zone set up around them, determined by the ECoW, and excavation works prohibited within the exclusion zone until the appropriate next steps have been carried out. must have an exclusion zone set up around them, determined by the ECoW, and excavation works prohibited within the exclusion zone until the appropriate next steps have been carried out.</li> <li>• Wildlife holes discovered during the recognised active season must be monitored via camera traps for species activity/usage, with the hole not being excavated until 30 clear days of no animal usage is signed off by the ECoW. If a hole is used repeatedly by species, then exclusion measures may be implemented such as non-fatal/humane trapping and translocation or exclusion gates/fencing prior to excavation.</li> <li>• Wildlife holes discovered during the recognised hibernation/torpor season of known species must be left undisturbed until the recognised active season commences, and the 30-day monitoring period can be undertaken by the ECoW. The ECoW is to determine the exclusion zone as appropriate to the potential species.</li> <li>• The ECoW is to check the depth of the potential wildlife hole and its suitability to support species. If a hole's depth is too shallow to support species, then excavation works can commence as planned.</li> <li>• The excavation of any wildlife holes must be supervised by an ECoW with the appropriate ecological licences in place. The hole must be excavated as per the licence conditions or if no licence is required then excavated in scrapes of 300mm in stages to allow the ECoW to check for any species that may still be present.</li> </ul> <p>Pre-work checks for nesting birds:</p> <ul style="list-style-type: none"> <li>• The ECoW will carry out pre-work checks of the work site and Project Aol for nesting birds.</li> <li>• Checks to involve trees, shrubs, and low-lying vegetation such as</li> </ul>	Design Institute/ Supervision Consultant Contractor/ ECoW	PMU, CSC, PMC

Subject	Potential Impact	Mitigation Measures	Institutional Responsibility	
			Implement	Monitoring
		<p>grasses and scrub.</p> <ul style="list-style-type: none"> <li>If nesting birds are found, they will not be moved/disturbed, and all works will cease within an exclusion zone determined by the ECoW based on the species sensitivities to disturbance until the juveniles have fledged and the nest signed off by the ECoW as inactive. Allow for potential 500m of the nest(s) until the young birds have fledged.</li> </ul> <p>Tree checks:</p> <ul style="list-style-type: none"> <li>Trees set to be cleared or disturbed as part of construction must be checked by the ECoW for habitat potential and potential presence of species. This may include checks of holes, gaps, and crevasses. Once signed off as clear of species the tree may be removed. Prioritise clearance outside of the recognised bird breeding season and hibernation season of species that inhabit trees.</li> </ul> <p>Risks from infrastructure:</p> <ul style="list-style-type: none"> <li>Any fencing to be used as part of the construction must be wildlife friendly with no barbed wire or sharp points exposed. Any fencing erected to be inspected by the ECoW based on the considerations above.</li> </ul> <p>Risks from pollution:</p> <ul style="list-style-type: none"> <li>Emergency spills response procedure must be in place.</li> <li>No refuelling within 10m of a watercourse or surface drain.</li> <li>All refuelling to take place on hardstanding or over a plant nappy/drip tray.</li> <li>Sufficiently stocked spill kit to be easily accessible during refuelling activities.</li> <li>Sufficiently stocked spill kit to be in each plant and vehicle to control address spills and leaks.</li> </ul> <p>Design Issues</p> <ul style="list-style-type: none"> <li>Collaboration with the engineering design team to ensure all the proposed infrastructure mitigation are optimally incorporated into the design.</li> <li>All culverts of appropriate size should have a ledge to allow animal passage during times of water flow. Culverts or underpasses where water flow is expected to be minimal will not require these ledges.</li> <li>All culverts must be unobstructed (e.g. wire mesh or grates) and should be able to be entered by animals on both sides (no steep gradients, rocks etc., blocking access).</li> <li>If sand erosion barriers are installed temporarily, they should be designed to prevent small reptiles and mammals from accessing the road as much as possible. They should also be designed to funnel animals towards culverts and must not be placed in a way that blocks entry to culverts.</li> <li>The avoidance/minimisation of fencing being used during construction</li> </ul>		

Subject	Potential Impact	Mitigation Measures	Institutional Responsibility	
			Implement	Monitoring
		<p>must be prioritised to reduce negative impacts on species movements. Any fencing to be used as part of the construction must be wildlife friendly with no barbed wire or sharp points.</p> <p>Construction traffic should not exceed 10mph as heavy plant movements are high risk to wildlife and people.</p>		
Climate Change		<ul style="list-style-type: none"> <li>• Use of flexible and heat resistant pavement structures: Considering hot days are expected to increase and temperatures can soar to over 40 °C it is important to consider pavement structures that can withstand these conditions to avoid adverse road safety conditions and increased maintenance cost.</li> <li>• Increase in maintenance budgets and associated implementation plan: Although no maintenance budget is known at this stage, the increase in very hot days and heat waves in combination with low precipitation will most likely need more maintenance of pavement and associated road structures such as bridges and stopover locations.</li> <li>• Accident Report System: Given climate extremes and the remote nature of the road a breakdown of a vehicle can result in potentially dangerous situations when no nearby accident report systems are in place. At recurrent short intervals, a direct line to emergency services could be made available for people in need (with the accident report system in place, health and safety risk can be reduced, with people being able to call for assistance in case necessary. Damage to pavement and structures is imminent given the expected conditions, but with the additional maintenance budget and flexible/heat resistant pavement, the risk can be reduced to Low.)</li> <li>• Flood Risk and Runoff study: Currently a set number of culverts have been included in the design; the number of culverts and other drainage options should be based on a flood risk and runoff.</li> <li>• Flood consideration near settlements: Although settlements are present near the road, flood risk considerations should be increased at the areas where the road passes settlements, as these people are at most risk of asset damage in case of floods.</li> </ul>	Design Institute	PMU, CSC, PMC
<b>Construction Phase</b>				
Traffic and Transport	<p>Traffic impairment through the following activities:</p> <ul style="list-style-type: none"> <li>• Increased movements of construction vehicles and</li> </ul>	<p>The Contractor is to complete a Construction Traffic Management Plan (CTMP) and will be developed and implemented in accordance with the project framework EMP, and will cover but not be limited to:</p> <ul style="list-style-type: none"> <li>• The risks assessments that will clearly identify all risks from the construction works to travellers, drivers, and workers will need to be developed.</li> <li>• Identification of the new access roads for construction vehicles and safety</li> </ul>	Contractor	PMU, CSC, PMC

Subject	Potential Impact	Mitigation Measures	Institutional Responsibility	
			Implement	Monitoring
	<p>heavy plant to and from sites</p> <ul style="list-style-type: none"> <li>• Transportation of materials, goods and workers to and from sites</li> <li>• Partial road closures to enable works to take place</li> </ul>	<p>measures used for pedestrian access and crossings minimizing.</p> <ul style="list-style-type: none"> <li>• Identification of all public roads and paths that will be affected and proposed for the transport routes during the construction (which sections will be closed and till when, where the traffic will be diverted).</li> <li>• Minimisation of the traffic disturbance and allow adequate traffic flow round construction areas.</li> <li>• Public notification of any traffic-related concerns, such as road closures.</li> <li>• The traffic flow through the site will be coordinated with the responsible traffic authorities (Traffic Police).</li> <li>• CTMP will be developed by the contractors for the safe use of vehicles on and off-site; safe access to construction sites with the minimum negative impact on the existing roads and in parallel for ensuring community safety and easy access to their properties (homes, land, etc).</li> <li>• For traffic control and safety, the information about the project activities and driving standards will be announced through local radio/TV. The Engineer and the Contractor/s will openly and transparently inform residents of the affected places and villages as a minimum on a weekly basis regarding the planned activities and safety measures to be employed.</li> </ul>		
		<ul style="list-style-type: none"> <li>• Design standards will apply GIIP where it can be incorporated in existing road design legislation.</li> <li>• Regular public consultation will be held with the local community and road users throughout the project cycle. These will report the results of additional studies as they are completed. A website/freephone telephone number will be provided so interested parties can access up to date information on the project and raise any concerns. During the construction phase, residents will be provided with details and timings of traffic management plans.</li> <li>• Timings for diversions, closures, and other measures which may have a detrimental impact on traffic flows will be programmed to occur where the least impact on traffic</li> <li>• will occur. This may necessitate completing some works overnight, or during weekends.</li> <li>• Effective speed management will be implemented throughout the project with clearly posted speed limits to be adhered to during works. Signs will be clearly marked and visible to road users and speeds will be appropriate for the conditions. Old, unneeded signs will be covered or removed. Upon completion of works clear and concise signage will be put in place to ensure road users are aware of the applicable speed limit and where changes in the posted speed occur.</li> </ul> <p>The Contractor will be required to carefully plan site access and put in place</p>	Contractor	PMU, CSC, PMC

Subject	Potential Impact	Mitigation Measures	Institutional Responsibility	
			Implement	Monitoring
		relevant H&S warning signage and provisions to minimise any risks to workers, local communities, users of the route/areas etc. The proposed location of the site should be selected on the basis that turning movements to and from the site can be conducted safely and without creating disadvantages to other roads users and local communities. Access to the site should be paved and wheel cleaning facilities installed so that debris is not taken from site vehicles onto the public roads.		
Air Quality	Dust deposition resulting in the soiling of surfaces and elevated PM <sub>10</sub> concentrations, because of dust generating activities on site (e.g., demolition and construction traffic track out). Dust soiling will arise from the deposition of dust in all size fractions i.e., up to PM <sub>10</sub> .	Air Quality Management Plan (AQMP) to be developed by the Principal Contractor in consultation with the competent authority and ADB and in accordance with GIIP. The AQMP will include the following: <ul style="list-style-type: none"> <li>• Maintain records of dust and air quality complaints in the AQMP. Identify causes and measures taken to reduce emissions.</li> <li>• Record any exceptional incidents that cause dust or air emissions.</li> <li>• Additional measures to be implemented regarding specific managements activities and to be included in the AQMP are given below.</li> </ul>	Contractor	
		Construction Monitoring Requirements: <ul style="list-style-type: none"> <li>• Undertake regular off-site inspections, where sensitive receptors are nearby (within 50m of site boundary); and</li> <li>• Increase frequency of inspections when activities with a high potential to produce dust are being undertaken and during prolonged windy or dry conditions.</li> </ul>	Contractor	PMU, CSC, PMC
		Site Arrangements: <ul style="list-style-type: none"> <li>• Plan site layout so that machinery and dusty activities are located away from receptors where possible;</li> <li>• Keep site fencing, barriers, etc., clean using wet methods;</li> <li>• Bulk cement and other fine powder materials to be delivered in enclosed tankers and stored in silos with suitable control systems to prevent overfill.</li> </ul>	Contractor	PMU, CSC, PMC
		Site vehicles and equipment: <ul style="list-style-type: none"> <li>• Vehicle loading and movements to be optimised, with backfilling where possible, to minimise the number of journeys;</li> <li>• Journeys to be planned to avoid peak hours;</li> <li>• Maximum speed limits on surfaced and un-surfaced haul route and work areas to be specified;</li> <li>• Ensure all vehicles switch off engines when stationary; and</li> <li>• All onsite and on road vehicles and machinery to be appropriately maintained and to comply with relevant emission standards.</li> </ul>	Contractor	PMU, CSC, PMC
		Construction Activities:	Contractor	PMU, CSC, PMC

Subject	Potential Impact	Mitigation Measures	Institutional Responsibility	
			Implement	Monitoring
		<ul style="list-style-type: none"> <li>Construction equipment should be fitted with, or used in conjunction with, suitable dust suppression techniques such as water sprays or local extraction;</li> <li>Drop heights to be minimised and fine water sprays to be used when appropriate; and</li> <li>Ensure an adequate water supply on site for effective dust suppression / mitigation using non- potable water where possible.</li> </ul>		
		Vehicle Track out: <ul style="list-style-type: none"> <li>Haul routes and construction site to be damped down to minimise dust generation;</li> <li>Vehicles leaving the site to be covered; and</li> <li>Dry sweeping of large areas to be avoided.</li> </ul>	Contractor	PMU, CSC, PMC
Noise and Vibration	Noise impact during construction: The impact associated with construction noise is characterized as negative in nature, direct in type, and local in extent, due to the limited propagation range of noise emissions. Although the construction activities will be transient at each specific location, the noise generated will be frequent and repetitive throughout the duration of works. The cumulative effect of these variables is assessed to result in an impact of medium magnitude. Residual Impact: For	<i>During Construction:</i> <ul style="list-style-type: none"> <li>Stakeholder engagement with affected communities as well as with the Ministry of Tourism and Cultural heritage to determine preferred timeframes for construction works, minimizing potential disturbances, as well as for the ministry to provide proper guidance, which should be furthered considered if necessary;</li> <li>Restriction of construction activities during night-time hours to prevent elevated noise levels during periods of increased sensitivity;</li> <li>Deployment of low-noise machinery and installation of appropriate noise suppression devices, such as mufflers and acoustic enclosures, on construction equipment; and</li> <li>Routine noise monitoring to record actual noise levels at sensitive locations, with the preparation and implementation of adaptive management plans should noise thresholds be exceeded.</li> </ul> <i>Mitigation Strategy for Residual Impact:</i> <ul style="list-style-type: none"> <li>Continued community consultation, including the solicitation of feedback to identify practical approaches for minimizing perceived disruption. Where feasible, community-driven recommendations should be incorporated into the construction management plan to ensure impacts remain as low as reasonably practicable.</li> </ul>	Contractor	PMU, CSC, PMC

Subject	Potential Impact	Mitigation Measures	Institutional Responsibility	
			Implement	Monitoring
	receptors situated in immediate proximity to the roadway, residual noise impacts may persist despite the identified reductions Vibration impact: Negligible			
Geology and Soils	Deterioration of Soil quality through compaction and erosion	<ul style="list-style-type: none"> <li>Store removed soil materials in stockpiles <math>\leq 2</math>m in height to minimise losses by erosion and compaction. In case of wind erosion of the soil stockpiles: cover or keep wet. Where viable, use existing tarmac roads and existing dirt track networks as construction and borrow pit access roads after upgrade as appropriate.</li> </ul>	Contractor	PMU, CSC, PMC
	Contamination	<ul style="list-style-type: none"> <li>Ensure the ground in the areas designated for storage of hazardous materials and fuels is impervious, flat and hard, where necessary these materials should be stored under cover.</li> <li>Servicing of the construction equipment should be carried out in designated areas, equipped with means to prevent spills and leakages.</li> <li>Re-fuelling should be strictly controlled and subject to formal procedures. Drip pans and spill response kits should be used at all times during refuelling in the field and in sites without drainage system.</li> <li>Timely remediation of any hydrocarbon or other contamination leakages should be performed, and any wastes disposed of appropriately to prevent contamination.</li> <li>Sanitary wastewater generated at operational sites should be collected. The wastewater from septic tanks should be transported by special vehicles for further appropriate treatment and disposal by licensed contractors approved by Company.</li> <li>Appropriate waste management procedures should be in place for all construction and related wastes, and licensed contractors utilised for reuse / recycle / disposal. Rain and snowmelt water in the Project sites should be collected by a drainage system; if necessary, retention ponds should be used to accommodate excess rainwater and meltwater run off to allow settlement prior to discharge alternatively silt traps should be used before discharging of the drainage water.</li> </ul>	Contractor	PMU, CSC, PMC
Groundwater	Deterioration of Groundwater quality	<ul style="list-style-type: none"> <li>Water abstraction sources are currently unknown and will be required for construction camps and concrete batching plant activities. Abstraction must be managed via an on-site water resource management plan to reduce the pressures on local water resources. Once the location of construction camps</li> </ul>	Contractor	PMU, CSC, PMC

Subject	Potential Impact	Mitigation Measures	Institutional Responsibility	
			Implement	Monitoring
		<p>and concrete batching plants is known the project area needs to be studied.</p> <ul style="list-style-type: none"> <li>• The study shall include identification of the sources of groundwater supply in the Aol and assessment of how the Project activities affect them. Special attention shall be paid to local communities identified and any other isolated dwellings where groundwater may be the only source of water supply.</li> <li>• Engagement with the local water supply agency to ensure water levels are not depleted to unacceptable levels from the construction activities. Contingency measures must be in place to temporarily stop works involving water usage should levels drop below acceptable levels to allow for water resources to replenish. This risk will be relatively higher during periods of low rainfall.</li> <li>• Ensure strict and regular control of the implementation of all measures intended for environmental protection in the Project.</li> </ul>		
	Contamination Minimisation	<p>The following measures shall be incorporated into the Waste and Hazardous Materials Management Plan (WHMMP) to mitigate pollution risks and ensure compliance with environmental regulations:</p> <ul style="list-style-type: none"> <li>• Potentially polluting activities shall be minimised at all times.</li> <li>• All sewage and wastewaters generated in the Project sites should be collected and treated as appropriate before discharging.</li> <li>• Formal solid and liquid waste management, collection and disposal procedures should be in place, and the waste disposal sites used by the project should be agreed with the authorities.</li> <li>• Wastewater from the washing of construction vehicles should be collected and reused after treatment.</li> <li>• Appropriately spill prevention and containment measures should be applied when storing and handling of fuels and other environmentally hazardous substances to prevent leaks and spills</li> <li>• The use and handling of fuel and lubricants onsite should be limited and monitored closely at all times. Drip trays shall be used when refuelling onsite or handling hazardous liquids. Further mitigation of contamination risk from spills are as follows: <ul style="list-style-type: none"> <li>- Establish an emergency response protocol and provide appropriate spill containment equipment to address accidental releases of hazardous substances.</li> <li>- Develop and implement standard operating procedures (SOPs) for fueling operations and the management of liquid and toxic material storage areas to ensure safe handling and regulatory compliance.</li> <li>- Site plans must specify the locations for the storage of liquid materials and toxic materials.</li> <li>- Fuelling operations shall occur only within containment areas. – All fuel and chemical</li> </ul> </li> </ul>	Contractor	PMU, CSC, PMC

Subject	Potential Impact	Mitigation Measures	Institutional Responsibility	
			Implement	Monitoring
		<ul style="list-style-type: none"> <li>- storage (if any) must be sited on an impervious base within a bund and secured fencing. The storage area must be located away from any watercourse. The base and bund walls must be impermeable and of sufficient capacity to contain 110 percent of the volume of tanks.</li> <li>- Filling and refuelling must be strictly controlled and subject to formal procedures and will take place within areas surrounded by bunds to contain spills / leaks of potentially contaminating liquids.</li> <li>- All valves and trigger guns must be resistant to unauthorized interference and vandalism and be turned off and securely locked when not in use.</li> <li>- The contents of any tank or drum must be clearly marked. Measures shall be taken to ensure that no contaminated discharges enter any drain or watercourses.</li> <li>- Disposal of lubricating oil and other potentially hazardous liquids onto the ground or water bodies must be prohibited.</li> <li>- If accidental spills occur immediate clean up must be undertaken and all clean-up</li> <li>- materials stored in a secure area for disposal to a site authorized to dispose of hazardous waste</li> <li>• Timely remediation of any hydrocarbon or other contamination leakages should be performed, and any wastes disposed of appropriately.</li> </ul>		
Surface Water	Reductions in water quality through pollution pathways	<p>A Waste and Hazardous Materials Management Plan should be implemented to reduce pollution incidences and include the following measures:</p> <ul style="list-style-type: none"> <li>• Specific hazardous waste collection and storage locations shall be in place; the waste disposal sites shall be designed to prevent waste materials reaching surface waters (e.g., located away from water features). Storage of hazardous wastes will be in watertight containers or under cover, stored on hard standing with a bund and drainage sump for the collection and subsequent disposal to Company-approved facilities for contaminated water. The base and bund walls will be impermeable and of sufficient capacity to contain 110% of the volume of tank (or one tank if more than one tank is located in the bund);</li> <li>• Strict rules and measures will be applied when storing and handling of fuels and hazardous substances to prevent leaks;</li> <li>• Fuelling of vehicles shall be at commercial refuelling facilities as far as practical;</li> <li>• On-site refuelling equipment will be inspected and approved by company. It will be in good repair with working level gauges, break away (self-closing) check valves, provision for static discharge.</li> </ul>	Contractor	PMU, CSC, PMC

Subject	Potential Impact	Mitigation Measures	Institutional Responsibility	
			Implement	Monitoring
		<p>Refuelling operations will only be undertaken by competent personnel;</p> <ul style="list-style-type: none"> <li>• Drip trays shall be used for refuelling;</li> <li>• Spill response equipment will be available at refuelling, hazardous materials and hazardous waste storage sites;</li> <li>• Concrete and asphalt will be transported by specialised vehicles;</li> <li>• Timely remediation of leakages of and appropriate disposal of the residuals;</li> <li>• Construction waste management and separate waste collection; and</li> </ul> <p>Simultaneous reclamation of the temporary occupied lands and clearing of construction waste as the project progresses to the next road section.</p>		
	Alteration to river flow rates as result of extraction and crossing structures construction	<ul style="list-style-type: none"> <li>• Water abstraction sources are currently unknown and will be required for construction camps and concrete batching plant activities. Abstraction must be managed via an on-site water resource management plan to reduce the pressures on local water resources. Once the location of construction camps and concrete batching plants is known the project area needs to be studied.</li> <li>• The study shall include identification of the sources of surface water supply in the AoI and assessment of how the Project activities affect them. Special attention shall be paid to residential communities identified and any other isolated dwellings where groundwater may be the only source of water supply.</li> <li>• Engagement with local water supply agency to ensure water levels are not depleted to unacceptable levels from the construction activities. Contingency measures must be in place to temporarily stop works involving water usage should levels drop below acceptable levels to allow for water resources to replenish. This risk will be relatively higher during periods of low rainfall</li> </ul>	Contractor	PMU, CSC, PMC
Waste	Improper handling and disposal of non-hazardous and hazardous solid and food waste	<p>The Contractor should develop and implement a Waste Management Plan for the construction phase that will cover:</p> <ul style="list-style-type: none"> <li>• Key sources of waste</li> <li>• Waste types/streams</li> <li>• Non-hazardous or hazardous streams</li> <li>• Estimated annual waste volumes per type/stream (reviewed annually)</li> <li>• Waste Reduction Procedure describing the measures that shall be taken by Contractor to reduce the volume of waste it generates</li> <li>• Reuse and Recycling Procedure describing what opportunities Contractor shall adopt to reuse and/or recycle the waste it produces to reduce the amount of waste that has to be treated or disposed of off-site by a third party</li> <li>• Waste Collection, Segregation and Storage Procedure describing the</li> </ul>	Contractor	PMU, CSC, PMC

Subject	Potential Impact	Mitigation Measures	Institutional Responsibility	
			Implement	Monitoring
		<p>methods it shall implement for handling the waste it generates, prior to collection</p> <ul style="list-style-type: none"> <li>• Waste Training Procedure that addresses as a minimum:</li> <li>• General waste awareness training for workers during the General HES Induction</li> <li>• Specialist training for workers with specific waste management duties.</li> <li>• Use of safety data sheets (SDS)</li> <li>• PPE usage for handling types of waste</li> <li>• Proper storing techniques</li> <li>• Reporting requirements</li> </ul>		
Landscape and Topography	<p>The temporary alterations to the local topography, land use and to the existing road / Project alignment because of the Project construction and activities</p> <p>This includes the presence of workers, construction sites, machinery and materials and waste movements</p>	<p>The following mitigation measures will reduce adverse effects of the Project on surrounding landscape character during the construction phase:</p> <p>Minimising the use of artificial lighting along the Project alignment and where needed, use directional lighting.</p>	Contractor	PMU, CSC, PMC
Ecological Resources	<p>Vegetation Clearance e.g., for the road corridor and site compounds</p>	<p>The removal of vegetation, including grasses, scrub, and trees will be avoided and/or minimised through the following measures:</p> <ul style="list-style-type: none"> <li>• Work areas will prioritise existing hardstanding, barren land, or areas devoid of surface vegetation where possible. This includes the siting of laydown areas and compounds.</li> <li>• Existing tracks or natural gaps in vegetation will be used as preferred access routes where practical.</li> <li>• The workforce will utilise clearly demarcated access routes and working areas, which have been selected based on the principle of avoidance and/or minimisation of vegetation removal.</li> <li>• Where vegetation is to be cleared, the following species mitigation measures will be in place:</li> <li>• Prior to any vegetation clearance, areas shall be clearly marked out with</li> </ul>	Contractor	PMU, CSC, PMC

Subject	Potential Impact	Mitigation Measures	Institutional Responsibility	
			Implement	Monitoring
		<p>posts and tape/rope prior to any clearance.</p> <ul style="list-style-type: none"> <li>• All vegetation clearance, including of grasses, trees, shrubs, scrub etc. must prioritise being undertaken outside of the recognised bird breeding season (to be determined by the ECoW).</li> <li>• Where work cannot take place outside of the bird breeding season, then a pre-clearance nesting bird check will be undertaken of the vegetation to be cleared by the ECoW.</li> <li>• Should an active nest be identified, the ECoW will set up an appropriate exclusion zone around the nest and clearance within the exclusion zone will be deferred until the nest is confirmed as inactive/unused by the ECoW. The pre-checks and exclusion zone protocol applies to ground nesting birds which can nest in low vegetation such as ling grasses and low-lying scrub.</li> <li>• The works must prioritise vegetation clearance during the recognised hibernation season of known reptiles, amphibians, and mammals in the Project area. If vegetation clearance is to take place outside of the recognised hibernation season, that being the active season, then suitable habitat including low-lying vegetation such as grasses and scrub must be cleared in a two-phase directional cut. First cut down to 150mm height in a direction which allows any species to escape to suitable and retained habitat. Allow 24 hours before the 150mm cut vegetation can then be cut down to ground level. The site ECoW will determine whether habitat is suitable and therefore requires the two-phase directional cut. If unsuitable, then vegetation can be cut to ground level in one phase.</li> <li>• Fires will not be used for vegetation clearance and the workforce will be educated on preventing bush fires. Processing and removal of vegetation arisings: <ul style="list-style-type: none"> <li>- Where practical, grass cuttings and mulch arisings will be left in-situ. If the soil is to be removed, then arisings will form part of the soil stockpiles.</li> <li>- Woody vegetation will be logged or chipped, as appropriate, and taken off-site to be composted or used as firewood. Where practical, hibernacula features can be created as log piles and topped with mulch and wood chippings for on-site habitat enhancement.</li> </ul> </li> </ul> <p>Reinstatement and compensation:</p> <ul style="list-style-type: none"> <li>• Where vegetation has been cleared temporarily, it will be restored by reseedling or replanting using locally sourced seed mixes and saplings. Tree planting species will be like for like, where possible, or native species as a minimum.</li> </ul>		

Subject	Potential Impact	Mitigation Measures	Institutional Responsibility	
			Implement	Monitoring
		<ul style="list-style-type: none"> <li>Topsoil and subsoils will be removed and stored separately for subsequent reinstatement.</li> </ul> <p>Fires will not be used for vegetation clearance and the workforce will be educated on preventing bush fires.</p>		
	Vehicle movements	<ul style="list-style-type: none"> <li>Single vehicle track policies and use of low-impact vehicles will be applied where practical. Off-road travel will be prohibited where practical. Natural breaks in vegetation will be used as preferred access routes where possible.</li> </ul> <p>The workforce will adhere to working corridors. All staff will be provided with environmental awareness training. The workforce will not deviate from approved clearance areas. Appropriate speed limits will be applied, and traffic will be restricted to existing and/or dedicated haul routes to reduce direct mortality and disturbance from vehicles during construction. Penalties for violation will apply. Pre-clearance site surveys will be conducted before the commencement of all works to prevent animals present in working area being killed or injured during works. Checks will be for all vertebrate species and will specifically include ground nesting birds and reptiles. Less noisy machinery and/or noise barriers will be used where appropriate (e.g., around static equipment in sensitive areas).</p>	Contractor	PMU, CSC, PMC
	Fencing	<ul style="list-style-type: none"> <li>In case fencing is erected, mitigation needs to take place. Fencing will be restricted to work compounds and associated areas (such as staff parking areas, fuelling areas, waste segregation, aggregate storage and delivery) to ensure that habitats are not fragmented by workforce activities unless this is for species protection measures. Temporary barriers will be used to prevent wildlife from accessing waste disposal areas and similar areas.</li> <li>The avoidance/minimisation of fencing being used during construction must be prioritised to reduce negative impacts on species movements. Any fencing to be used as part of the construction must be wildlife friendly with no barbed wire or sharp points exposed. Recommend Heras fencing to be used as this is anti-climb for humans and will exclude large mammals from the work areas.</li> <li>Relatively long distances of fencing erected must consider animal movements across the landscape and not block key large mammal migration routes during the migratory season or access to key water sources during periods of low rainfall or drought.</li> </ul> <p>Any fencing erected to be inspected by the ECoW to check that it does not pose any welfare risks to wildlife, based on the considerations above.</p>	Contractor	PMU, CSC, PMC
	Waste and Pest Management	<ul style="list-style-type: none"> <li>Contractors will be required to conduct regular debris clean-up activities immediately upon possession of the work site and to maintain the assigned sections throughout project construction including by regular collection and</li> </ul>	Contractor	PMU, CSC, PMC

Subject	Potential Impact	Mitigation Measures	Institutional Responsibility	
			Implement	Monitoring
		hauling of wastes to government-approved landfill locations. Sign boards will be installed along the project road at 5km intervals to remind drivers not to throw garbage along the road. The estimated cost of collecting and hauling the waste along the road is assumed to be part of construction costs. Contractor (in coordination with regulators) will undertake rodent control in all camps.		
	Construction of working compounds and camps	<ul style="list-style-type: none"> <li>Construction camps will be located away from areas of natural habitat (as determined by the ECoW) and a hunting ban will be enforced for all construction workers. Good site practice regarding the storage of waste and food will be implemented. Temporary barriers and covers will be used to prevent wildlife from accessing waste disposal areas and similar areas.</li> </ul>	Contractor	PMU, CSC, PMC
	Spread of non-native / invasive species	<ul style="list-style-type: none"> <li>Any invasive non-native species (INNS) will be identified, demarcated, and removed in accordance with GIP. GIP,</li> <li>e.g. cleaning of equipment before transport to site, will be applied to prevent accidental introduction of INNS. The project team will not intentionally introduce any new INNS (not currently established in the country or region of the project) unless this is carried out in accordance with the existing regulatory framework for such introduction. Notwithstanding the above, the project team will not deliberately introduce any INNS with a high risk of invasive behaviour regardless of whether such introductions are permitted under the existing regulatory framework. All introductions of INNS will be subject to a risk assessment (as part of the project's environmental and social risks and impacts identification process) to determine the potential for invasive behaviour. The project team will implement measures to avoid the potential for accidental or unintended introductions including the transportation of substrates and vectors (such as soil, ballast, and plant materials) that may harbour INNS.</li> </ul>	Contractor	PMU, CSC, PMC
	Use of fuels and chemicals	<ul style="list-style-type: none"> <li>Use of GIP to minimize impacts associated with dust and pollution (e.g., use of drip trays understanding equipment, designated refuelling areas with hardstanding).</li> </ul>	Contractor	PMU, CSC, PMC
	Use of water during construction	<ul style="list-style-type: none"> <li>Water abstraction and wastewater management must be managed via an on-site water resource management plan to reduce the pressures on local water resources and maintain aquatic habitats at levels to support local ecology.</li> <li>Engagement with local water supply agency to ensure water levels are not depleted to unacceptable levels from the construction activities. Contingency measures must be in place to temporarily stop works involving water usage should levels drop below acceptable levels to allow for water resources to replenish. This risk will be relatively higher during periods of low rainfall.</li> </ul>	Contractor	PMU, CSC, PMC

Subject	Potential Impact	Mitigation Measures	Institutional Responsibility	
			Implement	Monitoring
		<ul style="list-style-type: none"> <li>Water resource management plan must also contain measures to control contaminated water runoff from construction activities into local watercourses. Physical barriers must be in place to avoid contaminated surface water runoff into nearby watercourses.</li> <li>Contractors will be required to avoid water leakage and formation of permanent surface water at construction sites that can attract birds and mammals. As part of this, the roadbed must not have depressions where rainwater is accumulated.</li> <li>Pre-start checks must be carried out for all machinery and equipment involved in water usage during construction by an authorised and competent person. Service and inspection records must be kept on site to demonstrate the machinery is fit for purpose.</li> </ul> <p>Wastewater and drainage systems:</p> <ul style="list-style-type: none"> <li>For sites servicing a small number of employees (less than 150), septic tanks may be used.</li> <li>For larger sites, liquid wastes at a minimum will receive primary treatment in anaerobic tank or pond preceded by a bar screen to remove large solid objects (e.g., sticks, rags). Primary treatment (also referred to as clarification, sedimentation or settling) is the process where wastewater can settle for a period (around 2 hours) in a settling tank. This leads to separation of a liquid effluent which includes oils and grease and sludge. Primary treatment leads to reduction in suspended solids, biological oxygen demand and removal of floating material (e.g., fences).</li> <li>There will be no direct discharge of untreated sanitary or oily wastewater to surface water bodies.</li> <li>Wastewater arising on the site must be collected, removed from the site via a suitable and properly designed temporary drainage system and disposed of at a location and in a manner that will not cause neither pollution nor nuisance. The site plan required by SEMP's must indicate the system proposed and the locations of related facilities in the site, including latrines, holding areas, etc. There must be no direct discharge of sanitary or wash water to surface water. Disposal of materials such as, but not limited to, lubricating oil and onto the ground or water bodies shall be prohibited. Liquid material storage containment areas must not drain directly to surface water. Liquid material storage containment areas equipped with drains must be valved, and the valve must be maintained locked in the closed position with supervisory control of the key. Lubricating and fuel oil spills must be cleaned up immediately and spill clean-up materials must be maintained at the storage area.</li> </ul>		

Subject	Potential Impact	Mitigation Measures	Institutional Responsibility	
			Implement	Monitoring
		<ul style="list-style-type: none"> <li>Specific contract provisions must ensure that construction camps and other potential sources of secondary impacts are properly sited and provided with drainage and wastewater facilities. An explanation of the proposed site drainage system must be indicated on the Site Environmental Management Plan Drainage. The site plan must be devised to ensure that rain run-off from the construction sites is collected in retention ponds and other facilities. Fuel, lubricating oil and chemical spills must be contained and cleaned-up immediately. Spill clean-up equipment must be maintained on site.</li> </ul>		
	Construction Lighting	<ul style="list-style-type: none"> <li>Works will not be lit where this is practical. Where lighting is required, it will be directional and non-UV lighting sources will be employed.</li> </ul>	Contractor	PMU, CSC, PMC
	Contractor Behaviour	<p>Biodiversity awareness will be included within the contractor's site induction training. This will include roles and responsibilities, inventory of all critically endangered, endangered, and protected species using photographs,</p> <ul style="list-style-type: none"> <li>behaviour training including bans on hunting, foraging, and trapping, national regulatory requirements, activities that should be observed in specific sections or periods/months to avoid or minimise the risk of disturbance, injury, or death of critically endangered and endangered, and protected wildlife species, and reporting and protection activities during chance encounter with specific mammals, reptile, amphibian, and bird species.</li> </ul>	Contractor	PMU, CSC, PMC
Social Impacts	Community health and safety	<p>General</p> <ul style="list-style-type: none"> <li>A <u>Community Health, Safety and Security Plan</u> will outline health and safety procedures for the protection of the local community. Procedures will include the prevention of unauthorised access to the construction sites, construction compounds and the construction workers' accommodation. The plan will also outline a health and safety campaign for the local communities, with measures to target the safety and risk education of children. The Community Health, Safety and Security Plan will cross reference the Air Quality Management Plan.</li> <li>An <u>Emergency Preparedness and Response Plan</u>, which will include the identification of risks, a process for responding to and recording incidents and accidents.</li> </ul> <p>Construction Traffic</p> <ul style="list-style-type: none"> <li>The Contractor shall provide information to the local communities about the scope and schedule of construction activities, expected disruption and access restrictions at least 24 hours before commencement. Construction</li> </ul>	Contractor	Supervision Consultant (Social safeguards expert), PMU

Subject	Potential Impact	Mitigation Measures	Institutional Responsibility	
			Implement	Monitoring
		<p>site access roads which are also used by local traffic shall include safe passing places every 200 m where the roads are narrow.</p> <ul style="list-style-type: none"> <li>• A CTMP will provide details of safety measures which will be put in place to reduce effects associated with construction traffic. The plan will cover both on-site and off-site traffic movements. The Plan shall identify traffic diversions and management provisions, traffic schedules, signalling modifications, necessary closures, signage, lighting, and other provisions to ensure that adequate and safe access for motorists and other road users along the Project alignment.</li> <li>• Exposure to Diseases and Health Infrastructure If left untreated, communicable diseases can lead to long-term health issues and therefore the impact can be characterised as being long-term and, in some instances, permanent.</li> <li>• The existing local health care facilities have limited capacity to respond to a significant increase in the transmission of communicable diseases. The following measures to mitigate potential negative impacts on community health shall be undertaken:</li> <li>• Preparing and implementation of the health and safety plan at camp site (focusing on construction workers) and local communities in the project area including the information and education campaign in the form of awareness raising seminars and meetings on sexually transmitted diseases and HIV/AIDS (human immunodeficiency virus / acquired immunodeficiency syndrome) and with disseminating relevant gender- sensitive publications and distribution materials as required under the civil works contract;</li> <li>• Consultations with local authorities, hospitals, and communities for identifying optimal solution in case of non-local workers' needs in using the local health infrastructure. The communication methods will be described via Community Relations Management Plan;</li> <li>• A Workforce Code of Conduct shall provide clauses including measures that target anti-social behaviour; and</li> <li>• Ensure appropriate and adequate health care services are provided on site and at workers camps to address/ manage worker illnesses and injuries.</li> </ul> <p>Security</p> <ul style="list-style-type: none"> <li>• Ensure that a Project Code of Conduct and appropriate training for any security personnel are implemented to ensure best practice in running a secure site and implementing the Code of Conduct that fosters behaviours that help to avoid, eliminate, or minimise the use of excessive force in potential conflict situation; and Ensure the implementation of a Community Health, Safety and Security Plan that outlines health and safety procedures for the protection of the local community.</li> </ul>		

Subject	Potential Impact	Mitigation Measures	Institutional Responsibility	
			Implement	Monitoring
		Procedures will include the prevention of unauthorised access to the construction sites		
	Operational Health and Safety (OHS) impacts caused by on site working conditions. Social issues between different levels of workers, gender issues, language issues and potentially disharmony with local workers as a result of labour influx.	<p>Implementation of an <u>Occupational Health and Safety Plan</u> (OHS) which will include:</p> <p>Adequate health care facilities (including first aid facilities) within construction sites;</p> <p>Safety Training Program. A Safety Training Program is required and should consist of:</p> <ul style="list-style-type: none"> <li>• Initial Safety Induction Course. All workers should be required to attend a safety induction course within their first week on Site. The induction OHS trainings are mandatory for new staff and visitors; and</li> <li>• Periodic Safety Training Courses. Period safety course should be conducted not less than once every six months. All Subcontractor employees will be required to participate in relevant training courses appropriate to the nature, scale and duration of the subcontract works. Training courses for all workers on the Site and at all levels of supervision and management.</li> <li>• Supplies of PPE need to be ensured by the employer and training on how to use PPE correctly must be provided.</li> <li>• Regular safety meetings will be conducted on a monthly basis and should require attendance by the safety representatives of Subcontractors unless otherwise agreed by the Contractors. The CSC will be notified of all safety meetings in advance. The CSC may attend in person or by representative at his discretion. The minutes of all safety meetings will be taken and sent to the PIU within seven days of the meeting.</li> <li>• Before new activities are commenced the Risk Assessment should be conducted including a thorough examination of the working site to identify situations,</li> <li>• processes, etc. that may cause harm, particularly to people. After identification is made, the probability and severity of the risks should be analysed and evaluated. Based on the evaluation actions necessary to eliminate the hazard or control the risk using the hierarchy of risk control methods should be identified.</li> <li>• Safety Inspections. The Contractor should regularly inspect, test and maintain all safety equipment, scaffolds, guardrails, working platforms, hoists, ladders and other means of access, lifting, lighting, signing and guarding equipment. Lights and signs should be kept clear of obstructions and legible to read. Equipment, which is damaged, dirty, incorrectly positioned or not in working order, should be repaired, or replaced immediately.</li> <li>• Clean drinking water should be provided to all workers; adequate protection</li> </ul>	Contractor	Supervision Consultant (Social safeguards expert), PMU

Subject	Potential Impact	Mitigation Measures	Institutional Responsibility	
			Implement	Monitoring
		<p>to the general public, including safety barriers and marking of hazardous areas.</p> <ul style="list-style-type: none"> <li>Put in place an effective anonymous grievance redress mechanism for workers to raise any concerns for resolution.</li> <li>Labour Employment and Working Condition Management Plan must provide protections and safeguards for children. Social Safeguard expert to be employed and on hand to resolve any issues. Guidance from the MDH on Social and HR Assessment will also provide guidelines.</li> <li>Labour Employment and Working Condition Management Plan must provide protections for people at risk of modern slavery. Social Safeguard expert to be employed and on hand to resolve any issues. There will also be Guidance from the MDH on Social and HR Assessment.</li> <li>OHS Plan to prevent sexual harassment and GBV. Social Safeguards expert on site to handle issues.</li> <li>Fair labour contracts and policies that do not discriminate against any individuals or groups.</li> <li>Ensure adequate security for all workers and especially women so that they can access the workplace safely and securely and prevent sexual harassment and GBV. Health and Safety MP, and Labour Employment and Working Conditions MP will be used, in conjunction with</li> <li>gender mainstreaming and GBV prevention action plans from the Gender and GBV Assessment Report.</li> </ul> <p>The Contractor will be responsible for preparation of an Emergency Preparedness Response Plan (ERP) as part of the SSEMP and which will include sections relating to:</p> <ul style="list-style-type: none"> <li>Containment of hazardous materials;</li> <li>Oil and fuel spills;</li> <li>Fire and explosions;</li> <li>Work-site accidents;</li> <li>Earthquake hazards; and</li> <li>Emergency Response any global health issues.</li> <li>A Construction Camp Management Plan (see Construction Camps below) to be developed to ensure all workers coming from outside the community must be given safe, secure, clean accommodation and that there is enough space, access to water, sanitation, food, clothes, washing facilities etc., and have transport to the workplace as well as medical facilities. A detailed assessment of the impacts of proposed arrangements for worker accommodation in dedicated camps should be conducted, and options selected to ensure</li> </ul>		

Subject	Potential Impact	Mitigation Measures	Institutional Responsibility	
			Implement	Monitoring
		minimum strain on local facilities and reduced community disturbance		
	Construction Camps	<p>A Construction Camp Management Plan (CCMP) will be developed. Prior to the start of site works, an Environmental and Social Screening of potential camp locations will be undertaken to identify any sensitive environmental and social receptors and to ensure the camps are of sufficient distance from villages and local communities but are able to access the required utilities and services.</p> <p>Consultation with local communities organised and implemented by a Contractor before the construction camp is developed is required, covering:</p> <ul style="list-style-type: none"> <li>• Location of camps over one kilometre from any residential area and at least 50 m from any surface watercourse and not within 2 km of a protected area – any deviation from these separation distance must be supported by sufficient justification and additional mitigation measures, and the location and mitigations must be approved;</li> <li>• Coordination of all construction camp activities with neighbouring land uses;</li> <li>• Confirmation as to whether workers can be accompanied by families or whether rosters will enable locally engaged workers to go home daily or not;</li> <li>• The construction camps will be staffed and equipped with Accident &amp; Emergency/medical emergency facilities for all workers, to avoid straining the available health facilities that serve local communities;</li> <li>• The Contractor will be responsible for maintenance and clean-up of campsites and respecting the rights of local land users;</li> <li>• The plan will cover camp sites as well as any sites considered as associated facilities;</li> <li>• The plan will set out best practice measures, with a particular focus on the prevention of gender-based violence and the promotion of a gender-sensitive working environment; and</li> </ul> <p>The construction camp shall be placed in compliance with all applicable national requirements and permits (e.g., environmental, water supply, wastewater discharge, electricity, access roads etc.).</p>	Contractor	Supervision Consultant (Social safeguards expert), PMO
Cumulative Impacts	Project construction activities in combination with the works related to other Projects in the vicinity will have a cumulative impact on the environment	<ul style="list-style-type: none"> <li>• The Construction Contractor shall coordinate the construction activities with the operators of the infrastructures, crossed by the road to avoid simultaneous road construction and planned repairs of the existing in one and the same Project area. In case it is not possible to avoid such cases, the cumulative impacts shall be assessed, and mitigation measures proposed as appropriate prior to commencement of the works; and</li> </ul> <p>The Construction Contractors of the sister projects shall coordinate the construction works at the common Aol to minimize the impacts on environment and to ensure better health and safety conditions.</p>	Contractor	PMU, CSC, PMC

Subject	Potential Impact	Mitigation Measures	Institutional Responsibility	
			Implement	Monitoring
Operation Phase				
Climate Change	Increased hot days and heatwaves, drought conditions and wildfires also influence road integrity	As with increased hot days and heatwaves, drought conditions and wildfires also influence road integrity, therefore requiring additional maintenance budget to be considered. The additional maintenance budget will ensure that any damage to the road can be repaired, resulting in an overall Low risk after mitigation.	PMU	EA
Groundwater Quality	Reductions in water quality through alteration to river flow rates and contamination.	The operating authority of the road should develop an oil spill contingency plan to provide emergency response in the event of the road crash related loss of containment on the road.	PMU	EA
Waste	Improper handling and disposal of non-hazardous and hazardous solid and food waste.	Handling, treatment and disposal of waste in accordance with the Uzbekistan legislation. Hazardous and non-hazardous waste storage, collection and treatment/disposal methods should be identified and permanently controlled by the state authorities.	PMU	EA

**Appendix 11: Critical Habitat Assessment : Tashkent Rural Roads**

**Critical Habitat Assessment:  
Tashkent Rural Roads**

June 2025

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**Disclaimer**

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**ABBREVIATIONS**

ADB	Asian Development Bank
AOI	Area of Influence
CHA	Critical Habitat Assessment
CR	Critically Endangered
DD	Data Deficient
DOPA	Digital Observatory for Protected Areas
EAAA	Ecologically Appropriate Area of Analysis
EMP	Environmental Management Plan
EN	Endangered
EOO	Extent of Occurrence
EW	Extinct in the Wild
EX	Extinct
GN6	Guidance Note 6
IBA	Important Bird Area
IBAT	Integrated Biodiversity Assessment Tool
IEE	Initial Environmental Examination
IFC	International Finance Corporation
IUCN	International Union for Conservation of Nature
KBA	Key Biodiversity Area
LC	Least Concern
NE	Not Evaluated
NT	Near Threatened
RRS	Rural Roads Strategy 2035
SPS	Safeguard Policy Statement (2009)
VU	Vulnerable

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**EXECUTIVE SUMMARY**

This Critical Habitat Assessment (CHA) has been prepared as part of the Initial Environmental Examination (IEE) for the Asian Development Bank (ADB) in its capacity as the prospective financier of the Rural Roads Resilience Sector Project in Tashkent Province, Uzbekistan. The assessment has been undertaken to ensure compliance with the ADB Safeguard Policy Statement (SPS, 2009) and the associated biodiversity assessment criteria outlined in the International Finance Corporation (IFC) Guidance Note 6 (GN6).

Under ADB SPS, critical habitat refers to a defined subset of both natural and modified habitats that possess exceptionally high biodiversity value, warranting specific consideration during project planning and implementation.

An internationally recognized screening and assessment process was applied, starting with the compilation of a preliminary longlist of candidate species and biodiversity features. These were identified as potentially occurring within a 50-kilometer radius of the proposed road alignment based on secondary data, species databases, and expert input.

An initial screening process was then used to eliminate species and features that were unlikely to meet the ADB SPS critical habitat requirements or the IFC GN6 quantitative thresholds. The remaining shortlisted species underwent detailed quantitative evaluation, including assessment of their conservation status, population significance, and likelihood of regular occurrence within the Project Area of Influence (Aoi)—defined for ecological receptors as a 1-kilometer corridor (500 meters on either side of the proposed road alignments).

The CHA also confirmed that no nationally or internationally protected areas are located within the Aoi. As such, the focus of the analysis was directed towards the presence and conservation significance of Critically Endangered (CR), Endangered (EN), and Vulnerable (VU) species, in accordance with the applicable critical habitat criteria.

The Critical Habitat Assessment (CHA) concludes that no species or biodiversity features trigger critical habitat under the criteria set forth by the Asian Development Bank Safeguard Policy Statement (ADB SPS, 2009) and the International Finance Corporation Guidance Note 6 (IFC GN6).

However, the assessment identified a number of Endangered (EN) bird species that, while not meeting the thresholds required to trigger critical habitat designation, may nonetheless be present within or near the Project Area of Influence (Aoi). These species are recognized to be highly susceptible to disturbances caused by construction activities, including habitat alteration, noise, and vibrations.

Species of concern include the following:

- i. Egyptian vulture (*Neophron percnopterus*) – Endangered (EN)
- ii. Pallas’s fish-eagle (*Haliaeetus leucoryphus*) – Endangered (EN)
- iii. Saker falcon (*Falco cherrug*) – Endangered (EN)

These species are undergoing global population declines and are known to utilize habitats similar to those present within the Aoi. While site-specific observational data is limited, the CHA acknowledges that these species may occur in ecologically significant numbers, although available evidence does not demonstrate that their presence would exceed IFC GN6 critical habitat thresholds.

In accordance with the mitigation hierarchy (avoid, minimize, restore, offset), the following mitigation measures are recommended to minimize potential impacts on these species:

- i. Schedule construction works outside the recognized bird breeding season and periods of

- 
- migratory bird presence in the Project region.
- ii. Where this is not feasible, conduct pre-construction nesting bird surveys within the Aol to identify active nests in suitable habitat, including vegetation targeted for clearing.
  - iii. Apply avoidance buffers and activity restrictions around confirmed nesting sites, as required.

Full specifications for these and other biodiversity safeguards are provided in the Initial Environmental Examination (IEE) and its accompanying Environmental Management Plan (EMP), which form part of the Project's environmental compliance framework.

## **1. Introduction**

### **1.1. Project Description**

#### **1.1.1 Project Background**

1. The Government of Uzbekistan, in collaboration with the Asian Development Bank (ADB), is undertaking the Rural Roads Resilience Sector Project to upgrade and rehabilitate approximately 700 kilometers of rural road infrastructure across twelve administrative regions, including the Republic of Karakalpakstan. The project, financed under a sector loan modality approved on 11 December 2023, comprises a total investment of USD 298.8 million, of which USD 240 million is financed by ADB. The overarching objective is to enhance rural accessibility, strengthen climate resilience of transport infrastructure, and promote sustainable regional development through strategic road network improvements.

2. The engineering implementation framework is structured around five procurement packages covering the full project scope of 700 kilometers. Each package consists of discrete subprojects, which are further divided into individual lots to facilitate efficient contract management and phased execution. This modular approach supports flexibility in tendering and ensures timely delivery of civil works. The second and third batches of subprojects—comprising the remaining road segments—will be subject to detailed engineering due diligence and environmental/social safeguards appraisal, with all preparatory activities financed directly through the ADB loan to maintain procedural and technical consistency.

3. The design and construction of the upgraded rural roads are intended to meet international standards for safety, serviceability, and climate resilience. These all-weather roads will significantly improve access to economic, educational, healthcare, and administrative facilities, thereby enhancing socio-economic integration in rural regions. From a technical perspective, the project aims to institutionalize improved methodologies for rural road planning, geometric and pavement design, drainage management, and asset preservation. Targeted capacity development interventions will support national and subnational agencies in adopting modern engineering practices aligned with climate adaptation and road safety principles.

4. The institutional framework for project delivery is led by the Committee for Roads (CR) under the Ministry of Transport, serving as the Executing Agency (EA), with the Avtoyninvest Agency (AA) operating as the Implementing Agency (IA). A dedicated Project Management Unit (PMU) within the AA is responsible for overseeing all aspects of implementation, including the preparation of feasibility studies, procurement administration, environmental and social safeguards compliance, contract supervision, and quality assurance during civil works execution and subsequent performance-based maintenance. The PMU's centralized oversight ensures adherence to both ADB requirements and national engineering regulations.

5. To support the technical preparation of the second and third subproject batches—encompassing approximately 550 kilometers of rural roads outside the Jizzakh and Syrdarya regions—the PMU will engage an international consulting firm or Subproject Preparation Consultant (SPC) through competitive selection. The SPC will be tasked with conducting road condition assessments, engineering surveys, environmental and social screening, and preliminary/detailed design development. In line with ADB's Safeguard Policy Statement (2009), road sections anticipated to trigger Category A environmental impacts or Category A/B involuntary resettlement impacts will be excluded from the scope, thereby ensuring full compliance with environmental and social safeguard criteria during the planning and design stages

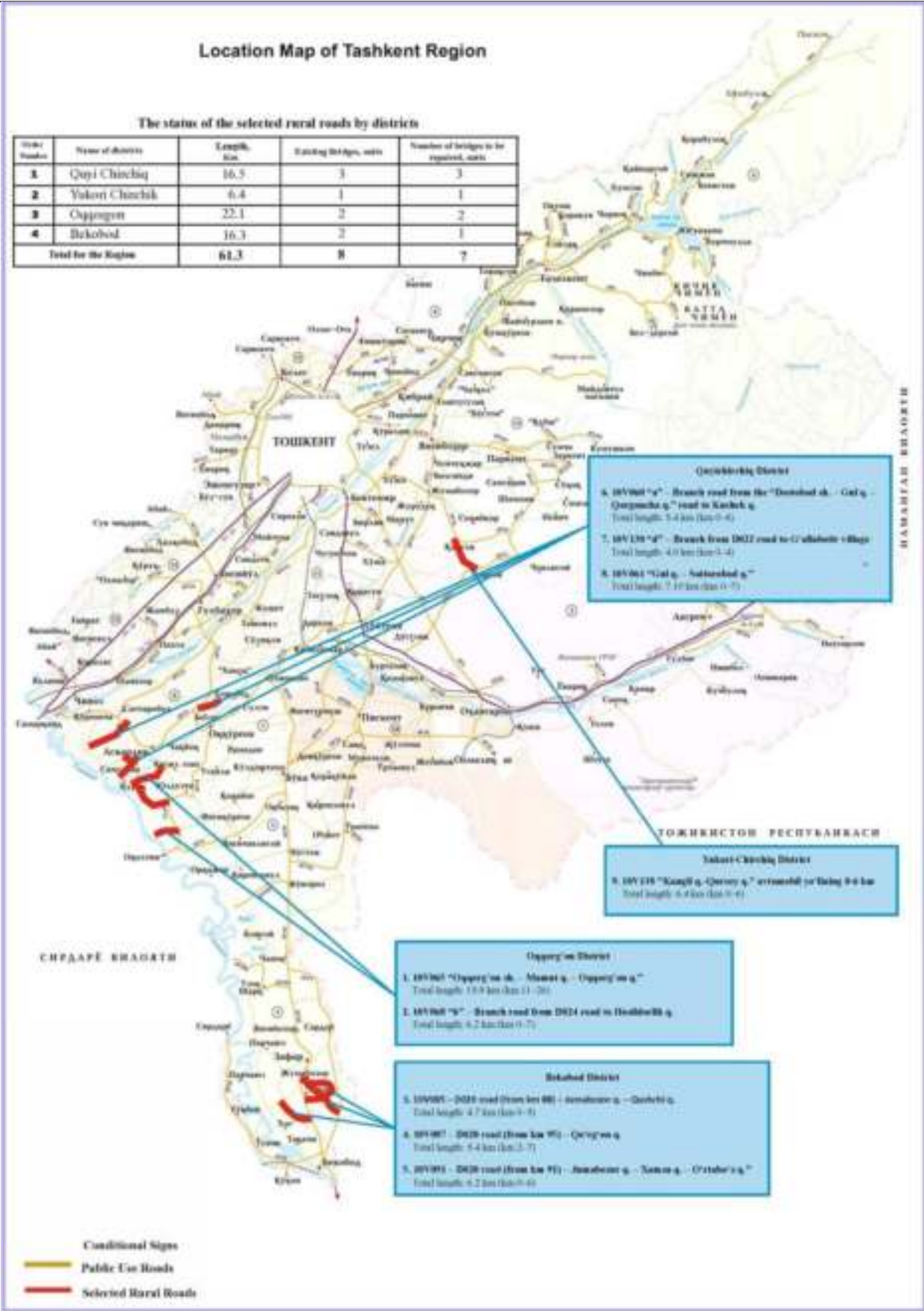


Figure 1: Layout of the Tashkent Project road routes, including reference names for each route start and end points

## 1.2. Purpose of this Critical Habitat Assessment

6. This report presents the findings of the Critical Habitat Assessment (CHA) conducted for the proposed Rural Roads Resilience Sector Project in Tashkent Province. The assessment has been undertaken as an integral component of the Initial Environmental Examination (IEE) in accordance with ADB safeguards requirements. The Area of Influence (AoI) for ecological receptors was delineated as a 1-kilometer-wide corridor, extending 500 meters on either side of the proposed road alignments. The assessment methodology was primarily desk-based and incorporated a comprehensive review of internationally recognized biodiversity datasets, including the Integrated Biodiversity Assessment Tool (IBAT), the IUCN Red List, peer-reviewed scientific literature, expert consultation, and other validated secondary sources.

7. The CHA has been developed in full compliance with the Asian Development Bank (ADB) Safeguard Policy Statement (2009), specifically addressing the requirements pertaining to critical habitat identification and management. Additionally, the assessment adopted relevant thresholds and methodological approaches outlined in the International Finance Corporation's Guidance Note 6 (GN6), which supplements and enhances the application of ADB safeguard standards in determining critical habitat.

8. The primary objective of the CHA was to establish whether the proposed Project meets the criteria for critical habitat designation and to identify specific species and/or biodiversity attributes that may trigger critical habitat classification. A structured screening process was applied to eliminate low-probability triggers and focus the assessment on ecological features with a credible likelihood of meeting critical habitat thresholds. Based on the findings, the assessment concludes that the Project area does not intersect with or impact any designated critical habitats.

9. The analysis was evidence-based and targeted key biodiversity components with conservation relevance, applying internationally accepted criteria to evaluate habitat quality, species viability, and ecosystem vulnerability. Species-specific evaluations were conducted where applicable, and geographic distribution data were analyzed in conjunction with habitat fragmentation and ecological integrity considerations. Where data gaps were identified, precautionary principles and expert judgment were applied to ensure robust and conservative conclusions.

10. Overall, the CHA supports the determination that the Project's footprint does not encroach upon critical habitats as defined under ADB SPS and IFC GN6. Accordingly, no additional critical habitat mitigation measures are warranted beyond the general biodiversity management actions already integrated into the IEE. This conclusion provides a basis for advancing project design and implementation while maintaining alignment with international biodiversity safeguard standards.

## 1.3. Methodology

11. The Critical Habitat Assessment (CHA) was executed using a structured, multi-stage methodology, fully aligned with the Asian Development Bank (ADB) Safeguard Policy Statement (SPS, 2009) and the International Finance Corporation (IFC) Guidance Note 6 (GN6).

- i. The process commenced with a Project Area Search, during which the Integrated Biodiversity Assessment Tool (IBAT) was employed to identify species and biodiversity features potentially occurring within a 50-kilometer radius of the proposed road alignment.
- ii. An Initial Screening followed, wherein the identified species and ecological attributes were assessed based on their conservation status and ecological characteristics. These included habitat preferences, mobility, migratory behavior, range, and breeding requirements. The likelihood of occurrence within the defined Area of Influence (AoI)—established as a 500-meter buffer on either side of the road alignment—was evaluated accordingly.
- iii. During the Scoping Phase, each relevant species and biodiversity feature was assessed against the seven critical habitat criteria stipulated under the ADB SPS and further supported by IFC GN6 threshold guidance. This stage aimed to determine potential triggers for critical habitat classification.

- iv. A Site Visit was conducted in April 2025 to ground-truth the desktop findings through direct ecological and physical observations along the proposed alignment.
- v. The final stage involved Full Screening, wherein species or features were screened in or out based on their alignment with critical habitat criteria. Detailed justifications were provided for each decision. For selected species, an Ecologically Appropriate Area of Analysis (EAAA) was delineated to assess the significance of the local population relative to the species' global distribution.
- vi. In cases where quantitative data on local populations were not available, surrogate indicators—such as the comparison between local area of occupancy and global extent of occurrence—were applied to ensure a conservative and scientifically credible determination.
- vii. Final Stage: At the final stage of the CHA, it is determined whether any species and/or biodiversity features have triggered critical habitat for the Project. Any recommendations for subsequent assessments, mitigation, or further data collection will be included in the report, as appropriate.

## 2. Data Collection and Consultation

12. A comprehensive desk-based review was undertaken to identify species, habitats, and biodiversity features—along with protected and designated ecological sites—within the Project area that may potentially meet the critical habitat criteria under ADB SPS (2009) and IFC GN6. The assessment applied a precautionary approach and utilized a wide range of globally recognized databases and tools. The following resources were systematically reviewed:

- i. Project Field Visit Report (April 2025) – Provided contextual field-level observations to complement secondary data.
- ii. Integrated Biodiversity Assessment Tool (IBAT) – Configured to identify all species, protected areas, and designated ecological sites within a 50-kilometer radius of the Project alignment (totaling a 100 km-wide corridor). IBAT consolidates data from key conservation databases including the IUCN Red List, Alliance for Zero Extinction (AZE), BirdLife International's Important Bird Areas (IBA), and Key Biodiversity Areas (KBA).
- iii. IUCN Red List of Threatened Species – Used to determine species' conservation status and evaluate extinction risk.
- iv. Global Biodiversity Information Facility (GBIF) – Sourced to provide occurrence records and species distribution data.
- v. Alliance for Zero Extinction Sites – Utilized to screen for single-site endemics at imminent risk of extinction.
- vi. EDGE of Existence Programme – Used to identify Evolutionarily Distinct and Globally Endangered species.
- vii. eBird Database – Consulted to obtain avifaunal occurrence data, particularly migratory patterns and site-specific bird records.
- viii. Important Plant Areas (IPA) – Used to screen the presence of botanically significant locations.
- ix. Digital Observatory for Protected Areas (DOPA) Explorer – Referenced to cross-check protected site boundaries and ecological designations.
- x. One Earth Database – Employed to verify the location and ecological characteristics of the Alai–Western Tian Shan Steppe bioregion. This source provided habitat uniqueness information and identified species likely to utilize the area, facilitating the screening of potential critical habitat triggers.

13. The integration of these sources ensured a robust and evidence-based preliminary identification of biodiversity features that could potentially meet critical habitat thresholds, forming the basis for further scoping and screening

14. The biodiversity baseline established through international databases was further substantiated using field survey data, additional desk-based analyses, and data gathered during the preparation of the Initial Environmental Examination (IEE). This included the identification of species within locally

designated conservation areas. Verification and expansion of the desktop data were achieved through a comprehensive scientific literature review and consultations with subject matter experts on local fauna and flora.

15. A Project Field Visit was conducted between April 2025. During this survey, various species were observed in the vicinity of human settlements. These included synanthropic rodent species such as the brown rat (*Rattus norvegicus*) and house mouse (*Mus musculus*), which commonly inhabit areas adjacent to human dwellings. Domestic animals were also recorded, including cats, dogs, donkeys, horses, and both small and large livestock species.

16. Herpetofauna documented during the site visit included several reptilian and amphibian species. Notable reptile observations comprised the gray gecko (*Sphaerodactylus cinereus*), typically found near buildings and within grassy vegetation, as well as aquatic and semi-aquatic species such as water snakes and grass snakes, observed near water sources and natural ravines. Amphibian presence on site was confirmed through the identification of frogs and toads, indicating the availability of freshwater microhabitats.

17. The ichthyofaunal composition within collector water bodies of the Project area was also recorded. Representative fish species included *Gambusia* spp., common gudgeon (*Gobio gobio*), mustard char (*Nemacheilus malapterurus*), rudd (*Scardinius erythrophthalmus*), common carp, and snakeheads (*Channa argus*). These findings are further detailed in the annexes of the Project IEE, which includes a comprehensive inventory of observed aquatic species and their associated habitats.

18. The conservation status of all identified species was cross-referenced with the IUCN Red List to determine their global threat classification. The Red List categories observed among the recorded species include:

- i. Not Evaluated (NE) – Species that have not yet been assessed against the IUCN criteria.
- ii. Data Deficient (DD) – Species for which there is insufficient information to make a direct or indirect assessment of extinction risk.
- iii. Least Concern (LC) – Species assessed to be at low risk of extinction and generally widespread and abundant.
- iv. Near Threatened (NT) – Species close to qualifying for or likely to qualify for a threatened category in the near future.
- v. Vulnerable (VU) – Species considered to be facing a high risk of extinction in the wild.
- vi. Endangered (EN) – Species facing a very high risk of extinction in the wild.
- vii. Critically Endangered (CR) – Species facing an extremely high risk of extinction in the wild.
- viii. Extinct in the Wild (EW) – Species known only to survive in cultivation, captivity, or as a naturalized population outside its historical range.
- ix. Extinct (EX) – Species for which there is no reasonable doubt that the last individual has died.

19. All species recorded during the field assessment were screened against the above categories to determine their relevance to the Critical Habitat Assessment (CHA), and to support a precautionary approach in accordance with ADB's Safeguard Policy Statement (2009)

### 3. Critical Habitat Requirements

20. The Asian Development Bank (ADB) Safeguard Policy Statement (SPS, 2009) defines critical habitat as a subset of natural and/or modified habitats that possesses high biodiversity value and warrants particular conservation attention due to its ecological, biological, or cultural importance. The identification of critical habitat is guided by seven internationally recognized criteria, which are designed to encompass a broad range of biodiversity values. These criteria are as follows:

- i. Habitat essential for the survival of Critically Endangered (CR) or Endangered (EN) species – These areas provide the minimum ecological requirements necessary to sustain populations of globally threatened species.

- ii. Areas of special significance for endemic or restricted-range species – These habitats support species with narrow geographic distributions, making them highly vulnerable to habitat disturbance or loss.
- iii. Sites critical for the survival of migratory species – These include breeding, staging, wintering, or migratory corridors necessary to complete the life cycle of migratory fauna.
- iv. Areas supporting globally significant concentrations or numbers of individuals of congregatory species – These include roosting, breeding, feeding, or overwintering sites regularly used by large aggregations of species.
- v. Areas with unique assemblages of species or associated with key evolutionary processes or ecosystem services – These areas may exhibit high species diversity, contain relict populations, or perform critical ecological functions such as water filtration, pollination, or carbon storage.
- vi. Areas of biodiversity with significant social, economic, or cultural value to local communities – These include traditional use areas, sacred natural sites, and locations with community-conserved biodiversity values.
- vii. Legally protected areas or sites proposed for protection – This includes areas designated or proposed under national legislation or international conventions, such as those recognized by the International Union for Conservation of Nature (IUCN), the Ramsar Convention on Wetlands of International Importance, and the UNESCO World Natural Heritage List.

21. The application of these criteria provides the basis for determining whether a project site intersects with or influences critical habitat, and thus whether additional mitigation, avoidance, or offset measures are required to achieve compliance with ADB's biodiversity safeguards.

22. To support the determination of whether critical habitat is present within the Project's Area of Influence (AoI), the Critical Habitat Assessment (CHA) adopts the analytical framework and threshold values outlined in the International Finance Corporation's Guidance Note 6 (IFC GN6). IFC GN6 provides quantifiable, species-specific thresholds that correspond to the critical habitat criteria established under the Asian Development Bank (ADB) Safeguard Policy Statement (SPS, 2009). These thresholds are derived from globally accepted benchmarks, notably those set out in the International Union for Conservation of Nature (IUCN)'s publications, including A Global Standard for the Identification of Key Biodiversity Areas and the Red List Categories and Criteria.

23. The IFC GN6 thresholds serve as indicative guidelines and are not intended to function as a rigid or prescriptive formula. Rather, they provide a scientifically credible foundation to inform expert judgment and support precautionary decision-making during the critical habitat screening and assessment process. It is important to note that while these thresholds enhance the objectivity of the assessment, the determination of critical habitat requires context-specific interpretation, particularly in cases where data limitations exist or surrogate indicators must be employed. The specific IFC GN6 thresholds relevant to each of the ADB's seven critical habitat criteria are presented under the corresponding subheadings in Section 5 of this report.

#### **4. Biodiversity Context**

24. The landscape traversed by the project alignment is predominantly flat and characterized by intensive agricultural land use. The area also features several hydrological elements, including water reservoirs, irrigation canal networks, and the Syrdarya River and Angren situated to the east of the alignment.

25. According to data provided by the United Nations Environment Programme (UNEP), the entire Area of Influence (AoI) of the Project lies within modified or likely modified habitat. The United Nations Biodiversity Lab further classifies the regional land use composition as a mosaic of rainfed cropland, irrigated cropland, impervious urban surfaces, and bare land, indicative of anthropogenically influenced landscapes with limited presence of intact natural habitats.

26. The region forms part of the Western Tien Shan, a recognized biodiversity hotspot, hosting a diverse range of vertebrate fauna. Based on data from the UNESCO Western Tien Shan datasheet, the

region supports:

- i. 61 species of mammals
- ii. 316 species of birds
- iii. 17 species of reptiles
- iv. 3 species of amphibians
- v. Over 20 species of fish

27. The Tashkent region is home to a diverse fauna of vertebrates. Among them are mammals such as wolves, foxes, hares, hedgehogs, jerboas, and various rodents, as well as a variety of birds and reptiles, including snakes and lizards.

28. These figures reflect the ecological richness of the region, with most of the species noted as occurring within the broader Western Tien Shan area. The region is of international conservation importance due to the occurrence of several globally threatened species. Notable avian species identified in UNESCO’s nomination documentation include:

- i. Eastern imperial eagle (*Aquila heliaca*) – Vulnerable (VU)
- ii. Great bustard (*Otis tarda*) – Vulnerable (VU)
- iii. Pale-backed pigeon (*Columba eversmanni*) – Vulnerable (VU)
- iv. Saker falcon (*Falco cherrug*) – Endangered (EN)
- v. Egyptian vulture (*Neophron percnopterus*) – Endangered (EN)

29. Threatened mammalian species within this ecoregion include:

- i. Dhole (*Cuon alpinus*) – Endangered (EN)
- ii. Menzbier’s marmot (*Marmota menzbieri*) – Vulnerable (VU)
- iii. Snow leopard (*Panthera uncia*) – Endangered (EN)
- iv. European marbled polecat (*Vormela peregusna*) – Vulnerable (VU)

30. The presence of these species underscores the ecological value of the region and highlights the need for biodiversity-sensitive planning and mitigation during project implementation, particularly in relation to critical habitat screening and conservation management.

#### 4.1 Location Context and Habitats

31. The physical environment of Uzbekistan is characterized by considerable geographical variation. While the majority of the national territory consists of arid and semi-arid plains and desert landscapes, the eastern part of the country—including the Tashkent Region—features foothills and mountainous zones associated with the western spurs of the Tian Shan mountain system. Elevations in the region vary from lowland plains to upland ridges exceeding 2,500 meters above sea level (ASL). The area forms a transitional ecological and climatic boundary between the steppe-desert lowlands and the mountainous ecosystems extending toward Kyrgyzstan and Kazakhstan.

32. The Tashkent Region is situated in the northeastern part of Uzbekistan and borders Kazakhstan to the north and east. The project area lies between the Chatkal Ridge and the Kuramin Mountains, near river systems such as the Chirchik and Akhangaran. The western boundary of the region opens into the Mirzachul Steppe (formerly the Hungry Steppe). The regional topography and location allow for the mixing of continental and montane climatic influences, resulting in cold winters and hot, dry summers with moderate annual precipitation concentrated in spring.

33. The region’s land use is predominantly agricultural, with irrigated cropland and orchards occupying extensive tracts in the valleys and foothills. In the Tashkent Region, approximately 256,000 hectares are dedicated to cultivation, with key crops including cotton, cereals, vegetables, and fruit trees. Irrigation is supported by a network of canals derived from the Chirchik and Akhangaran Rivers, which are fed by mountain snowmelt.

34. Natural forest cover is limited in the project area, with most woody vegetation found in field-protective shelterbelts and riparian buffer zones. These plantations are dominated by species such as black poplar (*Populus nigra*), which is commonly used for erosion control and windbreaks along rural roads and agricultural fields.

35. In addition to agroforestry and shelterbelt plantings, urban and peri-urban green infrastructure contributes to the region's landscape diversity. Parks, cemeteries, and residential zones feature ornamental species including maple (*Acer* spp.), plane trees (*Platanus* spp.), elm (*Ulmus* spp.), willow (*Salix* spp.), and mulberry (*Morus* spp.). These elements serve both aesthetic and ecological functions, enhancing urban microclimates, providing habitat for local fauna, and supporting biodiversity in semi-natural environments

## 4.2 Species Present

36. The physical environment of Uzbekistan is characterized by considerable geographical variation. While the majority of the national territory consists of arid and semi-arid plains and desert landscapes, the eastern part of the country—including the Tashkent Region—features foothills and mountainous zones associated with the western spurs of the Tian Shan mountain system. Elevations in the region vary from lowland plains to upland ridges exceeding 2,500 meters above sea level (ASL). The area forms a transitional ecological and climatic boundary between the steppe-desert lowlands and the mountainous ecosystems extending toward Kyrgyzstan and Kazakhstan.

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Table 1: Summary of species present within 50 km of the Project Aol

Group	Critically Endangered (CR)	Endangered (EN)	Vulnerable (VU)	Near Threatened (NT), Least Concern (LC), Data Deficient	Total
Fish	2 (e.g., <i>P. fedtschenkoi</i> , <i>P. hermanni</i> )	1 (e.g., <i>A. esocinus</i> )	2 (e.g., <i>L. capito</i> , <i>L. brachycephalus</i> )	–	5
Birds	1 (e.g., <i>V. gregarius</i> )	5 (e.g., <i>H. leucoryphus</i> , <i>F. cherrug</i> )	5 (e.g., <i>A. ferina</i> , <i>C. macqueenii</i> )	2 (e.g., <i>C. capoeta</i> )	13
Mammals	–	–	1 (e.g., <i>Vormela</i> )	–	1

			peregusna)		
Plants	1 (e.g., <i>Parrya tojibaevii</i> )	–	2 (e.g., <i>Tulipa affinis</i> , <i>T. micheliana</i> )	2 (e.g., <i>Tulipa greigii</i> , <i>Salvia korolkowii</i> )	5
Invertebrates	–	–	1 (e.g., <i>Onychogomphus flexuosus</i> )	–	1
<b>Total</b>					<b>25</b>

Table 2: Species with potential to trigger critical habitat under ADB SPS Requirements

Common Name	Scientific Name	IUCN Status
Syr Darya Shovelnose Sturgeon	<i>Pseudoscaphirhynchus fedtschenkoi</i>	CR (Possibly Extinct)
Dwarf Sturgeon	<i>Pseudoscaphirhynchus hermanni</i>	CR
Sociable Lapwing	<i>Vanellus gregarius</i>	CR
White-headed Duck	<i>Oxyura leucocephala</i>	EN
Pallas's Fish Eagle	<i>Haliaeetus leucoryphus</i>	EN
Egyptian Vulture	<i>Neophron percnopterus</i>	EN
Saker Falcon	<i>Falco cherrug</i>	EN
Steppe Eagle	<i>Aquila nipalensis</i>	EN
Asian Houbara	<i>Chlamydotis macqueenii</i>	VU
Marbled Polecat	<i>Vormela peregusna</i>	VU
Common Pochard	<i>Aythya ferina</i>	VU
<i>Tulipa affinis</i> (wild tulip)	<i>Tulipa affinis</i>	VU
<i>Parrya tojibaevii</i>	<i>Parrya tojibaevii</i>	CR

### 4.3 Protected and Designated Areas

41. IBAT data on eight protected and designated areas within 50 km of the borders of the Tashkent region (Table 3). These biodiversity features were evaluated in accordance with Requirement 7 of the ADB SPS to determine whether a critical habitat is involved in the Aol project.

Table 3: Legally protected and Designated areas located within 50 km of the proposed sites

Name of Protected Area	Approximate Distance from Project	Designation / Protection Status	Remarks
Chatkal Biosphere Reserve	Approx. 45–50 km northeast	UNESCO Biosphere Reserve, National Protected Area	High-altitude ecosystems; rich in bird and mammal diversity
Ugam-Chatkal National Park	Approx. 40–50 km north	National Park (IUCN Category II)	Covers Ugam River basin and Chatkal Mountains
Charvak Reservoir & Buffer Zone	Approx. 40–50 km northeast	Water Resource Management Area, Limited Protection Zone	Important fish and waterbird habitat
Zaamin National Park	Approx. 50 km southeast (Jizzakh Region)	National Park	Protects Syrdarya ecosystems and mountain forests; partially outside Aol
Aksu-Jabagly Nature Reserve (Kazakhstan border)	Approx. 50 km north	Strict Nature Reserve (IUCN Category Ia)	Transboundary area with ecological relevance to the region

Note: No specially protected areas have been found on the road construction sites in the Tashkent region in this Project

## 5. Critical Habitat

42. Out of the total 25 species identified within the 50-kilometer search radius surrounding the

proposed Project alignment, a subset of 6 species was determined to have the potential to meet the critical habitat criteria as defined under the Asian Development Bank (ADB) Safeguard Policy Statement (SPS, 2009). These species were shortlisted based on their conservation status, ecological characteristics, and likelihood of regular occurrence within the Project's Area of Influence (AoI), and were subject to further screening under the CHA methodology, as detailed in subsequent sections of this report. However, no critical habitats were ultimately identified among the full list of 25 species, as confirmed by the CHA results described below.

43. In accordance with the prescribed methodology for Critical Habitat Assessment (CHA), a detailed evaluation was conducted for all species and biodiversity features previously identified through the screening process.

44. The assessment concluded that none of the evaluated species or biodiversity features meet any of the critical habitat criteria defined under the Asian Development Bank (ADB) Safeguard Policy Statement (SPS, 2009). As such, no critical habitat is triggered within the Project's Area of Influence (AoI).

45. The species-specific and biodiversity feature-specific analysis, including justification for inclusion or exclusion under each ADB SPS requirement, is provided in the following appendices:

- i. Appendix A: ADB SPS Requirement 1 – Critically Endangered and Endangered Species
- ii. Appendix B: ADB SPS Requirement 2 – Endemic and Restricted-Range Species
- iii. Appendix C: Other biodiversity features assessed under remaining ADB SPS Requirements (3–7)

46. These appendices provide a transparent and evidence-based rationale supporting the conclusion that the Project area does not intersect with or impact any defined critical habitat

## **5.1 Critical Habitat Requirement 1 – Critically Endangered and Endangered Species**

47. ADB SPS Requirement 1 defines critical habitat as areas essential for the survival of species listed as Critically Endangered (CR), Endangered (EN), and Vulnerable (VU) under the IUCN Red List of Threatened Species. To operationalize this requirement, the International Finance Corporation (IFC) Guidance Note 6 (GN6) provides further quantitative thresholds, which were adopted in this assessment to enhance the rigor and consistency of species evaluation. The applicable IFC GN6 criteria are as follows:

- i. Areas that support globally important concentrations of an IUCN Red-listed CR or EN species, defined as supporting  $\geq 0.5\%$  of the global population and  $\geq 5$  reproductive units of the species.
- ii. Areas that support globally important concentrations of a VU species, the loss of which would result in a change of its IUCN Red List status to EN or CR, and which also meet the criteria outlined in GN6 paragraph 72(a).
- iii. Where relevant, areas containing significant populations of nationally or regionally listed CR or EN species, depending on ecological context and species distribution.

48. Based on IBAT outputs and supplementary desk-based biodiversity research, a total of 26 globally listed CR, EN, or VU species were identified as potentially occurring within a 50-kilometer radius of the Project's Area of Influence (AoI). All 26 species underwent detailed species-specific assessment in accordance with the CHA methodology, focusing on their global population distribution, likelihood of regular occurrence, and alignment with IFC GN6 quantitative thresholds. The results and justifications for each species assessment under Requirement 1 are provided in Appendix A, which includes species-specific findings, population relevance, and critical habitat determination outcomes

49. Following the detailed assessment of 26 species identified as potentially occurring within the Project's Area of Influence (AoI), it was determined that none of these species meet the thresholds necessary to trigger critical habitat under ADB SPS Requirement 1. Although no critical habitat has been

triggered under this requirement, it is acknowledged that several of the assessed species are globally threatened. As such, the Project must adopt appropriate biodiversity management measures to ensure that its implementation does not contribute to further population declines. In alignment with the ADB's commitment to achieving no net loss of biodiversity, specific mitigation actions will be implemented.

50. Key mitigation measures include:

- i. Scheduling of construction works likely to disturb avifauna outside of the recognized bird breeding season and periods of migratory activity;
- ii. Pre-construction nesting bird surveys in cases where works cannot be scheduled outside sensitive periods, particularly for vegetation clearing or habitat disturbance within the AoI;
- iii. Implementation of the Environmental Management Plan (EMP) developed as part of the Initial Environmental Examination (IEE), which contains detailed procedural safeguards and monitoring requirements.

51. Particular attention must be directed toward the following Endangered (EN) avian species due to their conservation status and potential sensitivity to project-related disturbances:

- i. Egyptian vulture (*Neophron percnopterus*)



- ii. Pallas's fish-eagle (*Haliaeetus leucoryphus*)



iii. Saker falcon (*Falco cherrug*)**5.2 Critical Habitat Requirement 2 – Restricted-Range Species**

52. ADB SPS Requirement 2 defines critical habitat as areas that hold special significance for endemic or restricted-range species. In alignment with this, the International Finance Corporation (IFC) Guidance Note 6 (GN6) provides a specific definition and quantitative threshold to assess the significance of such areas. Under IFC GN6, a terrestrial restricted-range species is defined as one with an Extent of Occurrence (EOO) of less than 50,000 km<sup>2</sup>. The critical habitat threshold applicable to this requirement is as follows:

- i. Areas that regularly support  $\geq 10\%$  of the global population and  $\geq 10$  reproductive units of the species.

53. To identify candidate species, the IBAT database was queried for all species within 50 kilometers of the proposed Project alignment that are listed by the IUCN as having an EOO less than 50,000 km<sup>2</sup>.

54. As a result of this search, two species meeting the restricted-range criterion were identified as potentially occurring within the broader 50-kilometer radius of the Project. However, neither species was confirmed to be present within the actual Project Area of Influence (AoI) based on field validation and habitat suitability assessments.

55. Consequently, the Project does not trigger critical habitat under ADB SPS Requirement 2. Detailed species-specific justifications and screening results under Requirement 2 are provided in Appendix B – Detailed Assessment of Endemic and Restricted-Range Species

**5.3 Critical Habitat Requirements 3 and 4 – Migratory and Congregatory Species**

56. ADB SPS Requirement 3 considers sites critical for the survival of migratory species, while Requirement 4 focuses on areas supporting globally significant concentrations or numbers of congregatory species. Both requirements aim to identify critical habitat based on species-specific patterns of movement and aggregation.

57. To support this assessment, the IFC Guidance Note 6 (GN6) provides the following threshold criteria:

- i. Areas that are known to sustain, on a cyclical or otherwise regular basis,  $\geq 1\%$  of the global population of a migratory or congregatory species.
- ii. Areas that predictably support  $\geq 10\%$  of the global population of a species during periods of environmental stress (e.g., drought, food scarcity, or breeding).

58. Uzbekistan lies within the Central Asian Flyway, a globally significant bird migration route. Numerous species migrate from breeding grounds in northern Eurasia through Uzbekistan to wintering

sites in Africa, the Middle East, South Asia, and the Indian subcontinent. The flyway is geographically broad—spanning hundreds of kilometers—and is primarily situated west of the Project Area, as many migratory bird species tend to bypass the mountainous regions to the east and south. However, satellite tracking data and ornithological studies confirm that several bird species—including those classified as Critically Endangered (CR), Endangered (EN), and Vulnerable (VU) by the IUCN—do migrate through the Project Area of Influence (Aoi).

59. In determining whether the Project area qualifies as critical habitat under ADB Requirements 3 and 4, reference was made to the IUCN Guidelines for the Identification of Key Biodiversity Areas (KBAs). The guidelines emphasize that along migratory routes, only stopover points or ecological bottlenecks—where birds congregate at high density—should be classified as critical habitat, rather than the entire flyway corridor.

60. Based on this rationale, and in alignment with ADB and IFC guidance, the entire Central Asian Flyway is not treated as critical habitat. Instead, attention is focused on localized KBA-designated stopover and bottleneck sites that may fall within or near the Project alignment. A detailed list and spatial overview of the Key Biodiversity Areas (KBAs) located within 50 kilometers of the Project alignment is provided in Table 4, which supports the habitat screening process under Requirements 3 and 4.

Table 4: Designated KBAs within 50 km of the Project alignment

Name of Protected Area	Approximate Distance from Project	Designation / Protection Status	Remarks
Chatkal Biosphere Reserve	Approx. 45–50 km northeast	UNESCO Biosphere Reserve, National Protected Area	High-altitude ecosystems; rich in bird and mammal diversity
Ugam-Chatkal National Park	Approx. 40–50 km north	National Park (IUCN Category II)	Covers Ugam River basin and Chatkal Mountains
Charvak Reservoir & Buffer Zone	Approx. 40–50 km northeast	Water Resource Management Area, Limited Protection Zone	Important fish and waterbird habitat
Zaamin National Park	Approx. 50 km southeast (Jizzakh Region)	National Park	Protects Syrdarya ecosystems and mountain forests; partially outside Aoi
Aksu-Jabagly Nature Reserve (Kazakhstan border)	Approx. 50 km north	Strict Nature Reserve (IUCN Category Ia)	Transboundary area with ecological relevance to the region

Note: No specially protected areas have been found on the road construction sites in the Tashkent region in this Project

### 5.3.1 Bottleneck Sites

61. To evaluate whether the Project's Area of Influence (Aoi) constitutes a migratory bottleneck within the Central Asian Flyway, multiple data sources were reviewed, including satellite tagging data, avian telemetry studies, and regional topographic and geographic features relevant to bird migration dynamics. Analysis of available satellite tagging data—along with ornithological literature and terrain analysis—revealed no evidence indicating that the Aoi or its immediate surroundings function as a significant bottleneck site. Instead, findings suggest the area lies within a broader migratory corridor without exhibiting the high-density concentration or constrained passage features typical of recognized stopover or bottleneck sites.

62. Specifically, Figure 2 and Figure 3 present the migratory tracks of satellite-tagged avian species, used to assess regional movement patterns. These include migratory paths of steppe eagles (*Aquila nipalensis*). When reviewed collectively, the datasets confirm that while the Project Aoi is traversed by the general Central Asian Flyway, it does not exhibit ecological or topographic characteristics consistent with bottleneck conditions. As such, the Aoi does not meet the criteria for critical habitat designation under ADB SPS Requirements 3 and 4 in relation to bottleneck or stopover site classification.

63. Figure 2 illustrates satellite tracking data from 14 migrating steppe eagles (*Aquila nipalensis*), a

species classified as Endangered (EN) on the IUCN Red List. The data demonstrate that steppe eagles utilize a broad migratory corridor in the region. Most of the recorded individuals skirt the Nuratau mountain range, effectively avoiding the Project Aol. However, two individuals were observed crossing the proposed alignment, apparently using a mountain pass near Tashkent, located between the foothills of the Nuratau and Turkestan ranges. While these crossings confirm occasional use of airspace above the Aol, the pattern does not reflect regular congregation or dependency on the area, and thus does not trigger a critical habitat determination based on migratory bottleneck criteria.



Figure 2: Migratory routes of Steppe Eagles.  
Project Aol indicated by black circle.

64. Figure 3 presents the satellite-tracked migratory routes of the Egyptian vulture (*Neophron percnopterus*), EN, a species listed as Vulnerable (VU) on the IUCN Red List. This species is known to both migrate through and breed within Uzbekistan, contributing to its conservation significance in the region. Analysis of migratory route data indicates that the primary flyways used by Asian houbara are located over 100 kilometers east of the Project’s Area of Influence (Aol). These routes do not intersect with or approach the Project alignment, suggesting that the Aol does not function as a migratory corridor or critical habitat zone for this species. Based on this assessment, the Project area does not meet the threshold criteria for critical habitat under ADB SPS Requirements 3 or 4 with respect to the Asian houbara.

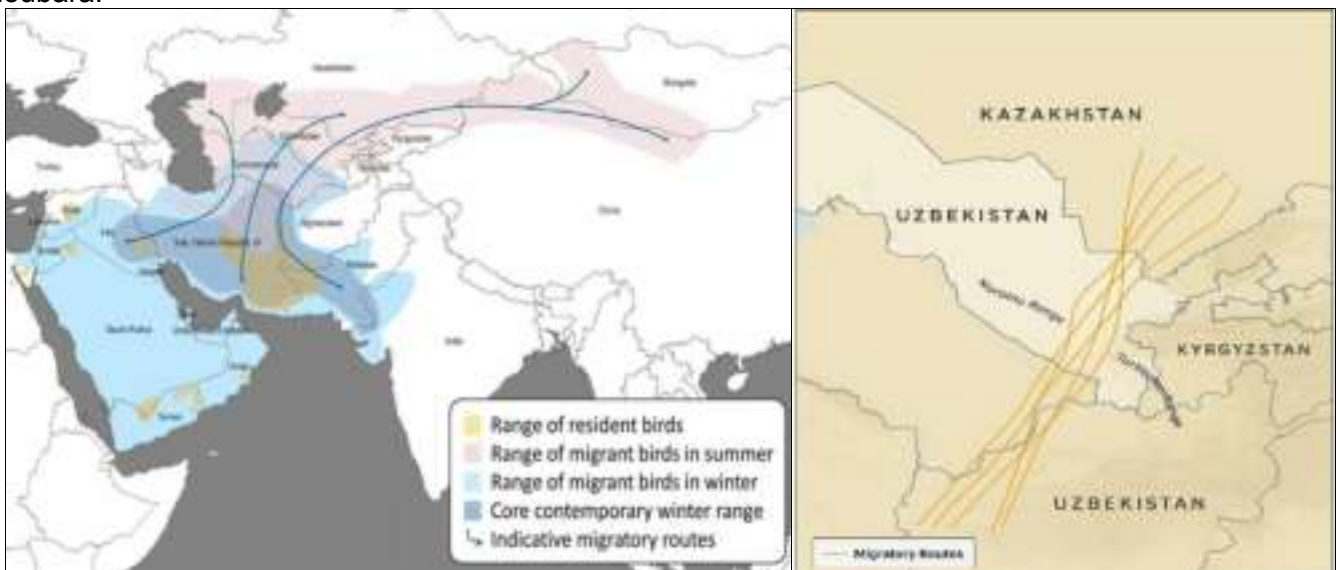


Figure 3: Migratory routes of Egyptian vulture. The Project Aol is indicated by the yellow line.

65. For all species researched, the migration routes pass over a wide corridor, with different individuals taking different routes, some over the mountains to the east, without any evidence that they pass through a bottleneck site. All studied migratory species follow broad migration corridors, with different individuals selecting different routes, some passing through the mountains to the east, and there is no evidence that they converge at a narrow bottleneck. Considering this, as well as the fact that the area forms part of a longer migratory pathway with similar significance over a wide distance, it is not appropriate to consider the project area as critical habitat for migratory birds under Criterion 3. Given this, and that it is part of a more extensive flyway of similar importance for a substantial distance, it is not appropriate to consider the Project area to be critical habitat for criteria 3 migratory birds.

### 5.3.2 Assessment of Stopover Sites and Congregatory Areas

66. The landscape within and surrounding the Project Area of Influence (Aol) is characterized by intensively modified agricultural land, with limited availability of natural habitats suitable for supporting large congregations of migratory species.

67. There are no critical places on the projected section of the road, birds migrate by different routes and they do not nest in the projected territory. A detailed assessment of these sites is included in Appendix C.

68. Therefore, the Project area does not contain critical habitat under Requirements 3 and 4. Nonetheless, the data suggests that the wider area is of importance to migratory species. Road infrastructure improvement and development activities in this migratory corridor present a risk to these species and the project should aim to mitigate potential impacts to at least no net loss.

### 5.4 Critical Habitat Requirement 5 – Evolutionary Processes and Ecosystem Services

69. ADB SPS Requirement 5 defines critical habitat as including areas that:

- i. contain unique assemblages of species,
- ii. are associated with key evolutionary processes, or
- iii. provide essential ecosystem services.

70. According to IFC Guidance Note 6 (GN6), areas that support key evolutionary processes are typically characterized by high spatial heterogeneity, including ecological features such as:

- i. Isolated landscapes, promoting speciation through geographic isolation,
- ii. Environmental gradients, such as elevation or moisture zones,
- iii. Ecotones, which are transitional zones between different ecosystem types and are often linked to divergent evolutionary processes.

71. Based on field assessment, desk-based research, and satellite imagery analysis, the Project Area of Influence (Aol) does not exhibit the ecological or biogeographic features associated with key evolutionary processes. The landscape within the Aol is predominantly modified agricultural land, lacking spatial or ecological complexity necessary for supporting speciation or habitat transition zones.

72. In terms of ecosystem services, the Aol includes segments of anthropogenically modified waterways, but these are confined within irrigated croplands and do not contribute to significant natural water catchment, flood regulation, or other high-value ecosystem services typically associated with critical habitat designation. Therefore, based on current scientific evidence and in alignment with ADB and IFC criteria, the Project area does not meet the critical habitat thresholds under Requirement 5.

### 5.5 Critical Habitat Requirement 6 – Community Importance

73. ADB SPS Requirement 6 considers critical habitat to include areas that support biodiversity of

significant social, economic, or cultural value to local or indigenous communities. This may include species that are culturally sacred, used in traditional medicine, support local livelihoods, or hold symbolic or historical significance within community practices.

74. As part of the Critical Habitat Assessment (CHA), consultations, literature reviews, and field investigations were conducted to identify any species or habitats within the Project Area of Influence (Aoi) that hold recognized social, economic, or cultural importance to local populations.

75. Based on the assessment findings, no species or biodiversity features of significant local importance were identified within the Aoi. Accordingly, the Project does not trigger critical habitat under ADB SPS Requirement 6

## 5.6 Critical Habitat Requirement 7 – Protected Areas

76. ADB SPS Requirement 7 identifies critical habitat as including areas that are legally protected, officially proposed for protection, or internationally recognized as important for biodiversity conservation. This includes areas that meet the criteria of:

- i. the IUCN Protected Area Classification,
- ii. the Ramsar List of Wetlands of International Importance, and
- iii. the UNESCO World Natural Heritage Sites.

77. There are no protected areas or sites designated under the Ramsar Convention in the vicinity of the areas where road construction will take place. The relevant species have been appropriately assessed in accordance with the applicable ADB requirements. For example, all globally threatened species present in the area have been properly evaluated in accordance with Requirement 1

78. There are no areas of critical habitat within 50 kilometers of the project site in accordance with ADB requirements. No bird congregations were identified, and the relevant species were also assessed in accordance with Requirements 3 and 4 (see Appendix C – Detailed Assessment of Requirements 3 and 4).

79. No protected areas occur within the Project Aoi, therefore, the Project does not trigger critical habitat under Requirement 7.

## 6. Conclusions

80. The Critical Habitat Assessment (CHA) concludes that the proposed Tashkent Province Rural Roads Project does not trigger critical habitat for any species or biodiversity features under the criteria set forth in the Asian Development Bank (ADB) Safeguard Policy Statement (SPS, 2009).

81. However, the presence of internationally endangered bird species within or near the Project Area of Influence (Aoi) necessitates the application of the mitigation hierarchy—namely, to avoid, minimize, restore, and, where residual impacts remain, to offset or implement additional conservation measures. These considerations must inform the detailed design and construction planning of the Project.

82. While these species do not trigger critical habitat under ADB thresholds or IFC Guidance Note 6 (GN6), they are considered vulnerable to project-related impacts and should be explicitly addressed through species-specific mitigation measures. The following Endangered (EN) species are of particular concern:

- i. Egyptian vulture (*Neophron percnopterus*)
- ii. Pallas's fish-eagle (*Haliaeetus leucoryphus*)
- iii. Saker falcon (*Falco cherrug*)

83. These species are all experiencing global population declines and are known to be sensitive to habitat disturbance, construction-related noise, and ground vibrations. Their documented use of habitats

similar to those found within the Project AoI suggests a reasonable likelihood of their occurrence in or near the Project area. Although site-specific data is limited, the CHA concludes that these species may occur in ecologically relevant numbers, though current evidence does not indicate population thresholds that would trigger critical habitat as per IFC GN6.

84. To mitigate potential adverse impacts on these species, the following good-practice construction timing and survey protocols will be applied:

- i. Schedule construction activities outside the recognized bird breeding season and periods when migratory species are known to be present in the region.
- ii. Where avoidance is not feasible, conduct pre-construction nesting bird surveys of all suitable habitat, including areas of planned vegetation clearance, within the AoI.
- iii. Incorporate adaptive construction planning and monitoring protocols to limit disturbance to avifauna.

85. A comprehensive set of biodiversity management and mitigation measures is detailed in the Initial Environmental Examination (IEE) and its accompanying Environmental Management Plan (EMP), which are binding on the contractor and supervising engineer during project implementation.

## 7. Appendices

### Appendix A – Detailed Assessment of Requirement 1 – Critically Endangered Species

1. This section comprises the Critical Habitat Assessment of the Critically Endangered, Endangered or Vulnerable species that may regularly occur in the Aol and meet Critical Habitat Requirement 1 thresholds.
2. Appendix A – Detailed Assessment of Requirement 1: Critically Endangered, Endangered, and Vulnerable Species. Appendix A presents the Critical Habitat Assessment (CHA) findings for all Critically Endangered (CR), Endangered (EN), and Vulnerable (VU) species identified as having the potential to regularly occur within the Project Area of Influence (Aol).
3. The assessment evaluates each species against the criteria defined under ADB SPS Requirement 1, supported by the corresponding IFC Guidance Note 6 (GN6) thresholds. These include:
  - i. Presence of  $\geq 0.5\%$  of the global population and  $\geq 5$  reproductive units for CR or EN species
  - ii. Significant global concentrations of VU species where loss would result in a change to EN or CR status
4. Each species is assessed based on conservation status, likelihood of occurrence, habitat suitability, migratory behavior, and available population data, including surrogate indicators where direct data is unavailable. The results presented in Appendix A form the evidence base for the determination that Requirement 1 is not triggered, while also identifying species for which targeted mitigation measures are warranted despite the absence of a critical habitat designation.

Table 5: Summary of CR, EN, and VU species which occur within 50 km of the Project Aol

Common Name	Scientific Name	IUCN Status	Occurrence in Aol / 50km Zone	Critical Habitat Triggered	Justification
Syr Darya Shovelnose Sturgeon	<i>Pseudoscaphirhynchus fedtschenkoi</i>	CR (Possibly Extinct)	Historically occurred in Syr Darya River near Tashkent; no confirmed sightings since 1968	No	The species is likely extinct in the area. The Syr Darya River lies approx. 2 km from the nearest road section (Route 4k-646), but outside the direct Aol.
Sociable Lapwing	<i>Vanellus gregarius</i>	CR	Migratory passage species in Uzbekistan; nearest key staging site (Talimarjan Reservoir) >100 km	No	While regionally important, the Aol is >2 km from Sardoba Suv Ombori (nearest suitable habitat). Population densities not high enough to trigger Critical Habitat.
Dwarf Sturgeon	<i>Pseudoscaphirhynchus hermanni</i>	CR	Endemic to Amu Darya basin, possible remote hydrological connection	No	No recent records in Tashkent Region; small isolated subpopulations only in lower Amu Darya (~>150 km away).
Amu Darya Shovelnose Sturgeon	<i>Pseudoscaphirhynchus kaufmanni</i>	CR	Restricted to lower Amu Darya; outside project range	No	Not present in Tashkent Region. Habitat too far downstream; no connectivity.
Saiga Antelope (Mongolian population)	<i>Saiga tatarica mongolica</i>	CR	No longer present in Uzbekistan	No	Extinct from historical range in Uzbekistan. No recent presence in project region.

**Appendix B – Detailed Assessment of Requirement 2 – Endemic and Restricted- Range Species**

5. ADB Requirement 2 defines critical habitat as including areas of special significance for endemic or restricted-range species. These are species with a limited geographical distribution, making them more susceptible to localized habitat loss and degradation. In accordance with IFC Guidance Note 6 (GN6), a terrestrial restricted-range species is defined as having an Extent of Occurrence (EOO) of less than 50,000 km<sup>2</sup>. The critical habitat threshold for this requirement is defined as:

- i. Areas that regularly support  $\geq 10\%$  of the global population size and  $\geq 10$  reproductive units of a given restricted-range or endemic species.

6. This threshold reflects the importance of localized habitat patches in sustaining globally significant proportions of species with limited distributions and informs the screening and assessment process under the Critical Habitat Assessment (CHA).

Table 6: Restricted-Range species occurring within 50 km of the Project Aol

Common Name (if any)	Scientific Name	IUCN Status	Occurrence within 50 km	Critical Habitat Triggered	Justification
—	Parrya tojibaevii	CR	Yes – recorded ~45 km northeast (Charvak area)	Yes (Potential)	Extremely small range and single known population make it qualify as restricted-range species under ADB SPS. Habitat lies within the 50 km buffer zone.
Korolkow's sage	Salvia korolkowii	NT	Likely present on limestone slopes near Charvak	No	Although endemic, the known population is dispersed and not restricted enough to trigger Critical Habitat. Further confirmation needed.
Greig's tulip	Tulipa greigii	NT	Likely present within 30–50 km range	No	While endemic, this species has a moderately broad distribution across the Western Tian Shan. Populations near Aol not significant in size.
—	Tulipa micheliana	VU	Closest subpopulation ~25 km SE of Aol	No	Subpopulations are low-density; habitat near Tashkent Aol not documented as core range. Critical Habitat threshold not reached.
Bocharic myotis bat	Myotis bucharensis	DD	Historically present near Tashkent	Uncertain	Species was rediscovered in nearby regions; lack of data precludes definitive CHA determination. Survey recommended.
—	Iris orchioides	Not listed (National priority)	Present on rocky outcrops and dry slopes within 50 km	No	National endemic but with scattered populations; not enough concentration within Aol to trigger Critical Habitat.
—	Rubia laevis	Not listed (National endemic)	Likely on upper slopes NE of project	No	Presence in project buffer zone confirmed; however, density and population size unlikely to reach threshold.

**Appendix C – Detailed Assessment of Requirement 3 and 4**

Table 7: Migratory species present

Species	Scientific Name	IUCN Status	Migration Type	Occurrence within 50 km + Habitat	State Management Area	Critical Habitat Triggered	Justification
Saker Falcon	Falco cherrug	EN	Partial migrant	Present in upland wooded slopes and cliffs within ~30 km	Dalverzin SFHMA (forestry-hunting area)	No	Use wetlands and cliffs but no significant concentrations; not triggering critical habitat thresholds (documents1.worldbank.org)
Asian Houbara	Chlamydotis macqueenii	VU	Partial migrant	Breeds across semi-desert 50 km SE of Aol; migratory flyway passes project area	Kalgansyr SFHMA	No	Flyway presence confirmed; lacks breeding/nesting population with critical density
Western Marsh Harrier	Circus aeruginosus	LC	Migratory waterbird	Occurs near wetlands (~<50 km) along Akhangaran River floodplains	Dalverzin SFHMA	No	Common but no breeding evidence within Aol; not meeting CHA criteria
Dalmatian Pelican	Pelecanus crispus	VU	Migratory waterbird	Recorded in >25 km wetlands near reservoir corridors	Dalverzin SFHMA	No	Present in low numbers with no breeding sites in Aol
Ferruginous Duck	Aythya nyroca	VU	Migratory waterbird	Wintering and breeding in small numbers near reservoirs within 50 km	Dalverzin + Kalgansyr	No	Scattered occurrence; not concentrated enough to trigger CHA
White-headed Duck	Oxyura leucocephala	EN	Migratory waterbird	Present in wetlands ~30–40 km from Aol	Dalverzin SFHMA	No	Habitat available but no key staging/breeding areas overlapping Aol
Common Pochard	Aythya ferina	VU	Migratory waterbird	Observed in scattered small groups near floodplains	Dalverzin SFHMA	No	Presence noted but below thresholds for critical habitat
Pallas's Fish Eagle	Haliaeetus leucoryphus	EN	Local migrant	Occasionally near riverine wetlands within 50 km	Kalgansyr SFHMA	No	Seasonal presence with low numbers; no key site within Aol