Environmental Assessment and Review Framework

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UZB: Railway Efficiency Improvement Project

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To: Dong-Soo Pyo
Director, Transport and Communications Division
Central and West Asia Department
ADB

Herewith we would like to extend our appreciation to you and to your colleagues for the assistance provided within the preparation of the Project "Uzbekistan. Railway Efficiency Improvement Project".

Please, find enclosed the Environmental Assessment and Review Framework for review and publication on the web site of ADB.

In our turn, we would like to inform you that this report will be also published on the web-site of the JSC O'zbekiston Temir Yo'llari.

Sincerely,

Head of PIU-T **Z. Kashaev**

Copies: Ko Sakamoto, Shokhimardon Musaev.

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LIST OF ABBREVIATIONS

ADB	-	Asian Development Bank
AM	-	Accountability Mechanism
CMR	-	Cabinet of Ministers
EA	–	Executing Agency
EARF	-	Environmental Assessment and Review Framework
EIA	-	Environmental Impact Assessment
EHS	-	Environmental, Health and Safety Guidelines
EMP	-	Environmental Management Plan
EMR	-	Environmental Monitoring Report
GHG	-	Greenhouses gases
GRM	-	Grievance redress mechanism
MAC	-	Maximum Allowed Concentration
PIU-T	-	Project Implementation Unit for Locomotive project
RUz	-	Republic of Uzbekistan
SES	-	Sanitarian Epidemiological Station
SPS	-	Safeguard Policy Statement
UNFCC	-	United Nation Framework on Climate Change
UTY	-	O'zbekiston Temir Yo'llari

GLOSSARY

Glavgosexpertisa	State Department responsible for Conducting Environmental Expertise Under SNPC
Khokim	Governor of administrative unit
Khokimiyat	Regional government authority
KMK	National acronym for Construction norms and regulations
Makhalla	A community of neighbors, which is based on full independence and self-governance.
SanR&N	Sanitary - epidemiological norms and regulations
SNiP	The same as SanR&N - set of basic regulatory requirements and regulations governing the design and construction in all sectors of national economy of Uzbekistan

NOTE

In this report, "$" refers to US dollars.

A. INTRODUCTION

1. With 31 million people, Uzbekistan is the most populous country in Central Asia. Being a double landlocked country requiring crossing at least two countries to reach seaports, transport plays an important role in sustaining its socioeconomic development.

2. Uzbekistan has continued to modernize its railway infrastructure. Since its founding in 1994, O'zbekiston Temir Yo'llari (UTY), the vertically integrated public railway company, has gradually implemented a holistic railway modernization program, including the completion of a unified rail network, electrification and modernization of existing lines, and improvement of rolling stock. The government accorded particular importance to electrification, with 2,446 km or 52% of the network now electrified.

3. Specifically, with regards to locomotives, the current locomotive fleet of UTY is 75% diesel (main line diesel locomotives are 28%, and shunting diesel locomotives are 47 %), and electric locomotives constitute only 25 % of the fleet. The latter includes 37 units of electric locomotives procured within the last 10 years. The fleet of locomotives, both diesel and electric, are of advanced age, with the majority having served more than 30 years.

4. Limitations in the absolute number of electric locomotives, as well as the ageing nature of the existing fleet, pose a major challenge to the further expansion of freight and passenger train services on a reliable basis. Currently, the existing fleet is utilized to its maximum potential, making it difficult for UTY to meet the growing demand. The slower acceleration and top speeds achievable by diesel locomotives, as well as the switching required between diesel and electric locomotives adds to transport times. Locomotive depots remain tailored toward the servicing of diesel locomotives, and require upgrading to suit an increasingly electrified fleet.

5. Institutionally, UTY remains a financially robust organization with the ability to carry all operations and maintenance costs, and the majority of capital works. However, similar to other railway organizations throughout the world, it faces heavy competition for both passenger and rail traffic from road transport, and in the case of transit traffic, from other countries. The ability of UTY to maintain its financial sustainability depends on its ability to improve the attractiveness of its services to end clients. This requires a combination of improved infrastructure and rolling stock, as well as refinements to its strategic business planning process.

6. In view of the abovementioned challenges, the Asian Development Bank (ADB) has been requested by the Government and UTY for financial assistance for a project to improve the efficiency of railway operations in Uzbekistan. The project is expected to finance the procurement of 24 electric locomotives, which will relieve the critical shortage of locomotives in the Uzbekistan railway network, and equip UTY to make full use of its growing electrified network.

7. The project will produce three outputs:

- deliver 24 electric locomotives, 16 of which will be used for freight trains, and 8 of which will be for passenger trains;
- to effectively cater to the maintenance needs of these new electric locomotives, UTY plans on upgrading a locomotive depot near Tashkent;

- help implementation of an improved business plan for UTY, to improve its operational efficiency, including in the areas of locomotive and rolling stock utilization, operational practices, timely adjustment of tariffs and optimization of operating expenses.

8. Bidding documents for purchase 24 electric locomotive include all necessary requirements related to environmental aspects: noise and vibration standards, oil for transformers and reference on relevant national environmental legislation.

9. Only one depot named “O’zbekiston” located in Tashkent province will be upgraded under the current project. The planned upgrades include installation of new equipment for maintenance of electric locomotives without replacement of old ones. Moreover, currently operating old electric locomotives type VL-60k will not be dismantled; they will be used as shunting electric locomotives. This project is categorized as category “C” for environment as defined by ADB’s Safeguards Policy Statement of 2009, which means minimal adverse impacts. However, there is an unlikely case of the category of the project changing to “B” depending on conditions as explained below.

10. In the unlikely case that other depots for maintenance of electric locomotives will be rehabilitated within the current project, a development of IEE may be required depending on their specific scope. The main task of the EARF is to ensure that possible subprojects or project components implemented under the framework comply with ADB safeguard objectives, principles and requirements.

11. The EARF for this project provides guidance on assessment of direct, indirect and induced impacts of the replacement of diesel locomotives, the operations of electric locomotives, and the conversion or upgrading of depots in case additional depot locations are identified in future and included in the project scope. In addition, the EARF includes an assessment of anticipated climate change.

12. The purpose of the EARF is also to guide the actions of UTY in improving its capacity for safeguards implementation under investment projects funded through international financial agencies in the future.

13. In general, the project will have significant positive impacts: improvement of local environment through avoiding air pollutants from diesel locomotives and reduction of GHGs due to switching to fuel with less emissions of CO_2.

14. The project implementation period is 2018-2021.

B. ASSESSMENT OF LEGAL FRAMEWORK AND INSTITUTIONAL CAPACITY

(i) Legal Framework

15. The Republic passed over 100 laws and regulations, developed programs and action plans to address environmental issues and promoted sustainable use of natural resources. A national legal framework in the field of Nature Protection and Management established in Uzbekistan, provides to the citizens the rights and duties specified in the country’s Constitution.

16. The Environmental Impact Assessment (EIA) procedure is regulated by Law on Environmental Expertise and The Regulation on State Environmental Expertise (SEE)

approved by Decree No.491 of the Cabinet of Ministers on 31 December 2001 and amended in 2005 and 2009. The regulation defines the legal requirements for EIA in Uzbekistan.

17. In accordance with this law, construction of new depots is defined as category 2, having moderate impacts on environment. Such projects require conduction of national Environmental Assessment and receiving a clearance from Ecological expertise on national level[1].

18. If any changes in emissions, waste water discharges or generation of solid wastes will occur due to the project works, the national legislation requires submission of updated Statement on Environmental Consequences (SEC)[2]. Updated SEC should replace previous documents which were active for situation before the project implementation.

19. If the project works will be limited by only installation of new equipment without changes in content and amount of emissions, discharges and wastes in upgrading depots, no any environmental approvals are needed.

20. Besides abovementioned regulations and laws, there are number national laws and acts applicable to the current project:

- Law “On Atmospheric Air Protection” (1996, amended on 10.10.2006);
- Law “On water and water use” (1993);
- Land Code of the Republic of Uzbekistan (1998);
- Law on Wastes (2002, as amended on 2011);
- Decree of the Cabinet of Ministers of the Republic of Uzbekistan on Approval of the collection and disposal of used mercury-containing lamps. No. 266 of 21.09.2011;
- Decree of Cabinet Ministries of RUz on the procedure of settlement usage of biological resources and procedure of issuing permits in the field of nature use, No. 290 of 20.10.2014.
- SanR&N RUz No.0179-04. Hygienic norms. List of Maximum Allowable Concentrations (MACs) of pollutants in ambient air of communities in the Republic of Uzbekistan including Annex 1;
- SanR&N No.0267-09. Admissible noise level into the living area, both inside and outside the buildings;
- SanR&N RUz No. 0300-11. Sanitarian Norms and Rules of organizing, inventory, classification, detoxification, storage and disposal of industrial wastes in Uzbekistan conditions;
- SanR&N RUz No 0146-04. Sanitarian Norms and Rules of living houses design in climatic conditions of Uzbekistan;
- SanR&N 0236-2007 “Sanitary norms and rules (SNR) on the effects of the electric field generated by overhead transmission lines of alternating currents of industrial frequency”;
- Sanitarian Rules and Norms #0172-06. Hygienic requirements for protection of surface water on the territory of the Republic of Uzbekistan;
- ShNK 4.02.33-04 Transmission lines;
- ShNK 4.02.67-07 Electric installation works. Repair and construction works;
- KMK 3.01.02-00 Safety measures in construction;
- KMK 2.01.08-96 Protection from noise;
- "Rules of organization and technical operation of the contact network of the electrified railways of SJSRC "O’zbekiston Temir Yo’llari" (2015);

[1] Resolutions of Cabinet Ministries of RUz # 491 (2001) and # 152 (2009), Attachment # 1.
[2] Resolution of Cabinet of Ministries of RUz # 14 (2014), para # 54.

- RD (Guidance Document) 34.20.501-05. Operating Rules for the Power Plants and Electric Networks;
- RD (Guidance Document) 34.03.202.95. Safety Rules for the Electrical Equipment Operation

21. It is important that the project will meet international lending requirements. The following international guidelines are relevant to the project and will be considered during the environmental assessment process:

- ADB's Safeguards Policy Statement (June 2009);
- ADB´s Operations Manual Bank Policies: Safeguard Policy Statement (March 2010);
- ADB`s Environmental Safeguards a Good Practice Sourcebook Draft Working Document (December 2012);
- IFC General Environmental, Health and Safety Guidelines (April 2007);
- EHS IFC Railway (2007);

22. Under international cooperation in the field of environment protection, Republic of Uzbekistan signed number of International Conventions, which should be undertaken by State Committee for Nature protection of the RUz. Among conventions relevant to the project the following two conventions will be applicable:

- UN Framework Convention on Climate Change (2007).
- The Stockholm Convention on Persistent Organic Pollutants (2004)

(ii) Institutional Capacity

23. Joint-stock company«O'zbekiston Temir Yo'llari» (UTY) will be the Executive Agency (EA). It has a sound track record with execution of similar projects, as well as operations and maintenance of electrified and non-electrified lines.

24. The simplified institutional structure of UTY is presented in Figure 1. Environmental performance of UTY is undertaken by an environmental specialist working in Department of Labor Protection, Technical and Industry Safety and Ecology. The specialist's duties include the followings:

- Coordinate development of annual environmental protection plans of UTY's sub-entities, and submission as UTY's unified environmental plan to State Nature Protection Committee (Goskomecologiya);
- Undertake visits to sub-entities to monitor proper implementation of environmental plans, submission of environmental reports to relevant government agencies (State Statistic Committee and) and compensation payments;
- Communication with external stakeholders, participation in development state environmental programs, strategies;
- Conduction training, awareness program for UTY entities' environmental staff;

25. UTY's environmental specialist participated in development of Third National Communication on Climate Change under UNFCCC.

26. There are environmental specialists under the depot "Ozbekiston" whose duties include:

- Preparation of reports on emissions to atmosphere, water and wastes for submission to State Statistical Committee;

- Calculation of compensation payments for emissions from depots and water consumption;
- Participation in development of annual environmental protection plans of depots and monitor their implementation;
- Participation in development of discharges/emissions limits (in air, water and wastes) for depots and monitor their validity. For development such limits the depot hires private companies;
- Conclude agreements with laboratory of Goskomekologia on monitoring water quality from depots' waste water treatment plan;
- Participate in the environmental training organized by UTY.

27. Other depots also have environmental specialists with similar responsibilities. In most of the cases these environmental specialists have a dual role as a safety engineer.

28. There are several project implementation units in UTY, implementing investment projects funded under various International Financial Institutions, including: (i) PIU-E in charge of electrification of Karshi-Termez (JICA), CAREC Corridor 6 (Marakand-Karshi) Railway Electrification Project (ADB) and CAREC Corridor 2 (Pap-Namangan-Andijan) Railway Electrification Project (ADB), and (iii) PIU-T for Railway Efficiency Improvement Project (ADB). PIU-E have environmental specialists who are in charge for ensuring the projects compliance with national and donor agencies' environmental and social requirements. The specialists' duties include conduction of environmental monitoring, submission environmental monitoring reports to JICA and ADB. Information on institutional structure of PIU-T is provided in Chapter G.

29. There are several design institutes preparing feasibility studies for new projects in railway sector. These institutes conduct a national Environmental Assessment (EA) as part of feasibility study (ZVOS). They are responsible for submission EA to Center of State Environmental Expertise and receiving Environmental Appraisal (Positive environmental conclusion).

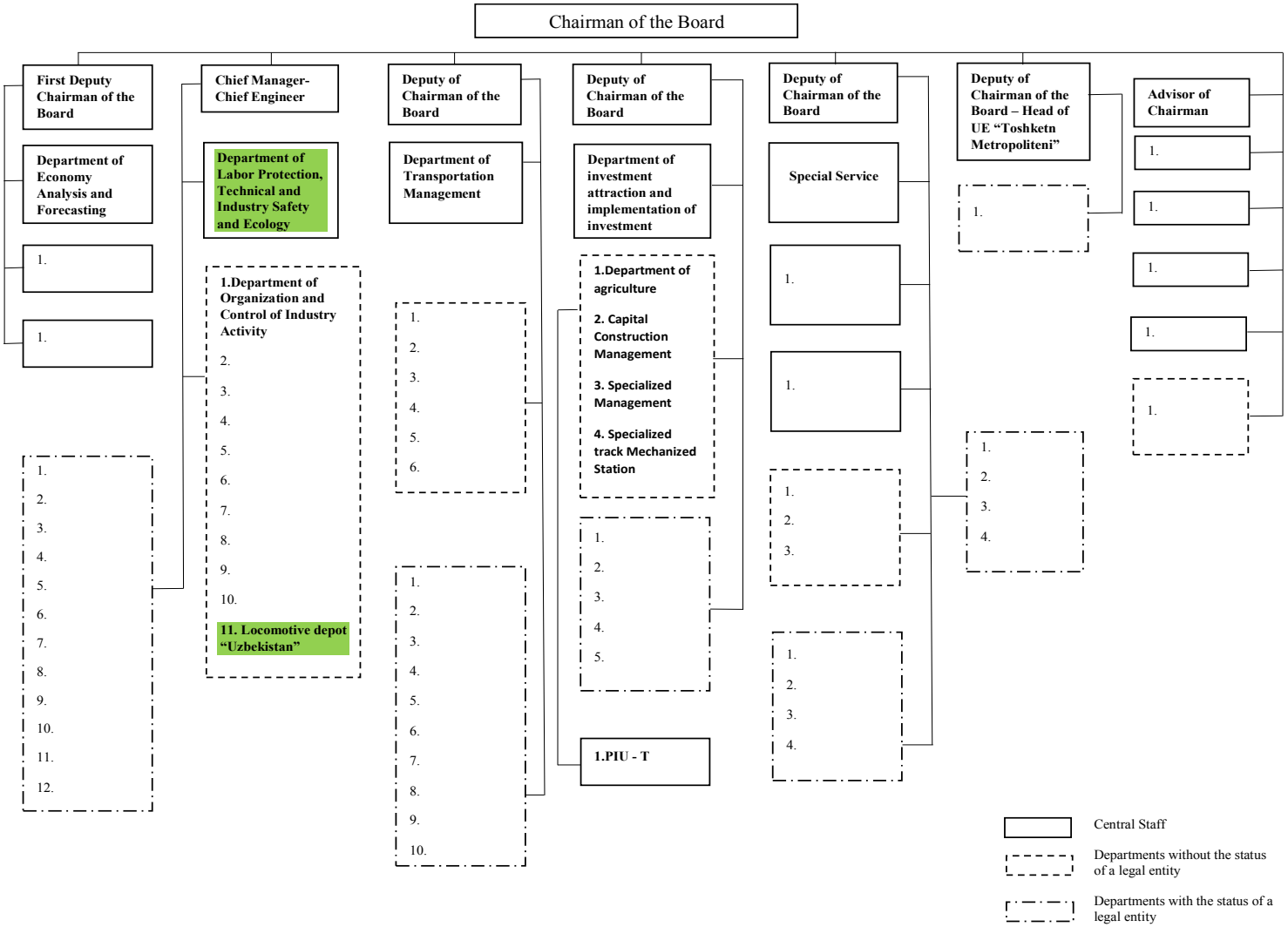


Figure 1: Institutional Structure of UTY (Source: www.uzrailways)

C. ANTICIPATED ENVIRONMENTAL IMPACTS

30. During the project implementations impacts may occur during depots upgrading and operation phases. The impacts could be direct or indirect and induced impacts. The below table provides summary on anticipated impacts during project construction and operating phases.

Table 1: Key anticipated environmental impacts during the rehabilitation of depots

Project activities	Potential impacts	Level of impacts and duration
Construction/upgrading stage		
Rehabilitation works (re-innovation)	• Solid and hazardous wastes eg: • Scrap metals, old batteries, circus boards; • Used boxes, used packaging; • Noise pollution	 • Moderate, short-term • Moderate, short-term • Insignificant, short-term
Demolishing of obsolete equipment	• Solid and hazardous wastes eg: • Scrap metals, old batteries, circus boards; • Used oil; • Noise pollution	 • Moderate, short-term • Moderate, short-term • Insignificant, short-term
Installation of new equipment	• Solid wastes: Used boxes, used packaging; • Noise pollution	• Insignificant, short-term • Insignificant, short-term
Operation phase		
Electric locomotive operation	• Noise and vibration from trains movement • Train safety and electrocution issues • Waste generation	• Moderate, long-term • High, long-term • Insignificant, long-term
Disposal of old locomotive	• Solid and hazardous wastes eg: • Scrap metals, old batteries, circus boards; • Used oil	 • Moderate, medium-term • Moderate, short-term

31. As shown in the table, during the project construction/upgrading phase most of the impacts will be of moderate and short-term nature, because most of the works will be

implemented inside buildings on the territory of existing depots. These impacts could be mitigated by good site management practice.

32. During operation phase noise and vibration may adversely impact on population due to increasing frequency, speed and loading weights of trains movements. However, investigations conducted within the previous project "CAREC Corridor 2 (Pap-Namangan-Andijan) Railway Electrification Project" showed, that replacement of diesel locomotives with electric ones will not lead to increasing of equivalent noise level (L_{ecq}). However, significant increasing of train frequency may lead to increasing noise level and possible vibration as well. For such situations modelling of noise and vibration propagation need to be undertaken. Based on results of modelling, appropriate mitigation measures need to be applied in order to comply with national standards on noise and vibration level (SanR&N No.0267-09 (for noise) and SanR&N RUz No 0146-04 (for vibration)).

33. Besides above mentioned direct and indirect adverse impacts, the project will have significant positive impact - operation of electric locomotives will allow to avoid increasing of GHG emissions in conditions of growing demand in passengers and freight transportation. Draft calculation of CO_2 emissions for the same amount of transported freight and passengers was made for two scenarios: (i) transportation with electric locomotives, and (ii) transportation with diesel locomotives (Attachment 1). Based on this calculation, transportation with electric locomotives will allow to avoid 914064.5 ton emissions of CO_2 annually.

34. Moreover, replacement of the diesel locomotive with electric ones will contribute improvement of local environment due to decreasing emissions of other pollutants (SO_2, NO_x) into atmosphere discharged from diesel locomotives.

D. ENVIRONMENTAL ASSESSMENT FOR SUBPROJECTS AND/OR COMPONENTS

(i) Screening and classification

35. Environmental assessment shall be started from the sub-project categorization. ADB's Rapid Environmental Assessment (REA) checklist for railway projects shall be used for determining the environmental category. A format of REA checklist is presented in Attachment 2. Considering type of possible project works and the fact that works will be implemented on the territory of existing depots, sub-projects could be categorized as B or C:

- **Category B.** A proposed sub-project is classified as category B and an Initial Environmental Examination (IEE) is required if environmental impacts from such projects are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for category A projects.
- **Category C.** A proposed sub-project is classified as category C if it is likely to have minimal or no adverse environmental impacts. No environmental assessment is required although environmental implications need to be reviewed.

36. Therefore, no actions need to undertaken if sub-project was categorized as C. If the project is classified Category B, an (IEE) needs to be undertaken.

(ii) Environmental assessment and environmental management plan

37. If a sub-project is classified as category B, a report on IEE should be prepared in accordance with the ADB's Safeguard Policy Statement (SPS) 2009 (Appendix 1). The outline of the IEE report is provided in Annex to Appendix 1 of SPS.

38. After presenting a general information on the sub-project description and its components, implementation schedule, the IEE will provide information on baseline environmental and social data. The environmental assessment will consider all potential impacts and risks of the project on physical, biological, socio-economic and physical cultural resources in an integrated way.

39. As shown in the Table 1, the main impacts during sub-projects construction and operation phases will be waste generation and noise pollution. Waste generation may have more impact during construction phase, noise and vibration – during operation phase.

40. The IEE should provide assessment of types of waste and their quantitative analysis. The assessment has to cover whole process - depots rehabilitation works, demolishing of obsolete equipment and installation new ones.

41. Depending on the type of waste, their disposal options need to be defined. It I recommended that first, waste need to be separated on hazardous and non-hazardous. Hazardous waste (used oil, accumulators, fluorescent lumps) need to be disposed into special designated entities such as: oil refining base, “Vtorcvetmet” (used batteries and accumulators), and enterprises specializing on demercurization.

42. Non-hazardous waste need to be separated on recyclable (scrap metal, paper, cardboard, cellophane or plastic packing) and non-recyclable (broken bricks, pieces of concrete). Recyclable waste should be sent on relevant waste treatment facilities. Non-recyclable waste will be disposed on the municipal landfill. For this, PIU-T has to conclude agreement with regional entities “Toza hudud” (under State Nature Protection Committee) responsible for wastes collection and disposal. During operation phase mostly domestic wastes and used oil will be generated which could be utilized in the the same way as described in above paras.

43. IEE also has to include assessment of noise impact during construction phase. Calculation of noise level could be undertaken in accordance with the guideline “Construction noise impact assessment”[3] or other available noise calculation methodology. Depending on type of receptors (residential, industrial/commercial areas, hospitals, schools and etc.) different limits will be applied for assessment. Since national standards for noise level (SanR&N No.0267-09. Admissible noise level into the living area, both inside and outside the buildings) are the same as international (IFC General Environmental, Health and Safety Guidelines (April 2007)), the national standards may be used as limits.

44. In case of exceeding limits, the IEE has to provide mitigation measures in order to bring noise to the acceptable level. The following measures could be used as mitigation:

- Construct noise barriers, such as temporary walls or piles of excavated material, between noisy activities and noise-sensitive receivers;
- Re-route truck traffic away from residential streets, if possible. Select streets with fewest homes, if no alternatives are available;
- Site equipment on construction lot as far away from noise sensitive site as possible;
- Construct walled enclosures especially noisy activities, or clusters of noisy equipment and etc.

[3] Chapter 7. Construction noise impact assessment, Biological Assessment Preparation “Advanced Training Manual Version 02-2012”

45. The same guideline or "Transportation and Construction Vibration Guidance Manual"[4] could be used for vibration assessment during construction phase. However, it is very unlikely that vibration impact will be significant at that stage. Usually, such impact occurs during blasting works or drilling piles. However, if depot rehabilitation will require conduction of drilling piles, or rehabilitating depots will be located close to historical or fragile buildings, vibration assessment need to be undertaken and mitigation measures will have to be developed.

46. For operation phase, assessment of noise and vibration level is essential. Noise and vibration modelling needs to be undertaken to ensure that due to increasing frequency, speed and loading weights of trains movements noise level will not exceed limits[5]. It should be noted that these standards will apply when an ambient noise level before project commencement is not exceed limits (45 dB night time and 55 dB for night time for residential area and etc.). If baseline survey shows exceeding limits, than, in accordance with IFC guideline, "noise impact should result in a maximum increase in background levels of 3 dB at the nearest receptor location off-site"[6].

47. To evaluate noise impact, such factors as expecting number of trains per day, distribution of train frequency during the whole day (day time and night), trains types (passenger, freight and shunting), number of wagons, technical specifications of trains, speed need to be considered.

48. The model needs reflect specific features of site as well – relief, elevation and height of structures and etc. Noise propagation has to be done for both day time and night time. To implement modelling the latest models available in the market that most accurately calculate noise values for line sources of noise in urban environments has to be used. Detail Term of Reference for noise and vibration modeling is presented in Attachment 3. The same model could be used for noise and vibration level assessment during construction phase.

49. Based on the above studies, IEE will propose various mitigation scenarios that would ensure that the national and WHO standards contained in the WB EHS Guidelines are met for the sub-project area.

50. The following mitigation measures could be used for decreasing noise level from train movements:

- Greening of area adjusted to railway alignment;
- Installation of acoustic screens;
- Grinding wheels and rails;
- Improve noise protection of receptors through installing double glazing windows and etc.

51. The IEE report should include a fully costed Environmental Management Plan (EMP) for rehabilitated depots. The environmental management chapter of IEE should describe environmental mitigation measures, a monitoring program, capacity building measures and institutional arrangements for EMP implementation, based on assessment of the capacity of

[4] Chapter 7.2 Transportation and Construction Vibration Guidance Manual, California Department of Transportation, 2013

[5] SanR&N No.0267-09. Admissible noise level into the living area, both inside and outside the buildings

[6] IFC General EHS Guideline, Noise Management, 1.7 Noise, Noise level guideline,

the Government and UTY in addressing environmental problems. Detail description of institutional arrangements for the current project is provided in section F of this EARF.

52. Proposing mitigation measures have to be summarized in the EMP table with indication a type of impact, proposing mitigation measures, responsible organization, and cost of measure implementation. Typical EMP is presented in Table 2. The identified sub-project impacts will be separated on three stages: pre-construction, construction and operation.

Table 2: Environmental Management Plan

Impact	Mitigation measures	Responsible	Cost

53. To monitor compliance with EMP during sub-projects implementation and operation phases an environmental monitoring plan will be developed within IEE. The environmental monitoring plan should include information on parameters which need to be measured, location of monitoring points, frequency, standards (limits) and responsible party. The typical environmental monitoring plan is presented in Table 3. Monitoring Plan also has to clear indicate activities during construction and operation phases.

Table 3: Environmental Monitoring Plan

Parameter to be monitored	Location	Frequency	Responsibility	Standards	Cost

54. If the existing facilities will be rehabilitated or reconstructed as part of the Project, environmental audit needs to be undertaken to check whether the existing facilities, including the alignment and associated facilities, are in compliance with the Government environmental requirements, and with ADB's environmental safeguards requirement.

55. If discrepancies or incompliance will be identified, corrective actions should be proposed for each area of concern, including costs and schedule before and during the project implementation. The Environmental Compliance Audit Report could be attached as an appendix of the IEE.

E. ANTICIPATED CLIMATE CHANGE IMPACT

56. Anticipated climate change impacts in Uzbekistan is provided Third National Statement on Climate Change under UNFCCC in 2016[7]. Among all climate change consequences, the following may impact on railway operation: (i) increasing of temperature of air with increasing amplitude of temperature fluctuation during the year, (ii) changes in distribution of precipitations during the year, (iii) increasing risk mudflows in mountain and foothills areas, and (iv) intensification of desertification process in plains. According to model, avalanche risk will decrease due to climate change.

[7] Uzbekistan's Third National Statement on Climate Change under UNFCCC, Uzhydromet, 2016

57. In accordance with results of Preliminary Climate Risk Screening conducted by ADB specialist, this project was categorized as medium risk project. Locomotives purchased under this project will be used on existing rail network, areas of which may be exposed to climate change related hazards. The project may also upgrade existing depots located away from climatic and geophysical hazards.

58. Due to increasing temperature, extremes will change - maximum temperature during the day time and night time will rise, which may impact on equipment performance. The locomotives will be selected and designed to withstand use in harsh climatic conditions, including extreme temperature events and mountainous terrain. General technical specifications for the electric locomotives included in the bidding document define ambient temperature regime at relative humidity 90% as between -40° and +50° C. Therefore, these locomotive will sustain operate even in conditions of expected raising of temperature. Depot upgrades will be non-structural and within well-tested parameters.

59. Fluctuations in climate parameters will affect the level of maintenance required for the electric locomotives. The project intends to help the EA procure spare parts to ensure good maintenance. Climatic events may impact rail operations in general. The aforementioned design recommendations will help reduce such risks.

60. As it mentioned in Introduction part to this EARF, the project will have significant positive impacts: improvement of local environment through avoiding air pollutants from diesel locomotives and reduction of GHGs due to switching to fuel with less emissions of CO_2.

F. CONSULTATION, INFORMATION DISCLOSURE, AND GRM

61. Should any sub-projects be classified as Category “B”, it is important that aspects relating to consultation, information disclosure and grievance redress mechanisms also be thoroughly considered and reflected in the IEE. UTY as Executive Agency will be responsible for conducting meaningful public consultations among the key stakeholders and all affected people. Such consultations should be conducted during all stages of the project cycle – starting from the pre-construction phase and continue during construction and operation phases. Residents of houses located next to the depots will be considered as affected people. Representatives of local communities, regional branches of nature protection committee need to be consulted as well.

62. At least one round of consultation shall be conducted for each settlement located next to the depot to be upgraded. Public Consultations have to be conducted at the stage of IEE preparation. Announcements about planning consultation could be placed in local media or public place to make sure that all interested parties, affected people are aware about planning event. During the consultation a brief information about the planning works in depot, anticipated impacts on environment and population if any, proposing mitigation measures have to be disclosed. Also proposing Grievance Redress Mechanism (GRM) have to be discussed with stakeholders and affected people. Minutes of public consultation have to include information on date and place of conducted consultation, number of participants, questions and concerns raised during consultations and given answers.

63. All concerns raised by participants during public consultations have to be considered in the IEE. Further consultations must be carried out if there are any changes in subproject details and context to ensure that all environment related concerns of the affected persons are addressed.

64. Final version of IEE needs to be disclosed on ADB website and on the UTY website in local language prior the project's construction/upgrading commissioning. Semi-annual environmental monitoring reports also need to be disclosed on ADB and UTY websites during the project implementation. If category of the project remains as C, only EARF will need to be disclosed on ADB and UTY websites.

65. The purpose of GRM is to receive and facilitate resolution of affected people's concerns and grievance about the UTY's social and environmental performance at the project level. After signing a loan agreement between UTY and ADB, UTY will institutionalize and maintain GRM by an administrative order or decision. A new GRM will be established for this project. The GRM for the current project was discussed and agreed with PIU-T, as presented in Attachment 4. The grievance mechanism should be scaled to the risks and adverse impacts of the project. Therefore, if the project is later reclassified as "B", the GRM will also need to be reviewed and modified if deemed necessary.

G. INSTITUTIONAL ARRANGEMENT AND RESPONSIBILITIES

For implementation of this EARF

66. The project implementation unit for locomotives (PIU-T) established by UTY, with experience of international financing institutions' procedures and policies, will be responsible for overall implementation of the project, including adherence to ADB's SPS 2009. The technical and administrative departments of UTY will also assist the PIU-T during the project implementation. For the implementation of the updated business plan, a working group, under the supervision of UTY management will be maintained.

67. The PIU-T carries out its activities during preparation and implementation of investment projects, including development of bidding documents for purchase of freight and passenger electric locomotives with assistance of specialists from associated related departments of the UTY.

68. The PIU-T comprises 3 core staff including head, chief procurement specialist/accountant, and locomotive specialist. Technical and administrative departments of UTY also assist PIU-T during project implementation. PIU-T will also liaise with departments in charge of locomotive depots for their upgrading.

69. PIU-T will be responsible for the implementation of this EARF, including facilitation of GRM, and assessing the environmental categorization of additional sub-projects in the unlikely case that they may be identified and added as part of the project scope.

For IEE preparation and EMP implementation in the case of the sub-projects being categorized as "B" for environment

70. If additional sub-projects are categorized as "B" for environment for purposes of ADB's SPS 2009, PIU-T will be ultimately responsible for the conduction of environmental assessment, information disclosure procedure, conduction public consultations etc. for such sub-projects, based on this EARF, and recorded in an IEE.

71. For development of IEE(s), the PIU-T will mobilize qualified environmental specialist(s). The PIU-T environmental specialist will be responsible for timely preparation of the IEE(s) for the depots in a manner satisfactory to ADB.

72. The environmental department of design institute under UTY (Boshtransloyiha) will be responsible for preparation of national environmental assessment and receiving all required permissions.

73. During the project implementation, a depot's construction brigade will be responsible for the EMP implementation. PIU-T's environmental specialist will be responsible for monitoring of EMP implementation and she/he will be assisted by environmental specialists of rehabilitated/upgraded depots who can conduct monitoring on a daily basis. During project operation phase, depots' environmental specialists will be in charge for compliance with EMP and national environmental requirements.

74. If any instrumental measurements of air, water quality or noise level are needed to be conducted during project construction or operation phases, UTY's sanitarian epidemiological station (SES) could be involved.

75. The estimated cost for IEE(s) development and EMP implementation is presented below, in the eventuality that additional sub-projects of "B" category are identified and added as part of the project scope:

Table 2: Cost estimates for IEE preparation and EMP implementation

Item	Unit	Quantity	Unit cost ($)	Total cost ($)
PUI-T's Environmental Specialist: Remuneration	Person-month	6	1200	7200
Per-diem and transportation	Lump-sum	1	2000	2000
Data collection, noise and vibration modelling	Lump-sum	1	10000	10000
Report preparation, communication, consultation	Lump-Sum	1	2000	2000
Total				**21200**

H. MONITORING AND REPORTING

76. These monitoring and reporting requirements will arise if additional sub-projects are categorized as "B" for environment for purposes of ADB's SPS 2009.

77. The PIU-T environmental specialist will be responsible for monitoring of EMP implementation.

78. If any instrumental measurements of air, water quality or noise level are needed to be conducted during project construction or operation phases, UTY's sanitarian epidemiological station (SES) could be involved

79. PIU-T will be responsible for timely submission of EMRs to ADB on semi-annual base. The format of environmental monitoring report is provided in Attachment 5.

ATTACHMENTS

Attachment 1. Calculation of GHGs emissions for electric and diesel locomotive

Greenhouses gases (GHG) calculations were done in collaboration with TRTA's Consultant on locomotives and in consultations with experts from UTY's and Tashkent Institute of Railway Engineers. The calculation was done with following assumptions:

(i) the same maximum load for electric and diesel locomotives (t-km);

(ii) similar mountain plan and profile (difficult relief) of alignment.

Technical parameters of diesel locomotives which are currently operated on the Uzbekistan railway, technical specifications of electric locomotives procuring under the current project and static characteristics of railroad were used as basic parameters.

Calculation were done based on the Guideline for GHG Emissions (GGHGE) of Asian Development Bank Projects (Addition guidance for transport sector). GHGs emissions were calculated only for operation phase (Table 3, GGHGE), since during depots upgrading works CO_2 emissions will be negligible in comparison with emissions during operation phase. Emissions factors for diesel, gas and coal were used in accordance with data of UK Department for Business Enterprise & Regulatory Reform (2007, Table 5C: Estimated carbon dioxide emissions from power stations in 2006).

Diesel emission factor was used for calculation CO_2 emissions from diesel locomotives. A conversion factor to convert kg of used diesel in liter was accepted equal 0.83. For Uzbekistan conditions this factor during summer season is 0.82 and for winter season is 0.85. Taking in account long hot season, an average annual conversion factor was accepted equivalent 0.83.

Amount of energy which would be consumed by electric locomotives was calculated based on distribution of source of fuel for energy production in Uzbekistan. In accordance with official data[8], 94,1% of energy in Uzbekistan is producing from natural gas and 4.9 % - from coal. The same ratio with relevant emission factors (for gas and coal) was used for calculation CO_2 emissions from electric locomotives.

In addition, it should be noted that, a theoretically 14.5 kg of air is required for the combustion of 1 kg of diesel during nominal operation of diesel locomotive. During operation on idle the air flow rate increases by 5-6 times. The current calculations were done for scenario with nominal operation regime of diesel locomotive (minimal air consumption). In reality, due idle, CO_2 emission will be even higher.

Summary of CO_2 calculations from electric and diesel locomotives is presented in below table.

#	Items	Trains	
		Freight	**Passengers**
	Electric locomotives		
1	**Daily capacity of one locomotive, km-t** (#2 x #3)	**1440000**	**840000**
2	Weight of train, ton	3000	1200
3	Daily running distance of one locomotive, km	480	700
4	**Time of one locomotive operation with maximal loading, hours/day** (#3 x #5)	**6.9**	**10**
5	Train speed, km/h	70	70
6	**Daily energy consumption by one locomotives, MWh**	**99**	**96**

[8] http://www.uzbekenergo.uz/ru/activities/technical-and-economic-indicators/

#	Items	Trains	
		Freight	**Passengers**
	(#4 x #7)		
7	Hourly energy consumption (MWh) of one locomotive, as per technical specification	14.4	9.6
8	**Internal energy consumption (for ventilation, heating and etc.) by one locomotive, MWh** ((1- #9) x #7 x #10)	**49.68**	**21.6**
9	Energy Efficiency	0.85	0.85
10	Working hours of one electric locomotive, hours	23	23
11	**Calculation of recuperative energy, MWh** (#6 + #8) x #12	**37.1**	**29.4**
12	Rate of returning energy in networks is up to 35%. Considering the worse case - option with 25% is calculated	25	25
13	**Energy consumption by each type of locomotives during one year, MWh** ((#6 + #8 - # 11) x #17 x 365)	**650092**	**257544**
14	**Total energy consumption with losses in electricity, MWh/year** (#13 x #15)	**715101**	**283298.4**
15	Losses in electricity network	1.1	1.1
16	**Total CO_2 emissions for locomotives, ton per year** (#14 x #18 / 1000000 * 1000)	**279672**	**110800**
17	Number of procured locomotives	16	8
18	gramCO_2 emission/(gas+coal) ton	391.09	391.09
19	**Total CO_2 for freight and passenger electric locomotives, t/year**	**390468**	
	Diesel locomotives		
20	**Diesel fuel consumption by each type of locomotive, kg** (#6 x # 21 x #22 x #23) x 1000	**272471040**	**132451200**
21	Coefficient for calculation the total fuel consumption with consideration losses on diesel and own needs	**1.25**	**1.25**
22	coefficient for fuel consumption during parking, maneuvering, diesel heating and other	**1.8**	**1.8**
23	the amount of diesel fuel in kilograms for the creation of one effective kWh of energy	**0.21**	**0.21**
24	**Total diesel fuel consumption by each type of locomotive, liter/year** (#20 / #25)	**328278361**	**159579759**
25	Conversion factor	0.83	0.83
26	**Total CO_2 emissions for locomotives, ton per year** (#24 x #26)/1000000	**877816**	**426716**
27	gramCO_2 emission/diesel liter	2674	2674
28	**Total CO_2 for freight and passenger diesel locomotives, t/year**	**1304533**	
29	**Difference in CO_2 emissions between electric and diesel locomotives** (#29 - # 19)	**914064.5**	

Attachment 2. REA checklist

Instructions:

(i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Environment and Safeguards Division (SDES), for endorsement by Director, SDES and for approval by the Chief Compliance Officer.

(ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.

(iii) Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title:

Sector Division:

Screening Questions	Yes	No	Remarks
A. Project Siting Is the Project area adjacent to or within any of the following environmentally sensitive areas?			
▪ Cultural heritage site			
▪ Legally protected Area (core zone or buffer zone)			
▪ Wetland			
▪ Mangrove			
▪ Estuarine			
▪ Special area for protecting biodiversity			
B. Potential Environmental Impacts Will the Project cause…			
▪ impairment of historical/cultural areas; disfiguration of landscape or potential loss/damage to physical cultural resources?			
▪ disturbance to precious ecology (e.g. sensitive or protected areas)?			
▪ alteration of surface water hydrology of waterways resulting in increased sediment in streams affected by increased soil erosion at construction site?			

Screening Questions	Yes	No	Remarks
▪ deterioration of surface water quality due to silt runoff and sanitary wastes from worker-based camps and chemicals used in construction?			
▪ increased air pollution due to project construction and operation?			
▪ noise and vibration due to project construction or operation?			
▪ involuntary resettlement of people? (physical displacement and/or economic displacement)			
▪ disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?			
▪ poor sanitation and solid waste disposal in construction camps and work sites, and possible transmission of communicable diseases (such as STI's and HIV/AIDS) from workers to local populations?			
▪ creation of temporary breeding habitats for diseases such as those transmitted by mosquitoes and rodents?			
▪ social conflicts if workers from other regions or countries are hired?			
▪ large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?			
▪ risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation?			
▪ risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation?			
▪ community safety risks due to both accidental and natural causes, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?			
▪ generation of solid waste and/or hazardous waste?			
▪ use of chemicals?			
▪ generation of wastewater during construction or operation?			

Attachment 3. Terms of reference for noise and vibration modeling

Noise and vibration modeling needs to be performed in order to assess how the project can meet the WHO standards contained in the World Bank Group's Environmental, Health and Safety Guidelines (WB EHS Guidelines) for noise and Transportation and Construction Vibration Guidance Manual, California Department of Transportation (2013) for vibration. Results of modeling will provide data on baseline situation and after project implementation.

Tasks and Scope of Work:

- Prepare a comprehensive noise and vibration baseline of the project area, near the identified sensitive receptors next to depots;
- Conduct noise and vibration modelling during construction and operation phases in the residential areas using the WHO standards as contained in the WB EHS guidelines (for noise) and in Transportation and Construction Vibration Guidance Manual, California Department of Transportation, 2013 (for vibration) using latest noise and vibration models available in the market that most accurately calculate noise and vibration values from railway operation in urban environments;
- Based on the above studies, propose various mitigation scenarios that would ensure that the WHO standards contained in the WB EHS guidelines are met for the project area for noise and standards, indicated in Transportation and Construction Vibration Guidance Manual, California Department of Transportation for vibration;
- Provide the cost for all mitigation scenarios;
- In order to perform the noise modeling accurately, additional surveys or baseline data on the topography and housing elevations in the area will need to be acquired, other supporting data and information if required will have to be acquired or measured.
- For vibration modelling additional surveys or baseline data on condition of structures located along the railway, presence of historical buildings and sensitive receptors (hospitals, schools, sensitive to vibration devices and etc.) if required will have to be acquired and measured.

Attachment 4. Proposing GRM

1.1 Objectives

In accordance with ADB SPS (2009), Grievance Redress Mechanism (GRM) will be established after the project effectivity, The main goals of GRM are ensuring the receipt and timely redress of grievances and concerns submitted by the aggrieved project affected persons, and resolve complaints at the project level and prevent escalation to the national courts or ADB Accountability Mechanism. A grievance mechanism will be established to allow affected persons appealing any disagreeable decision, practice or activity arising from land or other assets compensation. APs will be fully informed of their rights and of the procedures for addressing complaints whether verbally or in writing during consultation, survey, and time of compensation.

The grievance mechanism shall not impede access to the country's judicial or administrative remedies. Affected persons can approach a court of law at any time and independent of the project level grievance redress process. Along with the ADB requirements on development and approval of grievance redress mechanism by implementation of investment projects, grievance redress procedure in Uzbekistan is also regulated by the national legislation of Republic of Uzbekistan, in particular by the law "On Citizens' Applications" and the "Law on the order of submission of appeals of physical and legal entities" ((#378, 03 December 2014). According to the "Law on the order of submission of appeals of physical and legal entities", the application or complaint shall be considered within fifteen days from the date of receipt in the state authority, which is obliged to resolve the issue on the merits, as well as require additional study and (or) check, a request for additional documents - up to one month. The submission procedure for grievances and citizens' applications has been discussed during the public consultations in the project districts.

1.2 Grievance Redress Mechanism

The GRM for the current project takes into account the national legislation, the specificity of the project sites and results of public consultations. The APs will have the right to file complaints and queries on any aspect of environmental issue, land acquisition compensation and resettlement. PIU (UTY) will be responsible for establishment of GRM after the project effectivity and act as the GRM secretary to make sure that the GRM is operational to effectively handle environmental and social concerns of project affected persons.

The proposing GRM was discussed PIU-T manager and. PIU-T will ensure that grievances and complaints on any aspect of the environmental aspects, land acquisition, compensation, and resettlement are addressed in a timely and satisfactory manner. All possible avenues are made available to the APs to resolve their grievances at the project level. Under the proposed project level grievance mechanism, affected households may appeal any decision, practice or activity connected with environmental aspects, the assessment or valuation of land or other assets, acquisition and compensation. APs will be made aware of the procedures they can follow to seek redress, including, if necessary resort to the courts through the Government's grievance mechanism.

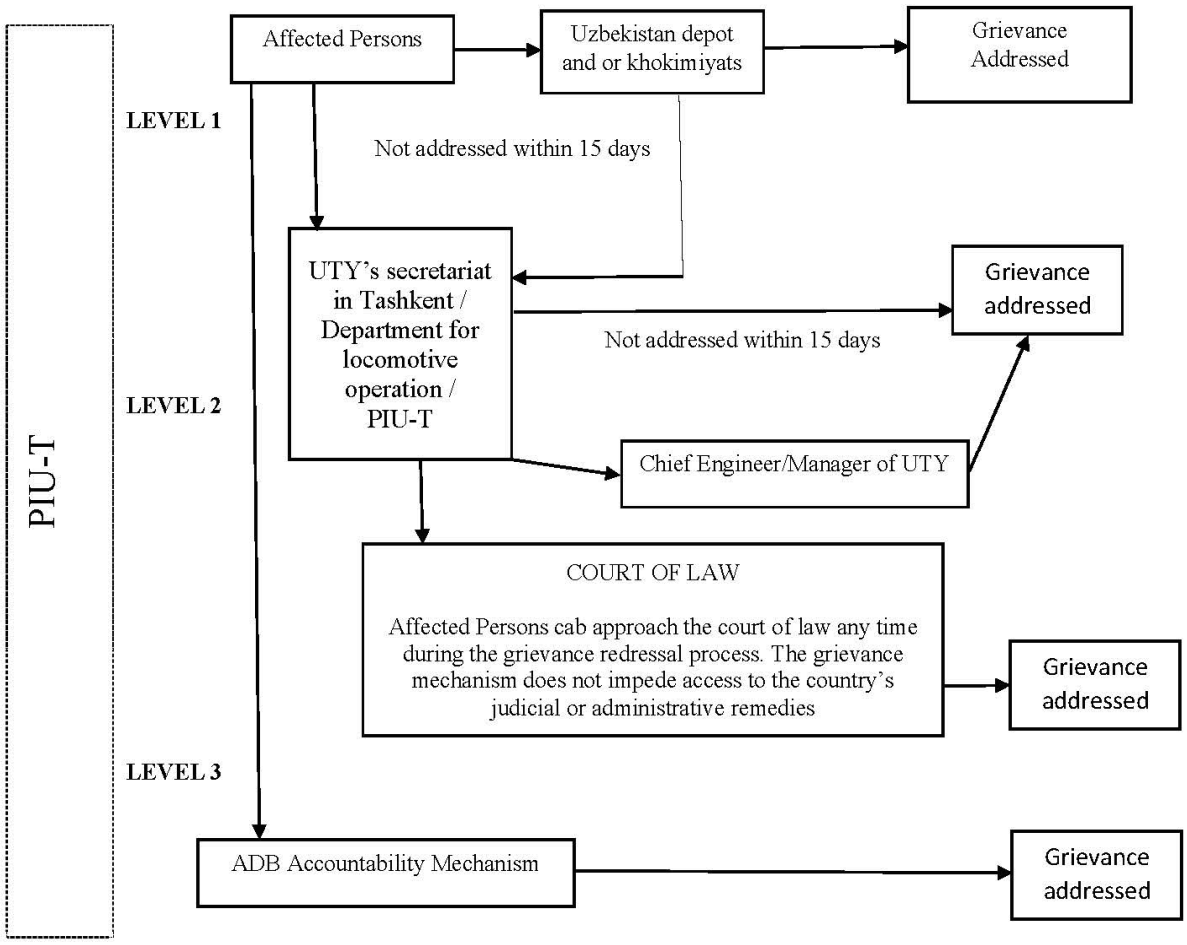
Level/Steps	Process	Timeline
Level 1- O'zbekistan (or other rehabilitated) depot(s), or district khokimiyats	The aggrieved person submits a grievance at O'zbekistan depot (or other rehabilitated depots) or khokimiyats. A designated focal point from depot will receive, register grievance and forward it daily to the Chief Engineer at O'zbekistan depot (or other rehabilitated depots). The alternative grievance entry points will be khokimiyats due to their obligations defined by the national legislation. After receiving grievances, the designated focal point from depot will review and asses the nature/specificity of the grievance, inform the Chief Engineer and forward grievances to the relevant party for resolution. Depending on the nature of grievance, it may be forwarded to Contractor (depot construction brigade), Land Cadaster, Makhalla or district branch of Nature Protection Committee. For example, complaints related to resettlement issues may be forwarded to Land Cadaster, khokimiyat and makhallas. In case of environmental issue, compliant will be forwarded to Contractor (depot construction brigade) or District Nature Protection Committee. The Chief Engineer will deal with grievances related to impact caused by the locomotive depots only.	15 days
Level 2 - UTY's secretariat in Tashkent	In case the grievance was not redressed at the first stage or the aggrieved person is not satisfied with the decision made, s/he can submit the grievance directly to UTY's secretariat in Tashkent. In accordance with the established procedure, the secretariat will forward complaints to Department of locomotive Operation to redress it. In case the grievance is not related directly to the project, the aggrieved person will be directed to appropriate departments where s/he should apply for the decision making. If the grievance was not redressed at the level of Department of Locomotive Operation, the grievance will be submitted to UTY's Chief Engineer and he will appoint special commission for redressing grievance.	30 days
Level 3- Economic Court	If the issue was not solved or the applicant is dissatisfied with the decision/resolution, the aggrieved person may submit grievance to the Economic Court (Court of Law) where decision will be made in accordance with relevant national legislations. However, a complainant may approach the court of law at any time during the grievance redressal process.	

1.3. GRM Records and Documentation

Most of grievances on environmental aspects, land acquisition and resettlement issues are redressed at 1-2 levels. All grievances received from the population will be registered in a logbook which should be available at all levels: at the O'zbekiston depot (or other rehabilitated depots). Besides, there are also logbooks in the khokimiyats where the grievances from the population are usually registered. Even so, the information on received by depots grievances and applications from the aggregated persons, and undertook measures should be submitted to the representatives of PIU-T on the project site for the accounting all grievances. Thereafter the information on all received grievances will be collected at the PIU-T.

The aggrieved persons can also use the ADB Accountability Mechanism (AM) through the direct citizens' application to the Head Quarter in Manila, particularly to Complaints Receiving Officer, Accountability Mechanism Asian Development Bank Headquarters 6 ADB Avenue,

Mandaluyong City 1550, Philippines Email: amcro@adb.org, Fax +63-2-636-2086. AM is the last resort and ADB has its availability as a recourse in case other mechanisms for dealing with harmful project effects are not successful. GRM is required by SPS (2009) and the use of project level GRM should be encouraged first.



Attachment 5. Outline of Environmental Monitoring report

Semi-annual Environmental Monitoring Report

Project Number: {XXXXX}
{Reporting period: Month Year}

{Full Country Name}: {Project Title}
{(Financed by the <source of funding>)}

Prepared by {author(s)}

{Firm name}

{City, country}

For {Executing agency}
{Implementing agency}

Endorsed by: (staff name of IA/PIU) and signature, submission date

Table of Contents

Part I Introduction

- Construction activities and project progress during the previous 6 months.
- Changes in project organization and environmental management team.
- Relationships with contractors, owner, lender, etc.

Part II Environmental Monitoring

Summarize the previous 6 months of environmental monitoring data, and provide explanations of any instances in which environmental standards or guidelines were exceeded. Typically, this will cover:

- noise and vibrations,
- water quality,
- air quality, and
- flora and fauna monitoring.

Recommendations are required to show how any exceedances will be prevented in the future.

Graphs can be used in this section to show trends, but large tables of data or multiple graphs should be attached in an appendix.

Part III Environmental Management

- The environmental management system (EMS), site-specific environmental management plan (SEMP), and work plans – to report on delivery of documents, required amendments, etc.
- Site inspections and audits – to summarize the number and type of site visits.
- Noncompliance notices – to summarize the details, including the number of notices given out, the issues covered, and the ranking of issues.
- Corrective action plans – to report on timeliness of preparation and completion.
- Consultation and complaints – to report on any consultations undertaken and list any complaints received.

Annexes

- Monitoring data.
- Photographs.
- Implementation report on the environmental impact assessment (EIA)/initial environmental examination (IEE) mitigation requirements, using the following format:

Reference	Requirement	Action to date	Action required/comment