

Environmental Assessment Report

Summary Initial Environmental Examination Report
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Uzbekistan: CAREC Regional Road Project

Prepared by the Republican Road Fund for the Asian Development Bank.

The summary initial environmental examination is a document of the borrower. The views expressed herein do not necessarily represent those of ADB's Board of Directors, Management, or staff, and may be preliminary in nature.

Abbreviations:

ADB	Asian Development Bank
CAREC	Central Asia Regional Economic Cooperation
CSE	Construction Supervision Engineer
dB(A)	Decibel Acoustic
EA	Executing Agency
EMP	Environmental Management Plan
FS	Feasibility Study (2006, IKS Consultant)
GDP	gross domestic product
GOSCOMPRIRODA	State Committee for Nature Protection
GoU	Government of Uzbekistan
IEE	Initial environmental examination
PCE	Passenger car equivalent
PIU	Project Implementation Unit
PPTA	Project Preparatory Technical Assistance
RoU	Republic of Uzbekistan
RoW	Right of Way
SIEE	summary initial environmental examination
TPM	total particulate matter
URF	Uzbekistan Road Fund
UTY	Uzbekistan Temir Yullari (Uzbekistan Railway Agency)
UZB	Uzbekistan
UZAVTOYUL	Road Agency (of Uzbekistan)

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CURRENCY EQUIVALENTS
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SUMMARY INITIAL ENVIRONMENTAL EXAMINATION

A. Introduction

1. The Project is classified environment category B in accordance with the Asian Development Bank's (ADB's) *Environmental Assessment Guidelines*. The summary initial environmental examination (SIEE), prepared by the project preparatory technical assistance (PPTA) consultant on behalf of the Republican Road Fund (the Road Fund, URF), is consistent with the requirements of ADB's *Environment Policy (2002)* and *Environmental Assessment Guidelines*. The Project will comprise upgrading of a section of national highway A-380, and will not involve realignment or construction of bypasses or diversions. As such, it does not fall under the type of projects that require an environmental assessment based on the Law on Ecological Expertise, 2000¹. All project activities will be confined within the right-of-way and that no significant realignments or interference with any natural habitat will take place.

B. Description of the Project

2. The Project will have three components: (i) road construction; (ii) road equipment acquisition; and (iii) consulting service for construction supervision and management. The Project will involve resurfacing and widening of a 91 km sections of the A-380 highway running through Central Uzbekistan, located in Karalpakstan Republic (28km) and in Kharezmi Province (63km). The section will be divided in 3 sub-sections of almost equal length, corresponding to Contract B2 (km 490-520), B3 (km 520-553) and B4 (km 553-581). 96% of the alignment passes through uniform habitats of Kyzylkum Desert.

3. Upgrading shall be confined within the existing 50-meter (m) right-of-way (25 m on either side of the road centerline). The upgrading will involve construction of 4 lanes, with pavement surface being cement concrete. The main working width will be 19.1 m centered over the existing carriageway. Construction and movement of materials will take place along the highway, so access roads will not be necessary. The Project will not involve land acquisition and resettlement. Rehabilitation works will require 2.83 million cubic meters (m³) of earthworks for subgrade and base course, 285,000 m³ for base course cement treatment, and 433,000 m³ for cement concrete pavement. Site works are expected to commence in late 2009, with actual work progressing for approximately 12 months. Construction material sources are abundant in the Project Area. Water for construction purposes will be piped from nearby Amudarya Reservoir and from large irrigation canals. The widening of the carriageway necessitates the removal of several hundred mature trees, all of which are planned to be substituted after work completion, following a detailed re-vegetation plan.

C. Description of the Environment

4. **Topography and Geology.** The topography of the land through which the two road sections pass includes mostly desert and slightly undulating terrain, as found at the boundary of the Amudarya River valley. The geology of the area consists of a mixture of sandstone and limestone, overlain with sand. Several stretches have prominent concentrations of salt crusts on the surface. Nearly all towns and villages in the vicinity of the road are located in the irrigated river plain and the delta of the Amudarya, a minimum of 5–10 km away from the road right-of-way, leaving the project roadsides almost totally uninhabited. Neither of the project road sections passes across or close to the river valley proper.

Map 1: Overview of the geographic location for the 3 Sub-Sections B2 – B4

¹ Included in the New Laws of the Republic of Uzbekistan Edition 23. Amendments were published in the Narodnoye Slovo in July 2000



5. **Climate, Air Quality, and Noise.** The project area has a southern temperate continental desert climate, with extremely hot summer temperatures exceeding 45°C and virtually no rain. December through February is the winter period, with temperatures dropping below –15°C, but more often around the freezing point or above 0°C. Temperatures begin to climb in March, accompanied by occasional rain (200 millimeters or less) and sometimes accompanied by flash floods. In these dry desert conditions, daily temperature fluctuations can be as much as 30°C. Snow cover is unstable and insignificant; the average frost penetration is about 80cm. The pronounced climatic fluctuations affect the conditions and stability of the present roadway structure and pavement, rendering the road often dangerous and unreliable.

6. Frequent dust storms occur during the summer months of March to May when winds exceeding 100 km/hour generate large disturbances, significantly raising the levels of total suspended particulates in the project area. Fine salt is also dispersed into the air mass during such storms.

7. There is no industry anywhere along the project alignment—air remains relatively free from gaseous emissions. Ambient air quality is currently not an issue due to low traffic intensity.

8. During the field investigation, no noise sensitive sites were identified along the alignment. Traffic-related vibration impacts are equally not an issue.

9. **Water Resources.** Aside from occasional rainfall and flash floods, the road does not pass over any surface water. The shallow groundwater aquifer is >25 m below the surface, saline, and polluted due to intensive pesticide and fertilizer use, especially in Khorezm Province. Groundwater at a depth of 100–150 m is also contaminated.

10. All along the sub-sections B2-B4, water availability is assumed to be no issue as there are two water sources in close vicinity (1-7 km, Map 1) being (a) the Tuyamuyun Reservoir established in 1979 with the erection of Tuyamuyun Dam, and (b) the right embankment irrigation channel running more or less parallel and close to B4 subsection. Drawing the required water amount from these sources is unlikely to affect the local groundwater quality and discharge volume.

11. **Flora and Fauna.** The ecological zone through which the road passes is part of the Kyzylkum Desert. The fauna and flora is dominated by desert-adapted species – mostly small shrubs. In some areas where surface salt contents are prominent, the vegetation cover has almost completely disappeared.

12. Although the Red Book of The Rep. of Uzbekistan (2003) makes reference to the potential occurrence of rare and endangered species living in the Kyzylkum Desert, there are, according to Goscompriroda's environmental experts no explicit records for sensitive species or habitats for the entire Project Area. Basically the species quoted in the Red Book are recorded as 'living in the general area', but have not been sighted within 5 km of the road sections by experts. Historically the area was, prior to 1980, the migratory range of the saiga antelope, an endangered species and the goitered gazelle, a vulnerable species. Since that time over-hunting and the shrinking of the Aral Sea has decimated the population such that now only 10% of the original numbers are believed to remain. There is no danger that the project will interfere with these species, as long as hunting activities of contracted labor are strictly monitored and penalized.

13. **Economic Conditions, Health and Cultural Resources.** The project road section has no tangible economic or industrial activity going on, and the terrain adjacent to the roadway is generally unused and deserted. Occasionally, nomadic sheep and cattle herding takes place, thereby acerbating problems with sand dune migration and erosion. Generally, the few villages near the project road have electricity, but little else. Frequent power outages are experienced and basic household services such as piped potable water or indoor toilet facilities do not exist. Poverty index is rather high in these rural areas. Public transport links are provided to Bukhara and Turtkul-Urgench along the A-380.

14. In sections B2-B4, there is no mineral development along the RoW. However, the region has iron ore which is planned for future mining. In addition, regional development plans foresee the construction of a cement factory near Mishkin.

15. Income-generating activities of local residents are limited, resulting in high degree of poverty. It is, however, assumed that a good part of the local population will find temporary jobs related to the future road construction works.

16. Health conditions of local residents along the road are poor, characterized by relative high infant mortality, short longevity, high incidences of cardiovascular ailments and tuberculosis and cancer. Chronic respiratory problems are frequent, often caused by frequent sand storms and continual dry air. Local residents are usually deprived from good drinking water quality, causing a multitude of gastro-illnesses. Local health services suffer from poor equipment and staffing.

D. Alternatives

17. The 'No-Project' Option is invalid for this project for the following reasons: (i) There is no alternative transport connectivity in this region, connecting the country's economic centres with Karakalpakstan in the far West. (ii) The no-action variant would accelerate the present poor road condition to become soon unserviceable and requiring increased reconstruction costs. Therefore, the FS concluded that rehabilitate the existing road and improve, at certain sections, the connectivity is considered the most economic and feasible solution. (iii) The

project follows the political preference and a presidential decree to rehabilitate and modernize the entire road corridor, being favored as major economic link and drive by connecting Central Asian countries with Western Europe.

18. There are no alternate transport modes in this region. The existing railway net does not provide similar connectivity, and it would not provide the same linkage of certain regions within Uzbekistan. This is even more relevant as there are plans to develop the Navoi Region (situated half way between Urgench and Tashkent) is foreseen to become developed in near future into a Free Economic Industrial Zone. The road solution seems therefore the only feasible solution to provide transport for both passengers and goods, both on national and on international scale.

19. The option for a 4-lane and concrete pavement technical solution is economically justified in view of (i) saving of vehicle's operating costs, (ii) reduced travel time, (iii) sufficient availability of natural construction material and cement-producing industries, (iv) longer life for concrete pavement, thus reducing replacement and repair costs (v) sufficient availability of construction water sources. Other justifications are related to better all-weather road conditions, thereby increasing road safety in the prevailing harsh climatic conditions.

E. Anticipated Environmental Impacts and Mitigation Measures

20. **Pre-Construction Phase.** The decision to restrict the road upgrading to within the existing right-of-way and carriageway will keep construction impacts to a minimum. There will be no major change in the alignment. At a stretch of about 5 km at the end of sub-section B4 will require shifting the centerline for about 20-25 m due to the close presence of railway. Only three private structures will be affected. The GoU already undertook negotiations for removal and compensation of these structures (one butcher shop, one roadside café, and one small petrol pump station). Existing transmission lines and underground gas pipelines are located outside the right-of-way. A work boundary of 25 m from the centerline will be defined using fencing to ensure that construction equipment are kept within the work sites. The Road Fund also plans to bring all construction materials to the construction area in bulk by railcar and from nearby intermodal terminals. Large trucks (up to 26 tons) will be used to transport materials to the construction site. Construction vehicles and equipment will make use of the existing highway such that no new access roads need to be established. As part of the detailed design work, areas along section B2 that are prone to flash floods shall be identified by local road agency staff and these conditions shall be accommodated in the final design.

21. For the measures proposed in the Environmental Mitigation and Monitoring Plan (annex A) the proposed actions shall become legally binding through inclusion as environmental clauses in the loan agreement between the RoU and the ADB as well as the specifications in the contract-bid documents. It is mandatory to include environmental safeguard requirements into the contract specifications as a clause, and request from the contractors to fully use the EMP while preparing an environmental action plan defining specific steps to followed during the construction period.

22. In order to avoid contractors claiming their ignorance on failures with regard to the measures worked out in the EMP it is absolutely necessary to ensure that the contractors will obtain the full copy of the IEE. For domestic contractors this document needs to be translated, for international contractors, the English version shall be binding. It is necessary that all contractors will, from the very beginning of mobilization, stay in close contact with the Project's Environmental Supervision Consultant to clarify any disagreement and discrepancies with respect to carrying out the works in an environmentally safe manner. To meet the requirement of mutual understanding, a 2 days initial training workshop is recommended that will bring together all parties involved. The workshop will focus on environmental safeguards and compliance requirements pertaining to the works.

Participation shall be mandatory for all key personnel of engaged contractors and sub-contractors. The workshop is to be held by the Project's Environmental Supervision Consultant. Each participant shall obtain a copy of the EMP.

23. **Construction Phase.** Construction period impacts associated with road rehabilitation in such an extensively disturbed, arid and remote area are few and involve: failure to apply good housekeeping practices during construction, noise, dust, and wind and rain-related erosion of exposed surfaces. More specific, potential impacts and the proposed mitigative actions will be:

- Failure to adhere to good housekeeping practices: Risks for both the physical and the human environment are likely to occur once the contractors do not adhere to good housekeeping practices at all work and camp sites, as stipulated in the Terms and Conditions of the Contract. Countermeasures need to be observed which will address: poor health status and financial situation of the laborers employed in these camps, sanitary facilities, appropriate dormitory facilities, general and specific work safety precautions, insurances, gender-biased employment practices, harassment, late or faulty payment of wages and child labor. Where applicable, the contractor shall prepare a traffic management plan to ensure that adequate vehicular and pedestrian access is provided at all times.
- Safe handling and storage of hazardous material: Fuel will be stored in an adequately protected area to prevent contamination of groundwater in case of spills or leaks. Construction camps shall be provided with septic tanks, and solid waste shall be properly stored and disposed of.
- Inappropriate management of earthworks, crushers and borrowpits: Large volumes of quarry rock, aggregate and sand will be transported and stored near the roadworks. These operations and storage areas will be constantly exposed to winds and will create primarily dust during the frequent windy conditions (sediment laden drainage water is not an issue since there is no water for this to drain to, thus simply percolating back into the surrounding soils during the rare rains). Dust control will be difficult given the scarcity of water. Dust at worksites and material piles will be controlled by watering, using water pumped from nearby water resources, loaded trucks fitted with canopies preventing spillage onto the highway and blowing dust. Dust control will be particularly stringent for mobile crushing plants, which can produce large plumes of fine dust that can become airborne many kilometers downwind of their location. The use of explosives will be regulated under strict management and precautionary measures. Environmental safeguards have been incorporated to provide for good practices during borrow and quarrying operations, and how to decommission the sites in an environmentally proper manner.
- Excessive withdrawal of construction and use water: Given the scarcity of fresh and good quality groundwater, in particular water suitable for use in concrete making, the plan foresees that the contractors will extract by pipeline the required volumes from nearby surface sources, namely the Tuyamuyun Reservoir and a large irrigation canal paralleling the road section B4. The Contractor will obtain licensed water extraction permits at meter-controlled extraction sites. A withdrawal monitoring program will be prepared in close consultation with local water management authorities. The daily maximum extraction volumes are subject to agreement and stringent monitoring by the licensing authorities. Failures in compliance will result in shut offs and penalties.
- Modification of surface drainage: Budget restraints and tight schedule could make contractors decide to skip proper surface draining repair and management during construction, leading to an array of potentially negative problems during the rare but intensive flash-flood events in some sections. In such spots, special precautionary measures need to be observed, such as provision of sufficient drainage, keeping clear drainage structures from any debris and providing for suitable technical solutions to facilitate the run-off from stormwaters. Construction inspection may therefore include the specific examination of existing / additionally needed culverts

and water channels in those areas subject to flash flooding to reconfirm that no drainage restrictions will result due to the construction work.

- Wind and rain erosion affecting embankment: Exposure of denuded ground to the frequent wind and rare rain events should be kept at minimum. Partially disturbed roadside terrain will need to be stabilized and re-vegetated as soon as construction is completed, to prevent sand dune migration and creation of hazardous road conditions.. Stabilization using reed mats and the planting of appropriate seedlings are the means of choice. Suitable desert shrubs need be selected as natural sand barriers. Waste sewage water shall be used for with watering such re-vegetated sites.
- Failure of compensation plantation program: The construction program incorporates a budget for replacement/revegetation of the roadside trees cut in Section B4 (between Ch km 569 and 581) It is recommended to replant the same natural mix of roadside trees as they were present before removal. No exotic species shall be allowed. Replanting includes local species of young trees of 2 and 3 years. The bill of quantities foresees compensatory planting in the said stretch with a quantity of about 10,000 pcs of young trees, to be executed by the contractor under guidance of the Resident Engineer and the control of the Project's Supervision Consultant. To ensure high survival rate of replanted trees, the contractor shall explore possibilities to engage roadside residents in the roadside maintenance program.
- Inadequate management of noise due to construction activities: Noise will be an overall minor construction period impact, since work will take place in rural isolated terrain with no population settlements along the road sections B2-B3. Only in section B4 there is a need to address construction-related noise development. As for the km 569-581 where sparse human settlement occurs, commendable countermeasures include observation of agreed work hours, suitable signage, the inclusion of 2 well-marked pedestrian crossings, regular speed controls and enforcement by road traffic police.
- Air pollution due to construction activities: Construction-period air pollution will be dust and emissions from operating machinery. Mobile aggregate crushing facilities and asphalt plants will emit CO₂, dust and some odor. It is assumed that the new mobile plants purchased as part of this loan will have dust suppression technology installed and as such will help to control the dust plumes that usually come from crushing operations. Emissions should be kept to a minimum given that state-of-the-art machinery will be used. Vehicle idling restrictions, modern converters and good vehicle maintenance are considered other effective means to contain air pollution.
- Failure of Contractor to prepare Final Report and proper decommissioning of sites: The contractor shall undertake proper decommissioning of work areas, work camp sites including waste dumps, and sealing/securing of wells newly dug for use during the construction period. Failure in compliance will result in payment withheld.

24. **Operation Phase.** With an expected small increase in traffic volume, associated impacts will likely be minor. Identified potential impacts and their respective mitigation proposals are:

- Degradation of local air quality with increased road traffic: The projected traffic volume increases are unlikely to cause local air pollution problems, particularly when viewed in relation to the continual presence of light to moderate local winds, and emission control technology improvements as well as the introduction of cleaner fuels. UZAVTOYUL shall continue maintaining revegetation areas. Measurements for NO₂, TPM, and CO₂ levels shall be taken at defined places and schedule, to identify any further action needed.
- Noise disturbance due to traffic increase: Noise conditions will be affected minimally due to increased traffic volume. The effects will be barely felt as there is no indication for roadside settlement development in near future. UZAVTOYUL shall continue

maintaining revegetation areas. Measurements shall be taken at defined places and schedule, to identify any further action needed.

- **Spill of hazardous and toxic material:** At present neither UZAVTOYUL nor the URF keep reliable accident records or have a written accidental spill protocol. This is in contrast to the national rail operator UTY which not only has a spill database but a spill management protocol and procedure. The mitigation planning shall therefore provide for a specific spill contingency plan and arrange that provincial offices be trained to respond adequately to such events..
- **Road safety and increased accident risks:** Causes for high road accident rates and risks are poor road condition, poor signage and road markings, risky driving habits, and poor technical reliability of road vehicles. Appropriate countermeasures may include:
 - (i) Improvement of road conditions, especially during winter and sand storm events; Regular patrolling of maintenance service, prevention of ice sliding, adequate winter preparation of carriageway, radio warning associated with weather forecasts including traffic warnings, identification and removal of black spots, fencing against crossing of animal herds where applicable, public awareness campaigns at local village level, schools, public media, improvement of driving license requirements and awareness campaigns including driving schools and road police patrols.
 - (ii) Improve signage and road markings, especially at identified black spots and at road sections where horizontal or vertical visibility is restricted; add signs indicating nearby ambulance and health posts for accident assistance; consider introduction of emergency telephone posts at regular intervals along road.
 - (iii) Intensify road control at identified black spots to improve driving discipline; announce intensified road controls in public media, making the public more aware of road accident risks and causes, educate on benefits of safe driving.
 - (iv) Initiate regular programs to check vehicle safety (e.g. axle load, number of passengers, brake conditions, lighting).
 - (v) Provide for rest areas in defined distances (max 25 km) along the road. These areas shall also be equipped with telephone posts for alerting traffic police and ambulances in case of road accidents.
 - (vi) Special attention will be given to the potential risks associated with nomadic groups traveling with their herds in the project area. Appropriate means of choice are suitable signage, awareness campaigns and increased traffic control during time of nomadic activities along the road corridor.

F. Economic Assessment and Anticipated Social Impact

25. Given the absolute small number of local residents, the construction works of the project road sections will on their own have little socio-economic effect and will generate few direct benefits other than during construction when some people from local communities will be employed. As more and more sections are upgraded and the highway has a uniform level of service along its entire length, benefits in terms of reduced travel time, more reliable transport service, greater passenger comfort and generation of jobs stemming from greater traffic-induced commerce may be realized and accumulate. These changes will, over the long term, gradually lead to an improved standard of living for those local families who will take advantage of new income generating opportunities. It will be better access to services such as health, schooling and markets that will be felt immediately once a section or road is improved.

26. None of the proposed road construction activities will negatively affect local communities or local economies, since they are generally located far from the road. The project will provide some benefit, bringing mostly temporary and limited economic

opportunities in terms of employment and provision of good and services. There should be no negative impact on community dynamics or cohesion as a result of the project since none of the work camps will be anywhere near settlements and secondly the camps will be small and staffed primarily with local people. Cultural clashes with foreign employees of contractors need to be settled at early stage and within mutual and friendly solution agreements. Special attention needs to be taken to observe in the employment arrangements gender issues, strict exclusion of child work, and control of sexually communicable diseases.

27. The upgraded 91 km of road will have only a minor positive impact on poverty since some of the poor in Kharezm and Karakalpakstan will find work during the construction period and few local shopkeepers will benefit from the increased need for food and small amenities for construction workers. There are no negative effects anticipated to influence to the public general, regarding the general provision of food and small amenities during the execution of works that will be confined to a relative short period (12 months).

28. There will be no social severance and/or resettlement issues to be solved with this project. The project will also provide good opportunities to introduce land-use control measures and related options to enact observance of the RoW.

G. Environmental Management Plan EMP

29. The IEE proposes a set of mitigation and monitoring actions in line with those potential impacts and environmental effects that are discussed above in Section E and F. The respective and consecutive actions proposed are shown in tabular form of the EMP, attached as Appendix to this document. This EMP in total identifies the mitigation and compliance monitoring requirements, including specifying how, when where and by whom, the mitigation and monitoring is to be carried out during the three key phases of the project. Both tables are self explanatory and have been prepared such that they can be used as environmental clauses in the contract documentation to be completed, and referred to the respective responsible agencies. The EMP also contains information on specific cost items that were necessary to budget separately as they are not included in the contracts.

30. Construction period monitoring will deal mostly with compliance monitoring of the following construction-related actions: (i) consultation with local community people prior to initiation of work that affects their livelihoods, e.g., access restriction and traffic congestion, noise; (ii) execution and management of the revegetation program; (iii) handling and delivery of construction materials; (iv) dust management at construction sites; and (v) general good housekeeping activities by the contractor at all construction sites.

31. The project implementation unit (PIU), with the assistance of the construction supervision engineer, shall undertake regular environmental compliance monitoring. A monitoring checklist will be prepared as part of each monitoring cycle and a monitoring report, which will be attached to the weekly and monthly progress reports. The monitoring report will provide an assessment of the contractor's implementation of mitigation measures, identification of other impacts that need to be addressed, and documentation of complaints by the affected people and how such complaints were addressed. To carry mitigation measures over into the operating period, the contractor will prepare a construction period environmental mitigation completion report to be submitted to UZAVTOYUL for its use during the operational period. Some measures, such as revegetation, will need to be continued and strengthened during the operational period. Generally spoken, monitoring during the operational phase will focus on environmental effects caused by the project (being presumably mainly impacts on air and noise environment, and relating to social impacts as well as road safety issues.).

H. Public Consultation and Information Disclosure

30. For this project, public consultations were held in June and July 2007: Two consultation sessions were undertaken in junction with the project package that included also the section B1 near Kungrad and Nukus (km 876-916). The former Public Consultation meetings were held in Bukhara and in Urgench. The hearings were attended by 23 national and international environmental specialists as well as members of local governmental line agencies who all traveled the length of the then project area (B1 to B4). There were also few participants from local small business sectors. The meetings were held by technical personnel of the UZAVTOYUL (by that time being assumed to be the EA) and assisted by the Technical Designers, describing the proposed work to local officials and seeking all comments and inputs.

31. Details about these events, attendance, results and recommendations have been described in the former IEE (Nov. 2007). Since the impacts are prevailingly benign, the project generated little interest and it was difficult to obtain opinions from the general public. Reportedly 100% of the attendees were in favor of the project and raised no objections or provided any additional advice.

32. The second round of consultation was held in Nukus (15/16 June 07) and in Kungrad (14/16 July 07), Karakalpakstan, addressed specific environmental concerns pertaining to that specific region. Equally, local officials and municipal managers had no concerns with construction period impacts.

33. During all consultations, all project details known at the time, except costs, were disclosed, including the preparation of an EMP and the need to implement and monitor it and the strong commitments of UZAVTOYUL to follow the environmental guideline defined in the EMP. During both sets of meetings, participants were pleased to note the emphasis on environmental controls but felt that for this project there was little to be worried about.

34. At this stage, no further public consultation is planned.

I. Recommendations and Conclusion

35. The project road, along with other proposed improvements along various sections of the A-380 highway, will contribute to reduced travel time, more reliable transport service, greater passenger comfort, and generation of jobs stemming from greater traffic-induced commerce. These changes will, over the long term, gradually lead to an improved standard of living for local families who take advantage of new income-generating opportunities. It will provide better access to services such as health, schooling, and markets that will be felt immediately once a section or road is improved.

36. While the IEE identified a number endangered species, these are found at great distance from the actual road alignment. Local experts indicated that few, if any, of these species are found anywhere at any time near the road right-of-way.

37. Provided that the mitigation and monitoring actions defined in the IEE are implemented during the construction and operation periods, **the Project will not have significant adverse environmental effects** and should be carried out as planned.

38. The IEE is considered sufficient to identify anticipated impacts associated with the Project, and provides measures for their mitigation and management. Therefore, no further environmental assessment is required.

APPENDIX

Environmental Mitigation Plan

Potential Environmental Impact/Issues	Mitigative Measures	Location	Time Frame	Responsibilities Implementing Supervision		Budget/ Costs \$ Estimate
1. PRE-CONSTRUCTION PERIOD						
1-1) Structure and assets might be affected due to re-alignment planning. Failure to restrict road rehabilitation design to the existing RoW	<p>All works will be executed within the existing subgrade width. Roadside trees to be removed for widening the carriageway will be replanted following a detailed revegetation plan provided by the Design.</p> <p>The utility transmission lines and the pipelines parallel the road and form a clearly visible construction boundary, which can easily be recognized as work boundary of 25m from the centerline of the proposed road sections.</p> <p>Three minor private assets at section B4 will be treated in the LARP. Due compensation will be observed.</p>	n.a.	during project design period	Technical Designers	Uzbekistan Road Fund and PIU	GoU
1-2) Plan to bring construction materials, incl. construction water, by any means, without consideration of environmental factors	<p>Design construction in such a way that avoids the construction If any new access roads and plan to bring bulk materials to the site by rail and then truck, in an environmentally friendly manner.</p> <p>Water for construction and use in work camps will be pumped from nearby surface water sources. Licenses will be obtained from 3 local water authorities for maximum daily withdrawal volumes. Plan for actual withdrawal to be daily monitored and reported.</p>	n.a.	during project design period	Project Management Consultant	Water Authorities and Supervision Eng.	n.a.

Potential Environmental Impact/Issues	Mitigative Measures	Location	Time Frame	Responsibilities		Budget/ Costs \$ Estimate
				Implementing	Supervision	
1-3) Failure to Include environmental clauses in contract and covenants in loan agreements, defining mitigative actions	<p>Prepare environmental contract clauses for contractors' contract Terms and conditions of standard documentation-using the EMP and monitoring plan as guides.</p> <p>Prepare an environmental loan covenant which binds URF to implement the EMP and execute monitoring in accord with the Env. Monitoring Plan; show proofs that the work has been satisfactorily been completed.</p> <p>In defining the BoQ provide specific environmental items against which interim payments can be tagged – and withheld for non-compliance.</p>	n.a.	before construction begins	PIU	URF	n.a.
1-4) No plan for provision of IEE, and related documents to the attention of the contractors. Incapacity of the contractors to understand environmental safeguard requirements	<p>The EA and its PIU will provide the successful contractor with the translated IEE and its EMP with instructions on how the mitigative measures and monitoring are to be undertaken, as defined in a work plan prepared by the Contractor with assistance from the Supervision Consultant.</p> <p>The PIU shall provide oblast-level inspectors with copies of the IEE and all supporting documents that can be used in their inspection process.</p> <p>At start of work phase, a 2-days workshop on environmental safeguards is to be planned, including all contractors and key personnel for construction works.</p> <p>The oblast-level inspectors who will be required to undertake inspection during construction will be provided with special training by the Supervision Consultant.</p>	<p>at all contract sites</p> <p>at Turtkul or Urgench</p>	<p>once the contract award is made to the winning contractor(s)</p> <p>prior to contractor's mobilization</p>	<p>PIU</p> <p>Trainers, affiliated with UZAVTOYUL together with Supervision Consultant</p>	URF	<p>GoU</p> <p>USD 8,500</p>

Potential Environmental Impact/Issues	Mitigative Measures	Location	Time Frame	Responsibilities Implementing	Supervision	Budget/ Costs \$ Estimate
2. CONSTRUCTION PERIOD						
2-1) Failure to adhere to construction-related good housekeeping and labor employment practices, including solid and sanitary waste management and health care provisions for all employees. Lack of gender sensitivity in employment conditions. Use of child labor, irregular and under-payment of workers.	Contractors need adhere to standard good house-keeping practices as defined in the contract Terms & Conditions and Conditions of Particular Application. Special care needs to be given to ensure proper work conditions and health care provisions for contracted labor, health care, work hours, dormitories, food provision, hygiene, management of domestic waste and water, storage of hazardous material and safe fueling. Gender requirements need to be observed in employment practices. Employment contract and labor payment practices need to be monitored and adjusted, as applicable. Child labor must strictly be prohibited. Failure to observe compliance requirements shall result in withheld contract payments.	any con-struction site or activity which is the respon-sibility of contractor	throughout construction period	Contractor(s)	Supervision Consultant	USD 19,000
2-2) Improper management of earthworks transport and storage procedures, leading to dust and air pollution, and soil contamination	Large volumes of quarry rock, aggregate and sand will be transported and stored near the roadworks. These operations and storage areas will be constantly exposed to the elements and will create primarily dust during the frequent windy conditions. sediment laden drainage water is not an issue since there is no water for this to drain to thus simply percolating back into the surrounding soils during the very rare rains. Dust control will be difficult given the scarcity of water. Dust at worksites will be controlled by watering. Trucks will be fitted with canopies preventing spillage onto the highway and blowing dust will be mandatory. Any spills on the haul roads will be cleaned up by the contractor within a 24-hour period. Payments shall be made in accord with the complian-ce report of the Supervision Consultant.	In all areas where ballast material is located	throughout construction period	Contractor(s)	Supervision Consultant	Included in the contractor's budget

Potential Environmental Impact/Issues	Mitigative Measures	Location	Time Frame	Responsibilities Implementing Supervision		Budget/ Costs \$ Estimate
2-3) Uncontrolled Deep Water Aquifer extraction at construction sites for concrete production. Restriction of water withdrawal not observed.	Drilling of wells shall be restricted in accord with regulation of local water agencies. Licenses have to be obtained from 3 specified water authorities (see Ch. 4.2.3 of IEE) The extraction volumes per well will be established based on the geo-hydrological conditions as determined by experts, such that recharge and extraction will be balanced. Each well to be used will have a maximum sustainable extraction volume established and a meter will be affixed to each well with a seal. Meters will be read daily, with records sent to the respective authorities. Contractors exceeding allowable limits will have the water supply shut off until investigations are completed and fines paid. All pipeline arrangements shall be properly sealed of and decommissioned at completion of works.	at all extraction points where permits were issued by respective water agencies.	throughout construction period	Contractor(s)	Supervision Consultant and Provincial Water Authorities	USD 5,300
2-4) Modification of surface drainage without repair and rehabilitation after construction is finished.	There is at least one such stretch along the project section (km 495-515) where flash flooding could take place. As part of the detailed design work, these stretches will be identified by the local road agency staff and these conditions accommodated in the final design. Construction inspection will include the specific examination of existing culverts and water channels sections prone to flash flooding; reconfirm that no drainage restrictions will result due to any construction work activity.	at any active water crossing or canal site	throughout construction period	Contractor(s)	Supervision Consultant and Goscompriroda	Included in the contractor's budget

Potential Environmental Impact/Issues	Mitigative Measures	Location	Time Frame	Responsibilities		Budget/ Costs \$ Estimate
				Implementing	Supervision	
2-5) Wind and rain erosion due to poor control measures. Lack of ground cover replacement at worksites	Clearing will involve about 130 ha additional land in partially disturbed roadside terrain, which need to be stabilized and re-vegetated as soon as construction is completed. Stabilization using reed mats and the planting of Saksaul seedlings according to advice from the Uzbekistan Forestry Institute in Tashkent will be undertaken. It may be possible to use waste sewage water to help with watering of the re-vegetated sites. To prevent wind and water erosion, revegetation of the disturbed areas will be undertaken as the work proceeds and as soon as work on any given stretch is completed. It is essential that all decommissioning activities will take soil stabilization and ground cover into due consideration to prevent consecutive environmental problems.	at any work site	throughout construction period	Contractor(s)	Supervision Consultant and Goscompriroda	USD 71,000
2-6) Risk of failure of compensation plantation after removal of roadside trees (Section B4)	Provide for regular monitoring of the replantation program in the respective sections, and ensure proper species selection, tending methods and efforts to replant dead young trees. Seek advice from specialists in State Univ. Urgench and Tashkent. Explore engaging local residents in the roadside tree maintenance program.	In specified sections B4	throughout construction period	Contractor	Supervision Consultant and Goscompriroda	Included in the contractor's budget
2-7) Inadequate management of noise related to construction activities	Only relevant in section km 569-581 where sparse roadside settlements occur. Countermeasures are: (i) suitable signage, (ii) the inclusion of 2 well-marked pedestrian crossings, (iii) regular speed controls and enforcement by road traffic police.	In specified sections B4	throughout construction period	Contractor, Employment of Test Laboratory	Supervision Consultant and Goscompriroda	USD 15,000

Potential Environmental Impact/Issues	Mitigative Measures	Location	Time Frame	Responsibilities		Budget/ Costs \$ Estimate
				Implementing	Supervision	
2-8) Excessive construction-related air Pollution	As above, this potential impact will only be relevant in the few sections where human settlements are near the road alignment (km 569-581). The new mobile crushing and asphalt plants, presumably being established near Mishkin village (km 565) will help to control the dust plumes that usually come from such operations. Emissions will be kept to a minimum given that state-of-the-art machinery will be used. Controls on vehicle idling time when not in use and equipment maintenance will be imposed through inspection and regular reporting, ensuring that equipment is maintained to specifications and that dust is carefully and continuously managed. Dust control will be particularly stringent for mobile crushing plants.	in all work sites where construction equipment operates	throughout construction period	Contractor, Employment of Test Laboratory Contractor,	Supervision Consultant and Goscompriroda	USD 20,000
2-9) Failure of contractors to submit final Monitoring Compliance Report. Non-compliance will bring the entire EMP and the monitoring program in jeopardy.	The contractor will prepare a mitigation measures implementation report summarizing the entire construction and decommissioning activities, at a schedule determined by the PIU and/or the Resident Engineer. The report shall, among others, describe all measures to continue into the operating period will be the maintenance of revegetation areas and confirmation of the record of the decommissioning of any work areas, workcamp sites including waste dumps, etc and the sealing/securing of wells newly dug for use during the construction period.	n.a.	at the end of construction period, or by decision of the Resident Eng.	Contractor, with help from PIU and later with operating unit of UZAVTOYUL's Provincial Unit	Supervision Consultant	Included in the contractor's budget

Potential Environmental Impact/Issues	Mitigative Measures	Location	Time Frame	Responsibilities		Budget/ Costs \$ Estimate
				Implementing	Supervision	
2-10) Blasting and drilling operations; Potential interference with public life and health, traffic flow, surface water flow. Security issues.	The contractor will prepare a plan on how to execute any blasting and drilling operation, specifying methods, quantities of blasting materials and equipment used, schedule of blasting operations, public warning precautions, and traffic diversions. The plan shall indicate all precautionary measures taken to prevent illicit misuse of explosives. As applicable, the plan must show all planned diversions of waterways, and how to reinstate them into their former stage and full functionality. The plan is subject to approval by the Resident Engineer.	n.a.	Before initiation of any construction work involving blasting or drilling operations, and/or waterway diversions.	Contractor, later with operating unit of UZAVTOYUL's Provincial Unit	Supervision Consultant	Included in the contractor's budget
2-11) Borrow and quarrying operations; Environmental problems associated with location/selection of quarry sites, such as erosion, sedimentation, soil contamination, loss of habitats.	Preparation of Site Management Plan, indicating quarrying methods, rehabilitation options and requirements to observe environmental safeguards, especially for adjacent water resources if present. Special care needs to be developed to re-vegetate such sites with suitable (desert) plants to prevent undesired erosion effects and sand dune migration. The decommissioning of quarry sites in line with the implementation of all planned mitigation actions has to be certified by the Resident Engineer.	At specified locations	Before construction works start	Contractor and sub-contractors	Supervision Consultant	Included in the contractor's budget
2-12) illegal hunting by work forces	The Contractor's Site Management Plan shall make provisions for controlling/preventing any illegal hunting activities, and how to imply a penalty system for detected violators.	at all work sites and surroundings	Before construction works start	Contractor and sub-contractors	Supervision Consultant	Included in the contractor's budget

Potential Environmental Impact/Issues	Mitigative Measures	Location	Time Frame	Responsibilities		Budget/ Costs \$ Estimate
				Implementing	Supervision	
3. OPERATION PHASE						
3-1) Degradation of local air quality due to increased traffic	Assuming a tripling of the traffic volume increase in 20 years potential air quality deterioration needs to be tested to identify appropriate countermeasures. Roadside sample tests need to be carried out at intervals specified by the Goscompriroda. The tests shall be carried out by a qualified contracted national laboratory. Air quality tests shall include measurements of NO ₂ , TSP, and CO ₂ concentrations at selected points along the reconstructed section. Each point measurement shall consist of 3 samples, in 10, 50 and 100 m distance from the centerline. The obtained results will be compared to national standards, and countermeasures need to be developed as applicable (e.g. observance of min.permmissible distance to RoW for erecting structures)	at pre-determined spots in accord with planned program	In 2015, 2020, and 2030	Contracted Laboratory, on behalf of EA	Goscompriroda	Maintenance Fund of URF
3-2) Uncontrolled land-use along the new road alignment, unplanned/ unwanted roadside settlement	introduce land-use control measures, restricted settlement regulations and related options to enact observance of the RoW.	all along road alignment	Starting when construction work completed	EA	EA	as above
3-3) Noise disturbance due to increased traffic	as above (3-1) for air quality sampling.	as above	as above	as above	as above	as above
3-4) Failure to address possibility of a hazardous or toxic materials spill,	At present, neither UZAVTOYUL nor the Road Fund keep reliable accident records or have written accidental spill protocols. It is commendable recommends that once the traffic volume of trucks doubles and the movement of hazardous and	n.a.	when event occurs	UZAVTOYUL	URF, and Goscompriroda	Maintenance Fund of URF

Potential Environmental Impact/Issues	Mitigative Measures	Location	Time Frame	Responsibilities		Budget/ Costs \$ Estimate
				Implementing	Supervision	
via a protocol and an early-developed contingency plan	toxic materials increase significantly a specific spill contingency plan e prepared and that provincial offices, including hospital personnel, be trained in adequately responding to such events.					
3-5) Deterioration of road safety, and increased accident risk	<p>(i) Improvement of road conditions, especially during winter and sand storm events. Regular patrolling of maintenance service, prevention of ice sliding, adequate winter preparation of carriageway, radio warning associated with weather forecasts including traffic warnings, identification and removal of black spots, fencing against crossing of animal herds where applicable, public campaigns at local village level, schools, public media, improvement of driving license requirements and awareness campaigns including driving schools, road police patrols.</p> <p>(ii) Improve signage and road markings, in particular at identified black spots and at road sections where horizontal or vertical visibility is restricted; add signs indicating nearby ambulance and health posts for accident assistance; consider introduction of emergency telephone posts at regular intervals along road.</p> <p>(iii) Intensify road control at identified black spots to improve driving discipline; announce intensified road controls in public media, making the public more aware of road accident risks and causes, educate on benefits of safe driving.</p> <p>(iv) Initiate regular programs to check vehicle safety (e.g. axle load, number of passengers, brake conditions, lighting).</p> <p>(v) Provide for rest areas in defined distances (max. 25 km) along the road. Rest areas shall be furnished with emergency telephone posts.</p>	applicable for the entire A-380 highway	During entire operation period	Traffic Police and UZAVTOYUL	URF	Maintenance Fund of URF

Potential Environmental Impact/Issues	Mitigative Measures	Location	Time Frame	Responsibilities Implementing Supervision		Budget/ Costs \$ Estimate
3-6) potential interference with traffic caused by nomadic activities	Nomadic activities, although reportedly on a decrease, may cause road safety risks if not properly addressed. Appropriate means of choice are (1) suitable signage, (2) increased traffic control during time of nomadic activities along the road corridor, and (3) awareness alerts among the local nomads to ensure good cooperation with local traffic police.	applicable for the entire A-380 highway	During entire operation period	Traffic Police and UZAVTOYUL	URF	Maintenance Fund of URF

Environmental Monitoring Plan, including Schedules, Responsibilities

(Note: all costs for monitoring activities during the Construction Period are to be budgeted in the Contract for the Project Management Consultant.

Monitoring costs for both the Pre-Construction and the Operational Phase are to be born by the EA, and therefore are not included in the Project Costs)

Recommended Mitigation Measure	Parameters to be monitored, and proposed methods	Schedule / Frequency	Executing Unit/Staff	Reporting Responsibility
1. PRE-CONSTRUCTION (DESIGN) PERIOD				
1-1) Checking design for integration of environmental considerations; i.e. working within RoW, materials haul restrictions	Prior to the completion of the design work the PIU and the consultant will complete an audit to ensure that the environmentally sound design and construction measures have been integrated in the detailed design and bid documentation	Prior to the end of detailed design work	PIU	URF
1-2) Mitigation and Monitoring Implementation Timetable	Sign-off by URF/PIU that mitigation and monitoring timetable has been prepared and will become part of contractual activities	Before groundbreaking	PIU	URF
1-3) Verification that environmental specifications were duly transferred to the bid documents and contracts	PIU with the help of the Supv. Consultant, is to provide draft environmental clauses and specifications based bid on the EMP, for inclusion in bid documents , and/ or use the EMP as the reference document	Prior to bids and signing of Loan Agreement between EA and ADB	PIU and Supervision Consultant	URF
1-4) Initial Workshop – training on environmental safeguard provisions	Prepare a completion report on the training workshop, including copies of materials used, attendance list and evaluation results.	Shortly before contractor's mobilization	Supervision Consultant	URF and PIU

Recommended Mitigation Measure	Parameters to be monitored, and proposed methods	Schedule / Frequency	Executing Unit/Staff	Reporting Responsibility
2. CONSTRUCTION PERIOD				
2-1) Ensure good and healthy work conditions and housekeeping practices at camp and work sites including solid and sanitary waste management	Verify compliance with work safety and hygienic requirements at: Cooking facilities, toilets, washrooms, dormitories, transport facilities, social services, health insurances, accident insurances. Consultation with Employers and employees. Use a monitoring checklist, confirm that the management provisions specified in the Site Management Plan are fully implemented. Verify work safety plan and observance.	Unannounced checks and inquiries, every month	Supervision Expert	URF and PIU
2-2) Observe gender issues concerning employment, and ensure that no child work occurs	Verify compliance with gender-specific provisions concerning employment records, and observance of gender-restricted works. Consultation/ verification with employers and employees and, as applicable, with local residents.	Unannounced checks and inquiries, every month	Supervision Expert	URF and PIU
2-3) Ensure sufficient surface drainage at construction area	Inspect and verify that adequate consideration and drainage works and protection have been provided: specifically that the mitigative measures defined in the Tech.Specs. are fully implemented in a timely manner.	During the construction period, once to confirm that sites have been identified; regular spot checks, particularly during rainy conditions (as applicable)	Supervision Expert	URF and PIU
2-4) Monitor water extraction	Special monitoring checklist will be prepared for each extraction site (pump meter). Verify installation of meters and obtain approval lists from water authorities. Extraction of a maximum contractor and Record of extraction volumes/day. Lists will be weekly checked by licensing authority.	Record of Contractor and Licensing authorities	Supervision Expert	URF and PIU

Recommended Mitigation Measure	Parameters to be monitored, and proposed methods	Schedule / Frequency	Executing Unit/Staff	Reporting Responsibility
2-5) Ensure adequate tree removal along roadsides, and verify appropriate re-plantation measures.	Ensure that tree-removal is kept to an absolute minimum. Inspection of cutting plan and confirmation of consultation with Provincial Forestry Authority and check for survival rate of newly planted items. Recording schedule, quantities, plantation maintenance and re-growth success/survival rate relating to all revegetation efforts. Control for erosion problems. Report to PIU and Goscompriroda	every 3 months after initial planting, until contract completion. After that, monitoring shall be handed over to UZAVTOYUL.	Supervision Expert and UZAVTOYUL	URF
2-6) Ensure adequate environmental protection	Ensure, by consulting local authorities and residents, that work force is not engaged in illegal poaching, fishing, hunting, or collection of protected / endangered plants and animals. Ensure that a strict penalty system is enforced in case of illicit hunting activities.	Unannounced inquiries and spot checks, every 3 months	Supervision Expert in cooperation with the Goscompriroda	URF and PIU
2-7) Earthworks – ensure adequate transport and storage	Undertake, as part of the construction inspection, the mode earthworks are handled in an environmentally acceptable manner and dust control is undertaken at all time, including the use of tarpaulins by trucks hauling fine materials, as well as watering and use of chemical suppressants along the haul road sections for 1 km at villages, Verify that maximum speed limits on access and hauling roads is observed and enforced.	Spot checks during work activities, throughout the construction period	Supervision Expert	URF and PIU
2-8) Erosion control and slope stabilization	Undertake regular inspection to confirm that slope stabilization and standard erosion protection methods (e.g. prescribed planting schemes) are used by the contractor for all works with clearing of topsoil, cut and fill.	Spot checks, throughout the construction period	Supervision Expert in cooperation with the Goscompriroda	
2-9) Prevent bitumen/asphalt and concrete production spills and pollution	Confirm that site and operational modes for both asphalt and concrete plants are according to norms and codes and within the procedures agreed by the Resident Engineer. Check if bitumen storage and handling is done without spillage. Verify work safety plan and observance.	Spot checks, throughout the construction period (bi-monthly)	Supervision Expert	URF and PIU

Recommended Mitigation Measure	Parameters to be monitored, and proposed methods	Schedule / Frequency	Executing Unit/Staff	Reporting Responsibility
2-10) Ensure good management of petroleum products such as fuel, lubricants and bitumen, without spills and contamination being practiced by contractor and all subcontractors.	Using monitoring checklist prepared in case of specific spill events, and record prevention measures initiated by the perpetrator. listed in item 2-8 of the Mitigation table will be assessed and reported on. Any non-compliance will be rectified immediately Inspections shall focus at all work sites, work camps, diesel generators, maintenance yards and fuel and bitumen storage facilities	As specified in the sampling schedule (bi-monthly)	Supervision Expert	URF and PIU
2-11) Risk of deteriorating carriageway during construction period	Precautionary and preventive measures shall include the Contractor's Action Plan to carry out regular quality checks of the (newly constructed) road sections to react with prompt repair in case of detected damages	every three months	Supervision Expert	PIU
2-12) Control construction-related air pollution	Using a monitoring checklist confirm that the mitigative actions defined for mitigating impacts resulting from all operations are correctly implemented. Arrange /assist for development of a roadside air quality monitoring program of selected air pollutants.	As specified in the sampling schedule	Supervision Expert and, Specialist Laboratory hired	
2-13) Control construction-related noise pollution	Using a monitoring checklist confirm that the mitigative actions defined for mitigating impacts resulting from construction-related noise are correctly implemented Arrange /assist for undertaking a roadside noise monitoring program.	As specified in the sampling schedule	Supervision Expert and, Specialist Laboratory hired	
2-14) Address social conflicts related to over-use or impacts on public utilities and agricultural supplies.	Verification / spot checks, interviews with line agencies, chiefly the local Akimats. Exploration of suitable and feasible countermeasures where applicable, and as early as possible to avoid escalating conflicts.	every three months	Supervision Expert	PIU
2-15) Control spread of sexually communicated diseases, caused by road users (mainly truck drivers)	Verification / spot checks, interviews with line agencies, chiefly the Provincial Health Department. Exploration of suitable countermeasures, including consultation with local authorities and Police.	half yearly	Supervision Expert	PIU

Recommended Mitigation Measure	Parameters to be monitored, and proposed methods	Schedule / Frequency	Executing Unit/Staff	Reporting Responsibility
2-16) Contractor's final submission of the Monitoring Report	Contractor must list, in tabular and prescribed form, list all environmental issues encountered and the respective mitigative/corrective actions taken. He must equally indicate type of impact, location, severances and need for further action(s).	At the end of construction works	Contractor	Supervision Engineer and PIU
3. OPERATING PERIOD				
3-1) Conduct the 1-year post construction operational audit, including the receipt of the contractor's monitoring reports.	The EA shall organize and undertake a complete environmental audit of the project. This audit is to be undertaken by the Oblast-level unit of Goscompriroda. A similar audit needs to be performed on the quality of executed works, to be undertaken by UZAVTOYUL.	No more than 3 months after the operating period has fully started.	Goscompriroda, Inspection Dept. UZAVTOYUL	Goscompriroda and PIU/ URF PIU/ URF
3-2) Management of traffic-generated air pollution	Should traffic growth rate exceed the projected 2%/year, a scheduled air quality monitoring program shall be initiated at specified monitoring sites.	Monitoring once/year for 2 continuous 24 hour period during the non-winter season at selected stations, at specified sites	UZAVTOYUL, In collaboration with hired Test Laboratory	PIU/ URF
3-3) Management of traffic-generated noise	With increasing traffic (as predicted) noise needs be monitored at specified sites and at agreed schedules.	Monitoring will take place once/year during peak traffic periods over two 24 hour continuous monitoring periods, at selected stations.	UZAVTOYUL, In collaboration with hired Test Laboratory	PIU/ URF
3-4) Revegetation of roadside plantations, and erosion control	UZAVTOYUL or a contractor will complete an inspection of roadside revegetation sites, using the data collected during the construction period, and enumerate the survival rate and define a substitute planting program to replant those that have not survived	Annually for three operating years	UZAVTOYUL or hired consultant	UZAVTOYUL

Recommended Mitigation Measure	Parameters to be monitored, and proposed methods	Schedule / Frequency	Executing Unit/Staff	Reporting Responsibility
3-5) Reduce pedestrian accidents due to improved roads and greater traffic volume	Traffic volume due to the project of 2% per year is not expected to affect the accident rate, however the increased speeding will; therefore, signage and enforcement will be essential. The efficiency of pedestrian crossings and speed controls need to be monitored, and compared with existing accident records.	annual safety check and statistics of pedestrian/vehicle accidents	Local Traffic Police, with collaboration of UZAVTOYUL	PIU/ URF
3-6) Mitigate effects from accidents involving spills of hazardous materials	Identify, by help of a checklist, causes of accidents, and appropriate technically feasible and economic mitigation measures.	Undertake an annual audit of these conditions and actions	UZAVTOYUL, with Oblast and Rayon level authorities	PIU/ URF