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AZERBAIJAN REPUBLIC

MINISTRY OF TRANSPORT

"AZERROADSERVICE" OPEN JOINT STOCK COMPANY

AZERBAIJAN MOTORWAY IMPROVEMENT AND DEVELOPMENT

Baku – Shamakhi Road Widening

Supplemental ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT FOR BAKU-SHAMAKHI (KM 91-107)

August 2015

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Abbreviations

ARS		Azer Road Service
CSC	-	Construction Supervision Consultant
EA	-	Environmental Assessment
EA&MF	-	Environmental Assessment And Management Framework
EIA	-	Environmental Impact Assessment
EHS	-	Environment, Health and Safety
EMP	-	Environmental Management Plan
EP	-	Environmental Protection
ESS	-	Ecology and Safety Sector
HIV/AIDS	-	Human Immuno-Deficiency Virus/Acquired Immune Deficiency Syndrome
IBA	-	Important Bird Areas
IBRD	-	International Bank for Reconstruction and Development
IUCN	-	International Union For Conservation of Nature And Natural Resources
LACMA	-	Law on Administrative Control on Municipality Activity
MAC	-	Maximum Allowable Concentrations
MDG	-	Millennium Development Goal
MENR	-	Ministry of Ecology and Natural Resources
MOH	-	Ministry of Health
MOT	-	Ministry of Transport
NGO	-	Non-Government Organization
OP	-	Operational Policy
PIU	-	Project Implementation Unit
RER	-	Regional Environmental Review
ROW	-	Right-of- Way
RPF	-	Resettlement Policy Framework
ARS	-	Road Transport Service Department
SFF	-	State Forest Fund
STD	-	Sexually Transmitted Disease
UNDP	-	United Nations Development Programme
WB	-	World Bank

Units of Measurement

°C	-	degree Celsius
km	-	kilometer
km/h	-	km per hour
km^2	-	square kilometer
m	-	meter
m^3	-	cubic meter
mm	-	millimeter

EXECUTIVE SUMMARY AND CONCLUSION

Introduction / Project Scope

The Baku-Shamakhi Road (Km 91-107) will undergo rehabilitation/construction and upgrading from two-lane Category II to a four-lane Category I Highway and will be funded by WB-IBRD and to be implemented by Azer Road Service (ARS) under the Ministry of Transport. This will form part of the continuous four-lane highway of the Baku to Shamakhi (M4) Road. This segment of the M4 will connect to the subsequent M4 (km 45-91) section which is now under construction into four-lane highway.

The objective of this supplemental environmental assessment (EA) is to present and assess the impacts of the Detailed Engineering Design (with not much change in alignment but more on specifying the pavement designs, slope stabilization and other features) which entails bringing new materials from previously identified quarries and borrow areas and several minor impacts along the road. The preparation of the Supplemental Environmental Assessment (EA) for Baku-Shamakhi Road Km 91-107 takes full cognizance of the IRD-EIA as the reference document.

Description of the Project

The project road of 45 km will be supportive of the objectives of the entire Baku-Shamakhi road which are as follow:

- Reduce road transport costs for road users
- Improve access and transit throughout the entire road
- Enhance safety within Azerbaijan's east-west corridor, through the implementation of a number of subprojects
- Better road quality and better safety through new alignments
- Lower travel costs and a shorter travel time.

In addition, as mentioned in the IRD-EIA, the other recognized objectives are as follows

- to boost the national and regional economy, supporting the swap of goods with neighbour countries and creating temporary and employment opportunities;
- to further the introduction of international standards in the transport sector of Azerbaijan and thus generally support the Country in westernizing process

The four-laning of the entire Baku-Shamakhi road is expected to result to economic growth for Azerbaijan is as a consequence of higher returns on investments through the marked growth of the traffic, increase in speed, and subsequent decrease in travel time with the better road infrastructure. In general, the enhanced east-west connections will foster economic integration and growth within the country, particularly the non-oil growth, leading to a degree of economic diversification.

From the existing two-lane Category II road, the segment km 45-91 of the Baku-Shamakhi highway shall be reconstructed into four-lane to connect to the existing four-lane road at both ends. The four-laning (for normal terrain) will entail the following:

- Centered along the centerline will be a 3.00 meter median
- Four (4) traffic lanes: Both sides of 2 x 3.75m
- Paved strip from edge of median to pavement at both sides: 1x 0.1m
- Both side pavement extension: 1 x 0.75m
- Both side paved shoulder (double bituminous treatment): 1 x 3.00m

Generally, the construction will be within the designated ROW. Indirect impact can extend even beyond the 60 ROW mainly due to social environmental characteristics of the project area. This has been considered in the IRD-EIA.

Description of the Physical Environment

The project area geographically is within the foothills of eastern prongs of Greater Caucasus. The landscape of this segment of the project corridor in western Gobustan is characterized as hilly and mountainous with a number of spots experiencing landslides and erosion. The soils in the Gobustan Rayon are mainly chestnut dark and yellow chestnut soils toward Gobustan and Shamakhi region are integrated into biological processes going on hydrosphere, atmosphere and lithosphere. The summer climate in the Km 91-107 (Gobustan-Shamakhi regions) is moderately warm and semi-arid with corresponding mild and short winter with is and non-persistent snow. The biggest river in the Baku-Shamakhi road is traversed by km 91-107 segment, which is the Pirsaat Chay and the tributary rivers that are mainly formed by rain, snow, groundwater and partially by glaciers are the Shorderesu, Agiderasu, Zagavala Chay and Ruslar Chay Rivers.

Description of the Natural Environment

The eastern part is composed of Artemisia steppe, grass steppe and scrubland; while the western part of Gobustan and the adjacent part of Shamakhi Rayon, with elevated moisture, are grasslands with pastures and farmlands. Generally, the flora along the road has two main components, perennial plants and annual ephemeral plants. Flora is composed by saltwort vegetation in first part of the study corridor and arid steppe vegetation and the arable and irrigable agricultural fields are found closer in the Narimankand (part of km 45-91) and Sabir village, which are located at around km 102+100. Beyond Pirsaat River are tracts of agricultural land with a wine factory on the LHS until km 107, the eastern edge of Shamakhi town.

The fauna that exist in the area are those that thrive in semi steppe regions. Fauna of the area has been very few due to anthropogenic activities. The impacts to any of these animals are rather minimal as the settlements tend to discourage their presence.

Human Environment

The Project section from km 91– km107 is part of Baku-Shamakhi road and passes through Daqliq Shirvan Region of Azerbaijan through two of four its rayons: Qobustan and Shamakhi. Within this 16km stretch, 4 km (km 91-95) is within Gobustan Rayon while the rest of the 12 km (km 95-107) is within Shamakhi Rayon.

Km 91–95 section of Baku-Shamakhi highway passes through the territory of Gobustan Rayon with a relief of high ground elevation and steep slope and wherein which some deep cuts will be done for the road. At the section km 91+360 – km 91+550 (RHS) there is one canteen/restaurant within the ROW of the road which is under process for relocation outside of the ROW. The section km 95–107 passes through the municipal lands of Marzandiyya, Sabir and Shahriyar of the Shamakhi Rayon. The section km 95–97 is within Marzandiyya municipal lands where some deep cuts will be needed. Road construction area includes 10.3 ha of the Marzandiyya municipal lands (excluding the area of the existing road). In the vicinity of Sabir village, there are industrial buildings, fuel stations, butcher shops, car repair shops, school, cemetery other commercial establishments. After Pirsaat River, a wine factory is found at the left hand side (km 106). Outside Sabir village are mainly agricultural lands – farmlands and graze lands.

Summary of Environmental Impacts and Mitigation Measures

In the four-laning of the road segment, direct and/or indirect impacts are generated which are rather short-term as they are felt and manifested during the actual performance of the construction activities. Modification of the actual worksites and material sources gives rise to direct impacts, including disturbances to natural environment components such as air and noise, flora and fauna, and water. Social impacts occur along the vicinity of the road nuisance such as impairment of the usual access, community health and safety concerns, plus socio-economic conflicts. Likewise, those temporary facilities allied to the construction, such as quarry sites and borrow pits, excess soil disposal sites, contractor's workers camps, and asphalt plants generate also short-term impacts. It is expected that impacts from these types of activities will cease once the contractor completes the project road and demobilizes from the site.

Supplementary Environmental Management during Construction

In the previous IRD-EIA for the four-laning of the road segment, anticipated direct and/or indirect impacts were already sufficiently tackled and adequately addressed in the IRD's EMP. In this Supplemental EIA, the change of scope due to Detailed Engineering Design (with not much change in alignment but more on specifying the pavement designs, slope stabilization and other features). Primarily new construction work is only done on the additional two lanes as part of the four-laning.

Impacts considered are those associated with the road construction will also include drainage, cross-pipes and culverts along with relocation of underground and above ground utility lines. . The new two-lanes will conform to a new pavement design, appropriated for the projected traffic and sited conditions.

In the four-laning work, the impacts will be expected along the road corridor as well as the material sources and processing plants. Hence, this Supplemental EIA will be mainly be on impacts and mitigation measures in connection with construction of two additional lanes

Capacity Building

The staff training for ESS/district ARS is recommended as part of the construction supervision contract by an international environmental specialist focusing on capability on the proper enforcement of the EMP. A typical ESS/ARS staff training will consist of lecture-type presentation of the general procedure and requirements for effective environmental monitoring followed by more detailed on-the-job and hands-on training at the construction site where the trainees will participate in the activities of the international environmental specialist/construction supervision staff in reviewing the Contractor's reports, periodic monitoring inspections, deliberation of environmental issues involving the Contractor and the project stakeholders, and finally the accomplishment of environmental reports.

Public Consultation Summary and Information Disclosure

In conformance with the Operational Policy (OP)/Bank Procedure (BP) 4.01: Environmental Assessment of the WB-IBRD, In conformity with the Operational Policy (OP)/Bank Procedure (BP) 4.01: Environmental Assessment of the WB-IBRD, public consultation for the Four-laning of 91-107 Section was scheduled on 23 October 2015 at 10:00 am at Shamakhi Executive Power Office, part of Shamakhi Rayon. The PIU-ARS coordinated the holding of public consultation with the Local Executive Power of Shamakhi Rayon, wherein local residents, village officials/representatives, local NGOs, and other stakeholders were invited. This was attended by around of 40 participants and in which the Environmental Consultant elaborated the rehabilitation/construction works, project's environmental, social impacts, and land issues along with WB and GoA policies in minimizing and mitigating projected impacts. Comments were later solicited from the participants in an open forum and both by means of written documentation

filled out by the participants themselves. Minutes of the Meeting have been separately documented and attached to the Report.

Upon finalization of this EIA document for Baku-Shamakhi km 91-107 project briefs shall be made available (in Azeri language) available in public places for the project-affected and local NGOs. Accordingly, ARS shall see the approval from MENR who will issue the Environmental Permission for the project. Subsequently, the Bank shall post the approved EA report in their Infoshop.

Conclusions

As determined in the environmental assessment the results clearly indicate that the environmental impacts of the proposed road rehabilitation/construction will likely take place during the actual construction, which will be temporary in nature. It is important that the appropriate mitigation measures during the design, construction, and operation phases be undertaken in order to minimize the negative impacts of the Project to acceptable levels.

An estimated cost for the mitigating measures has been done and shall be made separate cost items in the Bill of Quantities. This is one way of assuring that the measures will be given due attention and implemented within the project duration.

As a conclusion, should the measures be implemented conscientiously, the negative impacts will be successfully mitigated and the road rehabilitation/construction (four-laning) project will bring immediate and long term benefits to the people through improved infrastructure, reduction in transport cost, enhanced mobility and better accessibility.

1. INTRODUCTION

1.1 Project Background and Previous Studies

The project being considered in this Supplementary Environmental Impact Assessment (EIA) is referred to as the Baku-Shamakhi Road (Km 91-107) four-laning. This project will entail the rehabilitation/construction and upgrading of a road segment from two-lane Category II to a four-lane Category I Highway which starts at km 91+000 to km 107+000, as the actual chainage. This road segment is part of the upgrading of the entire Baku-Shamakhi Road (M4) starting from km 10 and km 107. Funding for this project will be coming from WB-IBRD and to be implemented by Azer Road Service (ARS) under the Ministry of Transport.

The existing 16km road segment has been rehabilitated in the period between 2008 and 2010 into a Category II road as per the Former Soviet Union Standard (SNIP) 2.05.02-85. The construction works produced a road with a two lane carriageway with a paved width of 9.00 m and an unpaved shoulder width of 2 x 3.00 m.

The Baku-Shamakhi road is the shortest way from Baku to Georgia and to western Azerbaijan. The four-laning construction for the Baku-Shamakhi Road has been subdivided into several road segments with their respective EIAs. Originally, an EIA was drafted for km 45-121[1], referred herewith as IRD-EIA. However, certain changes were adopted such that new designs are now being done for Km 91-107. After considering some alignment options, the four-laning of the section from Km 91-107 reverted to similar design with more details for slope protection works and other infrastructure. This introduced design is not considered major departure from the former scope as the reconstruction is confined within the defined four-lane strip. Because of this reason, a new EIA is not necessary, and a Supplemental EIA is being drafted to capture the difference of scope, with the perceived impacts and required mitigation measures

1.2 Brief Description of the Study Area

The Baku-Shamakhi highway is part of the Magistral Road, M4 (Baku to Yevlakh). The segment being considered starts at chainage km 91+000 and ends at km 107+000. The starting point of this approximate 16km road segment is at 9 km west from Maraza & Narimakand and ends at west bank of Pirsaat River. It touches two rayons: km 91 to 95 is part of Gobustan Rayon; while km 95 to 107 is within Shamakhi Rayon. This particular road segment is linked with km 45-91 and the rest of the west ends of the Baku-Shamakhi Road. The segment (Km 91-107) is under detailed design finalization by the consultant[2].

In the IRD-EIA covering km 45-121, the road has been described into several sections; and this EIA takes cognizance part of the third section described only as follows (*from IRD-EIA*):

- "The last part concerns the village of Sabir, having more than 4.000 inhabitants and located along the M4 on the Pirsaat River, after less than 20 km from the previous section. Village development is more significant on the left side of the road (toward Shamakhi) while the right one is still under expansion. Although the village of Sabir has an agricultural origin, local community has put several efforts to upgrade it to urban village. The city of Shamakhi, once the capital of the Azerbaijan and currently the centre of the viticulture and fruit culture of the Shirvan Region (Rayon) is located not far from Sabir."

[1] Nov.2013. IRD. Azerbaijan Highway Project II-Additional Financing. IBRD Loan No. 7516 AZ. Upgrading of Baku-Shamakhi Road Section of Baku-Shamakhi-Yevlakh Road, preparation of Environmental Assessment and Environmental Management Plan

[2] Dohwa Engineering Co., LTD.

The Km 91-107 road segment is located in an area that is generally characterized as hilly, with rolling terrain and unstable slopes that are prone to landslide. From km 91 to km 99 (before it enters Sabir Village) the terrain is predominantly highland that dips by 203 meters into the valley of the River Agidera. The road traverses a landslide-prone area (km 95.5 ~ km 96.5) where local collapse have occurred in the past. It also follows a hairpin route at km 97+300 to km 98+100 with tight horizontal curves. From the entrance of Sabir village to Pirsaat River, the terrain has milder slopes until it reaches the edge of the river.

From Dohwa's Preliminary Design Report it was described that the section km 95 – km 97 of the highway passes through the Marzandiyya municipal lands with several sporadic roadside development, the most prominent of which is a wine factory at km 106 LHS. This section of the highway will entail some deep cuts/excavations.

A map of the project road is shown in Figure 1 below.

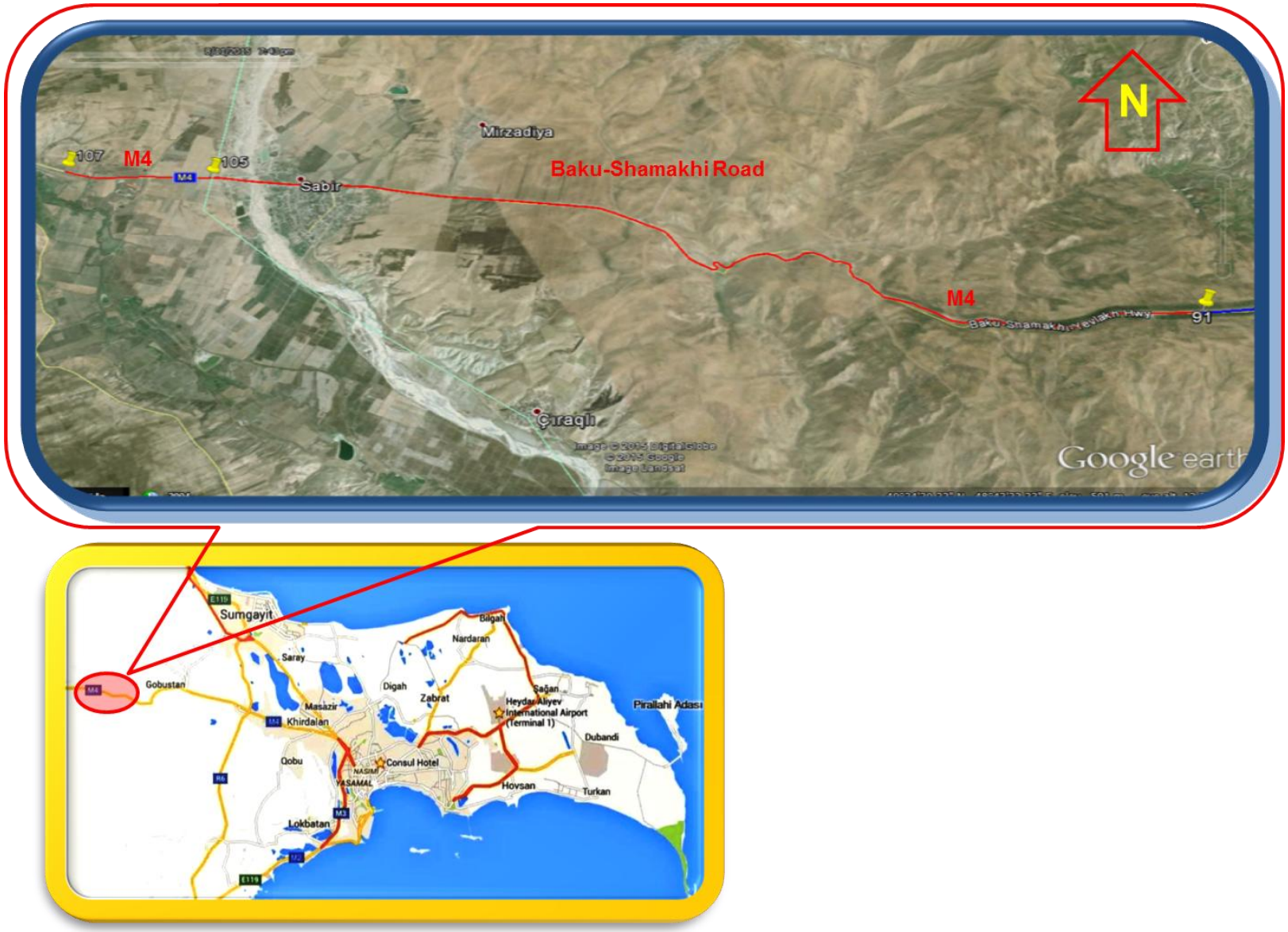

Figure 1: Map of the Project Road

1.3 Methodology and Scope of the Environmental Assessment

The preparation of the Supplemental Environmental Assessment (EA) for Baku-Shamakhi Road Km 91-107 takes full cognizance of the IRD-EIA as the reference document. Based on the Terms of Reference on Consulting Services Small Assignments Lump-Sum Payments - Contract No AHP 3, IC 2 issued by Azeryolservis ASC, particularly Task 3, *"the detailed consideration of the environmental impacts for this section is subject to the availability of respective engineering design. When the detailed engineering design for the section between km 91 and km 105 (changed to 107) section is developed, it should be closely coordinated with the EIA/EMP and follow its recommendations, and the EIA/EMP should be revisited accordingly for this section to assess and address the design features and associated impacts. In case of necessary changes to the design the respective EIA and EMP for the respective section will have to be revised accordingly to address all associated impacts."* Based on the Preliminary Design Report (March 2015) of Dohwa Engineering Co., LTD., the alignment was practically similar as was considered in the IRD-EIA; hence, only a Supplementary EIA is being drafted for the more detailed features.

This Supplemental EIA focused on impacts that will result in the provision of more detailed designs and assesses the adequacy of the associated Environmental Management Plan. Previous environmental assessment results will be also be checked vis-à-vis the new detailed design and recommendations shall be presented to conform to WB-IBRD's requirements and Azerbaijan legislations.

2. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

The legal and institutional framework for this EA considered prevailing national legislations in Azerbaijan and WB environmental policies and guidelines. The contents of this report focus on description of existing environmental conditions, environmental impacts associated with road rehabilitation/construction, recommended mitigating measures and environmental monitoring program. Furthermore, to ensure proper compliance additional training intervention, especially for Ecology and Safety Sector (ESS) of Azer Road Service (ARS) of the Ministry of Transport and local counterpart at the field level, on procedures for EMP compliance monitoring and related EIA concerns is deemed necessary and its conduct is proposed during Project implementation.

Table 1: Relevant Laws, Policies and Regulation on Environmental Protection and Road rehabilitation/construction

Laws and Regulations	Content
Azeri Law on Automobile Roads (March 10, 2000) Section 39: Protection of the Environment:	This law stipulates that any construction or reconstruction of roads requires the official approval of the Ecological Committee; that state of the art technology must be applied and that the chemicals that are used must be environmentally sound. Approval of the proposed environmental, health and safety norms of the construction shall come from the unit of the Ministry responsible for road environment
SNIP 2.05.02-85 Building Code & Regulations for Automobile Roads Ch. 3: Environmental Protection	This Norm indicates the general need to minimize adverse environmental impacts in road design and provides, for instructions on the removal and re-use of top soil (no. 3.4); the need to provide buffer between the road and populated areas and to carry out noise reduction measures to assure compliance with the relevant sanitary norms (no. 3.9); on the dumping of excess materials (no. 3.12).

Laws and Regulations	Content
The Law of the Republic of Azerbaijan on Sanitary and Epidemiological Safety, 1993 Section III: Responsibilities of State Bodies, Agencies, Companies… on the Provision of Sanitary and Epidemiological Safety	This law embodies the general framework provisions on the requirement to provide healthy and safe conditions at workplaces and work camps (and many others) in compliance with the relevant sanitary hygiene, construction regulations and norms (particularly items 14, 15 and 16).
Safety Regulations for Construction, Rehabilitation and Maintenance of Roads, 1978	Embodies a comprehensive compilation of safety rules to technical safety requirements of road construction equipment, operation and maintenance of asphalt plants, work in borrow sites, loading and unloading operations, work with toxic substances, etc.
SNIP III-4-80 Norms of Construction Safety	Relevant regulations on construction worker's health and safety. Chapters 2 and 5 provide organizational procedures of construction and work sites and material transport. Annex 9 contains standards on maximum concentrations of toxic substances in the air of working zones; Annex 11 states that workers need to be informed and trained about sanitation and health care issues and the specific hazards of their work
Guidelines for Road Construction, Management and Design, February 7, 2000	Part I: Planning of Automobile Roads: Addresses environmental issues in road design, construction and maintenance. Part II: Construction of Automobile Roads: Requires that the impacts on the ecological, geological, hydro-geological and other ecological conditions are minimized by implementing adequate protective measures. Part III: Protection of the Environment: Requires the consideration of appropriate protection measures, which shall contribute to the maintenance of stable ecological and geological conditions as well as the natural balance. Provides general overview on the requirements for environmental protection.
BCH 8-89 Regulations on Environmental Protection in Construction, Rehabilitation and Maintenance of Roads	Comprehensive provisions on environmental protection measures in road construction such as use of soils, protection of surface and groundwater resources, protection of flora and fauna, use, preparation and storage of road construction machinery and materials, servicing of construction machinery; provisional structures, provisional roads, fire protection, borrow pits and material transport, avoidance of dust, protection of soils from pollution, prevention of soil erosion etc. The appendices to this document also state standard for: maximum permitted concentrations of toxic substances; noise control measures; soil pollution through losses of oil and fuel from construction equipment; quality of surface water.
Sanitary Norms CH 2.2.4/2.1.8.562-96, 1997	Ambient noise quality and maximum allowable noise level standards for residential, commercial and industrial areas, hospitals and schools (day/night standards)
Reg. 514-1Q-98 Regulation on Industrial and Municipal Waste	This law includes requirements for industry and enterprises on the implementation of identified standards, norms and environmental protection for waste when designing, constructing or reconstructing

Source: Scott-Wilson. Preparation of Environmental Assessment and Environmental Management and Capacity Building, April 2007

2.1 EIA process

In processing of any environmental assessment for relevant projects in Azerbaijan, MENR's State Ecological Expertise (SEE) Department (under the Department of Environmental Policy and Environmental Protection) is responsible for the review and approval of environmental impact assessments (EIAs) submitted by proponents or developers. Proponents or developers of project shall submit necessary EA documents to the SEE in a form of a project brief following the format in Appendix D of EA&MF and which will be subjected to two stage processing. The first stage will take around one month and will entail an initial examination of the application of the proposed activity to be undertaken by the MENR along with the expected impacts of the proposed activity are considered. This stage may also include preliminary consultations with other agencies, NGOs, experts and initial public inquiries on the various aspect of the project. When determined that the project or activity will likely cause only minor impacts on the environment, the application may be approved with some conditions. On the other hand, if the activity is assessed to cause significant impacts, a full EIA is required. Subsequently in such a situation, a scoping meeting of representatives of the developer/applicant, invited experts and invited members of the public will be organized and to be chaired by the MENR. Based on the outcome of this scoping meeting, the MENR will notify the developer of the required scope and depth of the investigation and public consultation during the EIA study.

The second stage of the EIA process will take around three months, and which will entail a review and investigation by the MENR of the documents which would be submitted by the developer/proponent. A group of 5-11 expert reviewers and experienced members (e.g. members of the Academy of Science, university staff, or officials from other ministries) will be convened to perform the EIA document review and which will be chaired by MENR. The composition of the review group shall be upon the discretion of the MENR but will be taken from a roster of experts who can deal adequately with project-specific environmental issues. The expert group will undertake public submissions, investigations, and consultations relevant to the project impacts as deemed necessary for the review process. Consequently, at the end of this stage, a written review of documentation together with recommendations is submitted by the environmental review expert group to the MENR.

Based on the submitted review documents, the MENR then decides on whether to deny the application or to approve it, with or without conditions. In the case of road projects specified conditions attached to the approval relate to the construction phase and may include site management; noise; dust, discharges to the air land, subsurface or water, solid waste management, emergency contingency plans, etc. These conditions are set to assist the proponent/developer control the environmental impacts such that they are maintained as the acceptable limits. Should the application be approved with conditions, either the activity starts with due consideration on the conditions or the proponent/developer may opt to appeal against the conditions and resolutions may be subjected to judicial proceedings.

2.2 Legislation with reference to Environmental Assessment

In Azerbaijan, the fundamental legislation governing the implementation of environmental policies is the Law on Environmental Protection of 1999. This law provides the basis for the legal, economic, and social aspects of environment protection. The said law stipulates that its objective is to protect environmental balance thus ensuring environmental safety, prevent the hazardous impact of industry and other activities to natural ecological systems, preservation of biological diversity and proper use of natural resources.

The basic process of conducting environmental assessment for proposed projects in Azerbaijan is through the State Ecological Expertise (SEE). The aim of the State Ecological Expertise is to identify impacts on environment caused by industrial units, examine the results of such impacts and predicting possible ones, in accordance with the environmental requirements and qualitative parameters of environment (Art. 50 EP Law). Further, Article 52 of EP Law stipulates the Objectives and Responsibilities of the State Ecological Expertise as follows:

1. Activity of SEE is directed to assessment of an enterprise causing impact to environment and identification of the degree of risks of made decisions, identification of effectiveness of taken measures for environment protection and use of nature resources.

2. The SEE is an important mechanism used for environment protection, with the rights to interfere, if needed, into lawmaking process in case of any violations of environmental interests.

3. Responsibilities of the SEE:

    - Identification of the level of safety of enterprises, in terms of environment, and their activities which might cause direct or indirect harm to environment and public health thus exposing the present and future generations to danger;

    - Identification of conformity with the regulations of environment protection, sanitary-hygienic norms and rules, when the enterprise is yet under construction and planning;

    - Identification of the quality of environment protection measures and substantiation of such measures.

The field or sector coverage of the SEE is specified in Article 54 (The units controlled by the SEE) of the EP Law as:

1. The State and local programs related to development and placement of productive capacities in governmental and economical institutions.

2. The documentation of technical and economical substantiation, construction (reconstruction, enlargement, and renovation technology) and destruction of economical capacities, as well as assessment of the project influence on environment.

3. Documentation concerning creation of new techniques, technologies, materials, and substances, as well as import of the same from abroad.

4. Draft of scientific-methodical and normative-technical documentation concerning environment protection.

5. Certain ecological conditions caused by improper work of industry and extraordinary situations.

6. Ecological conditions of the regions and individual (separate) natural objects and systems.

7. Provisions of draft contracts stipulating use of natural resources, as specified by the relevant decrees of the concerned executive bodies.

The primary institution in Azerbaijan with respect to the environment is the Ministry of Ecology and Natural Resources (MENR). A Presidential Decree in 2001 transformed the former State Committee for Ecology and Natural Resources Utilization (SCENRU) into the MENR. Thereon, along with its inherent mandate from SCENRU, the MENR assumed over the functions of several other state bodies such as the departments of Hydrometerology, Geology, Forestry, and Fishery. The functions and activities of the MENR are sub-divided into the following main sectoral areas:

- Environmental policy development
- Environmental protection
- Water monitoring and management
- Protection of marine (Caspian Sea) bio-resources
- Forest management
- Bio-resources and protected areas management

During construction of the project, the applicant/developer should ensure adherence to conditions attached to the approval and be responsible for monitoring the developments of the projects along with the regular and timely reporting to MENR. The monitoring programme of the proponent/developer should be designed to give clear indications prior to conditions being breached. Practical corrective measures should be undertaken by the proponent/developer in order to avoid breach of any conditions stipulated in the approval.

The MENR is authorized to issue warning to proponent/developer should it observe that conditions are being breached. In the event that conditions are breached, the proponent/developer is obliged to stop whatever activity which is causing the breach. In such cases, the MENR may reconsider the approval, possibly with the participation of the Environmental Review Expert Group, and the conditions of approval may be reviewed.

Should project designs be altered significantly from those presented in the in the feasibility phase EIA, additional reports on the impacts of the changes may be requested by MENR.

In matters of legal framework, the constitution of the Republic of Azerbaijan embodies precepts and principles for environmental protection, ownership of natural resources and preservation of cultural heritage. Article 14 of Chapter III (Basic rights and liberties of a person and citizen) entails the state ownership of natural resources in Azerbaijan, without prejudice to rights and interests of any physical persons and legal entities. Article 39 constitutes the rights of everyone to live in a healthy environment, to gain information about true ecological situation and to get compensation for damage done to his/her health and property because of violation of ecological requirements. Article 40 states the rights to practice and participate in culture and protection of historical, cultural, and spiritual inheritance and memorials. In Chapter IV (Main responsibilities of citizens), Article 77 states the responsible for protection of historical and cultural memorials; while Article 78 stipulates the citizen's responsibility for protection of environment

In addition the legislative framework relating to the environment generally consists of the following:

- Parliamentary legislation that defines and establishes the State regulation of protected natural areas, and the protection and use of the environment and biodiversity
- Presidential Decrees and orders and the Cabinet of Ministers resolutions
- By-laws of the executive authorities (Ministries and Committees)
- International Agreements and Conventions to which Azerbaijan is a signatory

Itemized below is a compilation of legal and regulatory framework related to road rehabilitation/construction and improvement.

Table 2: Relevant Laws and Regulation on Environmental Protection and Road Rehabilitation/Construction

Reference	Description
The Law of the Republic of Azerbaijan on Environment Protection, 9 February 1999	The general framework for all national objectives in the area of environmental protection: Chapter I. General Provisions Chapter II. Rights and duties in the area of protection of the environment Chapter III. Use of nature Chapter IV. State cadastre and monitoring of the environment, natural resources, standardization and certification Chapter V. Economic regulation in the area of protection of the environment Chapter VI. Regulation of ecological equilibrium of the environment Chapter VII. Ecological requirements upon industrial and other categories of operations Chapter VIII. Ecological examination Chapter IX. Education, training, scientific researches, statistics and information in the area of ecology and protection of the environment Chapter X. Extraordinary ecological situation and zones of ecological disasters Chapter XI. Control over protection of the environment Chapter XII. Ecological audit and implementation of ecological audits Chapter XIII. Liability for breach of legislation on protection of the environment, resolution of disputes Chapter XIV. International co-operation in the area of protection of the environment
"Law on Ecological Safety" (04.08.1999)	This law defines legal bases of ecological safety as component safety of the state, society and population, the purpose of which is establishment of legal bases for protection of life and health of the person, society, its material and moral values, environment, including atmospheric air, space , water objects, resources of the ground, natural landscape, plants and animals from danger, arising as a result influence natural and anthropogenic action
Article 50: Ecological Expertise	Requires identification of impact on environment caused by any activities, examine the results of such impacts and predict possible impacts in accordance with the environmental requirements and qualitative parameters of environment.

Reference	Description
Article 54: Objects of the State Ecological Expertise	Defines the types of project which require compulsory "State Ecological Expertise (SEE)', *i.e.* to undergo the systematic EIA process.
Articles 35, 36, 37, and 38: Ecological Demands during Project Design and Implementation.	During the feasibility study, it should be confirmed that the project will comply with: the maximum permitted discharges and emissions of pollutants in the natural environment the maximum permitted noise and vibration levels, and other harmful physical influences as well as health norms and standards of hygiene
Law on Environmental Security 08.06.1999 and Decree No172 on application of the Law on environmental security 04.08.1999	This Law defines and sets the legal bases and dimensions of environmental safety with the related danger, dangerous situation, environmental emergency situation and disaster subsets together with their impact areas and subjectivity to risk exposure within the territory of the Republic of Azerbaijan.
The Law of the Azerbaijan Republic on Specially Protected Natural Areas and Objects 24 March 2000	This Law sets the legal bases of organization and protection of specially protected natural areas, protection of specially protected natural units within the territory of the Republic of Azerbaijan. Specially protected natural areas are sites of land and water (water area), and atmospheric space above them consisting of natural complexes and objects, representing special ecological, scientific, cultural, aesthetic and improving value, habitats of rare and endangered species of flora and fauna, fully or partly, constantly or temporarily excluded from economic circulation. Specially protected natural areas and objects in the Republic of Azerbaijan are classified into their categories of international, republican, regional and local value. Restriction on economic use of natural resources in the specially protected natural areas and objects or specially allocated sites are provided in the regulated regime of economic activity. The Law allows the use of specially protected natural areas for the following purposes: nature protection, scientific researches, monitoring of the environment, sanitation, training and education, tourism and rest (recreation).
Law of the Azerbaijan Republic on provision with environmental information March 2002 270 - IQ	This Law regulates relations connected with provision by State and local self-government bodies and authorities of in-time and exact information on environmental condition and application of natural resources. This Law interprets environmental information about: condition of soil, water, Earth surface, atmosphere and living organisms, changes, as a result of human activity, which may occur or occurred in environmental components, which effect or may effect on human health, assessment of these changes, environmental protection, measures on efficient application and expenses. According to the Law, by procedure of provision with environmental information, it is divided into restricted-type and open-type information; and excluding restricted information, every person, independent of time and unconditionally enjoys the right of getting information.

Reference	Description
The Law of the Republic of Azerbaijan on Sanitary and Epidemiological Safety, 1993 Section III: Responsibilities of State Bodies, Agencies, Companies… on the Provision of Sanitary and Epidemiological Safety	General framework provisions on the requirement to provide healthy and safe conditions at workplaces and work camps (and many others) in compliance with the relevant sanitary hygiene, construction regulations, and norms (particularly items 14, 15 and 16).
The Law on Fauna *N. 675-IQ* *4 June 1999*	This law determines legal grounds of usage and protection of fauna in Azerbaijan Republic. The objects and subjects are enumerated in the 4th article of the Law. Generally, objects of fauna are different species of fauna, zoolites, products of their life activity, and ranges of their location. Subjects of fauna are natural and legal persons. Law (article 5) distinguishes State, municipal and private property on fauna and determines termination bases of this law (article 26). All animals in nature are state property, and animals, which are separated from nature by different licenses and, which are determined by state list may be municipality property and private property.
Law on the Protection of Plants *210 – IQ* *December 3, 1996*	The aim of the Law is realization of system of measures directed to prevention of mass propagation of the plant's vermin, illnesses and Weed, barring of losses of production, production of ecological clean products, protection of environment, health of the population, useful flora and fauna from harmful influence of pesticides, quarantine, isolation and liquidation of other especially dangerous vermin.
Law "On Fisheries" *457 – iQ* *13 June 1998*	This Law establishes legal grounds of organization, management, increase, application and protection of fish resources in Azerbaijan Republic. Fish resources are State property. One of important obligations of State in the sphere of protection of fish reserves is creation of special regime, ichthyologic and temporary reserves for protection of fish species, water flora and fauna plants, included into Red Book, creation of ichthyologic and temporary reserves, allotment of special protected areas of water.
Law of the Azerbaijan Republic on subsurface (subsoil) *№ 439-IQ of 13 February 1998*	This Law shall regulate relations in connection with the development (exploration, research), efficient use, protection and safety of works in the subsurface on the territory of the Azerbaijan Republic, including subsurface in the Azerbaijan Republic section of the Caspian Sea (Lake), provide for the protection of interests of the state, users of the subsurface and individuals in course of use of the subsurface
Regulations on Carrying Out the State Expertise of Geological Information on Subsoil Plots Granted for the Use and Reserves of Mineral Resources. *No. 102 of 13 February 1999*	These Regulations have been prepared in accordance with the Law of the Azerbaijan Republic “On Subsoil”, the Decree of the President of the Azerbaijan Republic No. 701 of 27 April 1998 “On Application of the Law of the Azerbaijan Republic On Subsoil”, and shall determine the conduct and approval of the state expertise of as well as the main requirements on geological information on subsoil plots necessary for the construction and operation of underground installations not connected with the extraction of mineral resources in the Azerbaijan Republic, and the state expertise of the reserves of the already explored mineral resources

Reference	Description
	fields and conditions for mineral resources (hereinafter shall be referred to as the "state geological expertise").
Law of the Azerbaijan Republic on Fertility of Lands № 788-IQ of December 30 1999.	This Law shall established legislative provisions related to reinstatement, increase and protection of fertility of state, municipal and private lands in the Azerbaijan Republic.
Azeri Law on Automobile Roads: Section 39: Protection of Environment, March 10, 2000.	Spells out that any construction or reconstruction of roads requires the official approval of the Azerbaijan State Ecological Expertise, must introduce state of the art technology, and chemicals used must be environmentally benign. The unit of the ministry responsible for road environment must approve the environmental, health and safety norms of the construction.
Law the Azerbaijan Republic on "Industrial and domestic waste" No: 514-iQ Adopted: 30 June 1998	This law regulates in Azerbaijan Republic relationships, connected with protection of environment from industrial and domestic waste (further called waste) generated, as a result of human activity, decrease of hazardous influence of those waste, provision of ecological balance in the nature, determines state policy on usage of waste, as secondary raw materials, excluding hazardous gas, sludge water and active waste.
Law of the Azerbaijan Republic on municipality water industry 29 June 2001 N. 159-IIQ	Purpose of this Law is to determine legal bases of relationship between municipalities and corresponding bodies of executive power, legal and physical persons, connected with usage and protection of water industrial objects, located at the territory of municipalities of Azerbaijan Republic. Water industrial objects of local significance, being state property and located at municipality land area are transferred to municipality property, in order established by President of Azerbaijan Republic. Municipality property on water industrial objects may be established taking into account the following conditions: transferring of water industrial objects belonging to state property to municipality ownership, in order established by legislation; establishing of new water industrial objects by municipalities; purchase of water industrial objects, belonging to legal and physical persons by municipalities on base of agreements; By other conditions, taken into consideration by legislation, (article 3).
Law of the Azerbaijan Republic on safety of hydrotechnical installations December 27, 2002 N. 412 - HQ	The Law regulates relations connected with guaranteeing of safety of hydro-technical installations during design, construction, operation, reconstruction, recovery, preserving and liquidation of them and determines relevant duties of state power organs, owners and operators of these installations. The hydro-technical installations may be state, municipal and private property. Right for operation of hydro-technical installations is to be obtained in the order determined by legislation of Azerbaijan Republic. At the territories of location of hydro-technical installations, relevant protection regime is to be applied depending on classification of them on safety issues, and the protection zones are to be formed around them. Sizes of protection zones, their boundaries and use rules are determined by relevant executive power organ. Features of guaranteeing of safety of hydro-technical installations operated within enterprises of the state energetic and water transport systems, including safety of off -share installations located in the Sector of the Caspian Sea (Lake) owned by Azerbaijan Republic are to be determined by Regulations approved by relevant executive power organ. Carrying out of explosion work and mining

Reference	Description
	of nature resources, also location and activity of objects rendering negative physical, chemical and biological effect to these installations and environment are prohibited. Economic activity of legal entities or natural persons at the origins and zones of rivers, water basins and at sea, which negatively effect to safety of hydrological installations, is to be terminated or limited.
Law on the Protection of Historical and Cultural Monuments of Azerbaijan Republic *№ 470-IQ, Baku, 10 April 1998*	This Law is regulating the issues connected to protection, investigation and using of historical and cultural monuments. Article 13. Protection of the monuments during construction and other service works Article 14. Archaeological investigations on the sites of new constructions
Rules of Issue of the Status of "Mountainous-Mining Allocation" To Subsurface Section For Extraction of Mineral Resources, Construction and Operation of Underground Facilities Not Associated with Extraction of Mineral Resources *No. 1 of January 9, 1999*	These Rules shall establish procedures for the issue of the status of "Mountainous-Mining Allocation" to a subsurface section upon special permission (license) for extraction of mineral resources and construction and operation of underground facilities not associated with extraction of mineral resources on the territory of the Azerbaijan Republic.
Rules for Liquidation and Conservation of Enterprises Engaged into Extraction of Mineral Resources, Mountainous-Mining Excavations, Drilling Wells and Underground Facilities not associated with extraction of mineral resources *No. 2 of 9 January 1999*	These Rules shall be compulsory for all subsurface users irrespective of the type of ownership engaged into exploration, extraction of mineral resources and construction and operation of underground facilities not associated with mineral resources in the territory of the Azerbaijan Republic and the Azerbaijan Republic section of the Caspian Sea (lake).
Land Code *25 June 1999* *No: № 695-iQ*	When land is required for projects of national interest, compensation is initially offered on the basis of valuations made in accordance with a standard code (no. 158 dated 1998). If landowners are unhappy with this valuation, there is scope for agreeing a revised valuation. In the event that such agreement cannot be reached, the acquiring authority can process its application for acquisition through the courts, but this is often a long and complex process. The landowner also has an option for seeking recourse through the courts. The Land Code also allows for exchange land to be given, that is equivalent to the land being acquired.
Cabinet of Ministers Resolution No. 42 *(On Some Normative and Legal Acts Relating to the Land Code of the Azerbaijan Republic dated 15 March 2000)*	This resolution outlines procedures for the compulsory acquisition of land for state or municipal needs.

Reference	Description
Cabinet of Ministers Resolution No 110 (On Approval of Regulations for an Inventory Cost estimation of Buildings Owned by Natural Persons dated June 1999)	This resolution outlines procedures for acquisition and compensation valuation for affected buildings and immovable properties. It refers to the standard code No. 58 that is to be used for making valuations of land and property to be acquired. These valuations are made on the basis of standard unit rates for different types of construction in different regions of Azerbaijan.
Civil Code 1 December 1998	This Civil Code states that any rights to immovable properties must be registered with the State, and that land may be recalled from owners for state or municipal needs as approved by the relevant courts.
Water Code of the Republic of Azerbaijan December 26, 1997 N. 418- IQ	Regulates the use of water bodies, setting also property rights and covering issues of inventory and monitoring. State, municipalities and individuals may own water bodies depending on their importance. The Code regulates the use of water bodies for drinking and service water and for medical treatment, spas, recreation and sports, agricultural needs, industrial needs and hydro energy, transport, fishing and hunting, discharge of waste water, fire protection, and specially protected water bodies. It provides for issues of zoning, maximum allowable concentrations of harmful substances and basic rules of conduct for industry.
The Forestry Code of the Republic of Azerbaijan 30 December 1997 N. 424-iQ	The purpose and objectives of forestry legislation of Azerbaijan Republic are to manage forests with scientific approach, to preserve biological diversity of ecosystem, on base of principles of increasing reserve potential to use them effectively, protect and restore. The intents of forestry relations in Azerbaijan Republic is for the forestry fund of the Azerbaijan Republic, areas of the forestry fund, trees and bushes and its use. All forests within Republic and land lots of forestry fund not covered with plants, (forest and non-forest lands areas) comprise forestry fund of Azerbaijan Republic. Forest fund belongs to State property and it is State property. Forests and forest fund is not privatized. Subjects of forestry relations are state bodies, the municipalities, natural and legal persons.
Rules for Use, Protection and Preservation of Trees and Bushes which are not included to the Forestry Fund of Azerbaijan Republic No 173; 19 of September, 2005	This document includes detailed description of trees and shrubs that are not include to the forestry Fund and the way of their protection as well as the exclusions and the regulation in case of necessity of their cutting or replanting.
Presidential decree on "Creation of Nature Reserve for group of mud-volcanoes of Baku and Absheron peninsula" 15 August 2007	This decree is addition to the Law on Protected Areas (2000) and includes establishment of the legal framework for the purpose of protection of unique landscape forming by mud- volcanoes occurring on the area.
Law of about land lease №: 587-IQ. Adopted: 11 December 1998	This law determines the legal bases of leasing and leasing relationships of land of state, municipal and private property in Azerbaijan Republic.
EIA Handbook for Azerbaijan (UNDP), 1996	Regulations on EA in Azerbaijan which define the type of projects requiring EA, the contents of an EA document, the roles and responsibilities of the developer and the competent national authorities, the procedures for public participation and the appeal

Reference	Description
	process.
Azeri Law on Automobile Roads: Section 39: Protection of Environment, March 10, 2000.	Spells out that any construction or reconstruction of roads requires the official approval of the Azerbaijan State Ecological Expertise, must introduce state of the art technology, and chemicals used must be environmentally benign. The unit of the ministry responsible for road environment must approve the environmental, health and safety norms of the construction.
Guidelines for Road Construction, Management and Design, February 7, 2000	Addresses environmental issues in road design, construction, and maintenance.
Part I: Planning of Automobile Roads	Requires minimizing the impacts on the ecological, geological, hydrogeological, and other natural conditions, by implementing adequate protection measures.
Part II: Construction and Reconstruction of Automobile Roads	Requires consideration of appropriate protection measures, which shall contribute to the maintenance of stable ecological and geological conditions as well as natural balance.
Section II.3: Protection of the Environment	General overview on the protection of environment.
Reg. 514-1Q-98: Regulation on Industrial and Municipal Waste	Requirements for industry and enterprises for implementation of standards and norms of environmental protection for waste when designing, constructing, or reconstructing.
SNIP III-4-80: Norms of Construction Safety	Detailed regulations on construction worker's health and safety. Chapters 2 and 5 provide the organizational procedure of construction and work sites and transport sites. Annex 9 contains standards on maximum concentrations of toxic substances in the air of working zones; Annex 11 specifically requires that workers need to be informed and trained about sanitation and health care issues and the specific hazards of their work.
SNIP 2.05.02-85 Building Code & Regulations for Automobile Roads Ch. 3: Environmental Protection	Indicates the general need to minimize adverse environmental impacts in road design and provides, for instructions on the removal and re-use of top soil (no. 3.4); the need to provide buffer between the road and populated areas and to carry out noise reduction measures to assure compliance with the relevant sanitary norms (no. 3.9); on the dumping of excess materials (no. 3.12);
Safety Regulations for Construction, Rehabilitation, and Maintenance of Roads, 1978	Compilation of safety rules related to technical safety requirements of road construction equipment, rehabilitation of bridge, operation and maintenance of asphalt plants, working with toxic substances, working in borrow sites etc.
The Law of the Republic of Azerbaijan on Sanitary and Epidemiological Safety, 1993 Section III: Responsibilities of State Bodies, Agencies, Companies… on the Provision of Sanitary and Epidemiological Safety	General framework provisions on the requirement to provide healthy and safe conditions at workplaces and work camps (and many others) in compliance with the relevant sanitary hygiene, construction regulations, and norms (particularly items 14, 15 and 16).
BCH 8-89 Regulations on Environmental *Protection* in Construction, Rehabilitation and Maintenance of Roads	Comprehensive provisions on environmental protection measures in road construction such as use of soils, protection of surface and groundwater resources, protection of flora and fauna, use, preparation and storage of road construction machinery and materials, servicing of construction machinery; provisional structures, provisional roads, fire protection, borrow pits and material transport, avoidance of dust, protection of soils from pollution, prevention of soil erosion etc. The appendices to this

Reference	Description
Sanitary Norms CH 2.2.4/2.1.8.562-96; 1997	document also include state standards for: maximum permitted concentrations of toxic substances; noise control measures; soil pollution through losses of oil and fuel from construction equipment; quality of surface water. Ambient noise quality standards for residential, commercial and industrial areas, hospitals and schools (day/night standards);

As stated in Article 151 *(Legal value of international acts)* of the Azerbaijan Constitution, agreements in International Conventions supersede national laws in case of conflict. This principle is embodied in Articles 81 and 82, Chapter 14 (International Co-Operation on Environment Protection Issues) of the Law on Environmental Protection. Furthermore Azerbaijan is signatory to most international agreements and conventions relating to the environment, as shown in Table below.

Table 3: International Agreements and Conventions

International Convention	Year Ratified
UNESCO Convention on Protection of World Cultural and Natural Heritage	1994
UN Framework on Climate Change	1995
UN Convention for the Protection of the Ozone Layer (Vienna Convention)	1996
Kyoto Protocol on Greenhouse Gas Emissions	1997
Agreement on Mutual Cooperation of the Commonwealth of Independent States in the area of Hydrometeorology	1998
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), and Agreement on Protection of Sturgeons	1998
UN Convention to Combat Desertification	1998
Aarhus Convention on Access to Information, Public Participation in Decision Making and Access to Justice for Environmental Matters	1998
UN Convention on Environmental Impact Assessment in the Trans-boundary Context (Espoo Convention)	1999
Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention)	1999
UNECE Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (Aarhus Convention)	1999
UNESCO Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention)	2001
UNECE Convention on the Protection and Use of Trans-boundary Watercourses and International Lakes (Helsinki Convention)	2000
UN Convention on Biological Diversity	2000
FAO Convention on Plant Protection	2000
Protocol on UN Framework Convention on Climate (Kyoto Protocol)	2000
Protocol on Substances that Deplete the Ozone Layer (Montreal Protocol)	2000
European Agreement about Transportation of Dangerous Goods on International Routes	2000
UN Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (Basel Convention)	2001
UNECE Convention on Long-Range Trans-boundary Air Pollution	2002

Source: Scott Wilson Ltd, D112140EAEMP

On July 18, 2001, the Republic of Azerbaijan ratified the treaties of the Convention on Wetlands of International Importance as Waterfowl Habitation which was held in Ramsar city (Iran) and which later became to be known as the Ramsar Convention. The Ramsar Convention was the first of the modern global intergovernmental treaties on the conservation and sustainable use of

natural resources, and emphasized on the conservation and wise use of wetlands primarily as habitat for water birds. Traditionally regarded as wastelands, wetlands were at constant threat due to conversion of use, especially to agriculture. With the Ramsar Convention, the importance of wetlands has been recognized in sustainable development and for conservation of world's biodiversity. In Azerbaijan wetlands perform vital functions such as flood control, water purification, water regulation, production of fish and etc., making them essential in the biophysical health of the areas. Primarily the signatories to the Ramsar Convention are expected to do the following: (i) specify at least one wetland on a List of Wetlands of International Importance; (ii) encourage the wise use of wetlands; (iii) establish wetland reserves, cooperate in the exchange of information and shared wetlands species.

1.1.1 Administrative Framework

The following government agencies will be involved in the management and monitoring of environmental aspects or concerns of the proposed road rehabilitation/construction project:

ARS is responsible for planning, constructing, operating, and maintenance of national roads in Azerbaijan. The Project Implementation Unit (PIU) of the ARS will be in charge of project management, among others, to ensure that appropriate budget will be provided for the implementation of mitigation measures and monitoring the programme, and that the contract provisions are properly implemented. The Ecology and Safety Sector (ESS) of the ARS shall coordinate the EA study, carry out required public consultations, ensures implementation of the EMP and public disclosure of the EA study. The ESS shall also liaise with relevant government offices for securing environmental approvals.

The ESS and the district offices of ARS in Rayons along the project road will undertake day-to-day supervision of construction and oversight of the implementation of environmental management plans during project implementation.

The Regional Monitoring Department of the MENR shall undertake routine and random monitoring of the project to determine compliance with environmental regulations and standards.

The Sanitary and Epidemiology Department of the Ministry of Health (MOH) will undertake routine monitoring of the living conditions and sanitary provisions at the contractor's work camp and worksites. MOH's Regional Disinfection Centre shall be involved in approving the contractor's work camp installations and facilities and their compliance with the relevant sanitary and health norms and guidelines.

During the operational phase of the Project, ARS will undertake routine monitoring of road safety, the storm water drainage system, the condition of tree plantations and re-vegetation, etc.

1.1.2 World Bank's Safeguard policies

The World Bank's environmental and social safeguard policies focus on preventing and mitigating negative impacts to social and physical environment throughout the project cycle. The policies serve as guidelines and bases for the World Bank and borrowers the overall project cycle starting from identification, preparatory works (Pre-feasibility Study/ Feasibility Study) and implementation (design/procurement and construction) of programs and projects.

WB's Environmental Impact Assessment (EIA)

Environmental assessment of project is based on the Bank's environmental assessment policy and recommended processing are described in Operational Policy (OP)/Bank Procedure (BP) 4.01: Environmental Assessment. Considering the project, the relevant policies consist of:

- Involuntary Resettlement (World Bank OP/BP 4.12);

- Natural Habitats (World Bank OP/BP 4.04: Natural Habitats 2001);
- Forestry (World Bank OB/BP 4.36);
- Management of Cultural Property (World Bank OP 11.03).

The following table presents the World Bank Policies vis-à-vis the local Legislations

Table 4: WB and Azerbaijan Policies Considered in the Environmental Assessment

Policy Aspects	WB Policy	Azerbaijan Local Legislations
Involuntary resettlement	**The World Bank OB/BP on Involuntary resettlements requires WB**: The policy requires that if involuntary land taking and resettlement become necessary, a clear plan for compensating and assisting displaced people is prepared by the borrower for the World Bank's review	- the laws and regulations on land acquisition and resettlement (LAR) in Azerbaijan; and - A Resettlement Framework for the Road Network Investment Program (the Program) dated June 2007 established the principles and procedures for the compensation of land, houses, buildings, crops and livelihoods to be affected by the Program. The Resettlement Framework was prepared by the Government, endorsed by the Ministry of Transport and disclosed in June2007.
Natural Habitat	T**he World Bank OP/BP on Natural Habitats**: ensures that WB-supported infrastructure and other development projects take into account the conservation of biodiversity as well as the numerous environmental services and products which natural habitats can provide to human society. • Azerbaijan is signatory to the convention on biological diversity which seeks to ensure conservation of biological diversity and sustainable use of its components.	- "Law on Plant Protection" (1996) - "Water Code" of the Republic of Azerbaijan (1997): for the protection of water and includes several types of aquatic habitats including: rivers, lakes, the Caspian Sea, wetlands, riparian habitats, river catchments, water sources, and other wetland areas related to protected natural resources - "Law on Fisheries" (1998) - "Law on Fauna" (1999) - Law on Environment Protection (1999) of the Republic of Azerbaijan defines the protected area estate and buffer zones - Land Code (1999) defines the actual types of areas protected by the State for biodiversity - "Law on Protected Areas" (2000) - "Law on national parks and reserves (2003 - "Law on environmental protection (1999) - "Law on ecological security (1999)
Forestry	**The World Bank OP/BP on Forestry:** aims to reduce deforestation, enhance	- Forestry Code (1997)

Policy Aspects	WB Policy	Azerbaijan Local Legislations
	the environmental contribution of forested areas, promote a forestation, and reduce poverty encourage economic development.	
Cultural Property	**The World Bank OP on Cultural Property**: acknowledgement of cultural resources such as sources of valuable historical and scientific information as assets for economic and social development, and as an integral part of a people's cultural identity and practices (OD 4.50 and OP 11.03).	- Law on Protection and Utilisation of the Cultural and Historical Monuments' - Law of the Republic of Azerbaijan on Legal Protection of Expressions of the Azerbaijan Folklore
Public Consultation and Disclosure	**The World Bank's policy on Public Consultation and disclosure:** - EIA reports have to be presented to both Government of Azerbaijan and the WB management and serve as a background document for approval by the competent authority. In accordance with OP/BP4.01 the Borrower (the Government of Azerbaijan) has to present the EIA Report and the Land Acquisition Plan at a public place accessible to consultation for project affected groups and local NGO's.	- Handbook for the Environmental Impact Assessment Process in Azerbaijan 1996.

The scope of EA examines the project's potential negative and positive environmental impacts and recommends any measures needed to prevent, minimize, mitigate or compensate for adverse impacts and improve environmental performance.[3] An Environmental Management Plan describing in detail the mitigation measures, monitoring program, institutional strengthening and implementation schedule and costs are included in this EA report.

The EA report will be presented to both the Government of Azerbaijan through the Ministry of Transport (MOT) and WB, and which shall serve as a background document for approval by the relevant authority or agency (MENR) in Azerbaijan. The borrower (i.e. the Government of Azerbaijan) will have to make the draft EA Report available in Azeri language in public places accessible to project-affected groups and local NGOs in accordance with OP/BP 4.01, Environmental Assessment. The borrower must also officially transmit the EA report to the Bank prior to formal appraisal. Once local disclosure requirement has been met for the EA Report, the Bank shall also make it available to the public before the formal appraisal process of the project begins.[4]

[3] The World Bank Operational Manual: Operational Policies (OP) 4.01, January 1999 (as revised in August 2004).
[4] The World Bank (2002): The Disclosure Handbook. Operations Policy and Country Services. December 2002.

3. PROJECT OBJECTIVES AND PROJECT DESCRIPTION

3.1 Objectives and Purpose of the Project

The project road of 16km will provide the continuity of four lanes from Baku to Shamakhi. Accordingly, by the road will be supportive of the objectives of the entire Baku-Shamakhi road which are as follow:

- Reduce road transport costs for road users
- Improve access and transit throughout the entire road
- Enhance safety within Azerbaijan's east-west corridor, through the implementation of a number of subprojects
- Better road quality and better safety through new alignments
- Lower travel costs and a shorter travel time.

In addition, as mentioned in the IRD-EIA, the other recognized objectives are as follows

- to boost the national and regional economy, supporting the swap of goods with neighbour countries and creating temporary and employment opportunities;
- to further the introduction of international standards in the transport sector of Azerbaijan and thus generally support the Country in westernizing process

The four-laning of the entire Baku-Shamakhi road is expected to result to economic growth for Azerbaijan is as a consequence of higher returns on investments through the marked growth of the traffic, increase in speed, and subsequent decrease in travel time with the better road infrastructure. In general, the enhanced east-west connections will foster economic integration and growth within the country, particularly the non-oil growth, leading to a degree of economic diversification.

3.2 Project Works Description

From the existing two-lane Category II road, the segment Km 91-107 of the Baku-Shamakhi highway shall be reconstructed into four-lane to connect to the existing four-lane road (km 45-91) and the redesigned four-lane up to Shamakhi. In the AHP III: Preliminary Design Report (March 2015) by Dohwa Engineering Co., LTD., the road segment is designated as Section 4-1: km 91 to km 105. The redesign for widening/upgrading or new alignment solutions for Section 4-1- km 91 to km 105 (revised to 107) considered the following:

- Substantial slope stability issues;
- Mountainous terrain;
- Physical constraints such as built up areas (e.g. Sabir village, etc.);
- A number of side roads;
- Rolling terrain

The geometric design follows the following design criteria based on the SNIP.

Table 5: SNIP Road Geometric Design Criteria

Category	Unit	Design Standard		Ref. SNIP 2.05.02-85*
		Normal Terrain	Highland Terrain	
Design speed	Km/h	120	60	P 4.1, Table
Total width of road	m	27.5	22.5	
Lane width	m	3.75	3.75	
Carriageway width (number of lanes)	m	2x7.5(4)	2x7.5(4)	
Median strip width	m	5.00	3.00	P 4.12
Shoulder width	m	3.75	2.25	P 4.10

Category	Unit	Design Standard		Ref. SNIP 2.05.02-85*
		Normal Terrain	Highland Terrain	
Cross fall in the carriageway (shoulder)	%	2(4)	2(4)	
Horizontal minimum radius	m	800	125	P 4.21, Table 10
Vertical maximum gradient	%	4	6	

Source: Dohwa Engineering Co., LTD. [5]

The cross-sectional profile of the road is shown in the next Figure.

The road construction will also include drainage, cross-pipes and culverts along with relocation of underground and above ground utility lines.

Generally, the construction will be within the designated ROW. Indirect impact can extend even beyond the 60 ROW mainly due to social environmental characteristics of the project area.

[5] March 2015 AHP III: Preliminary Design Report. Dohwa Engineering Co., LTD.

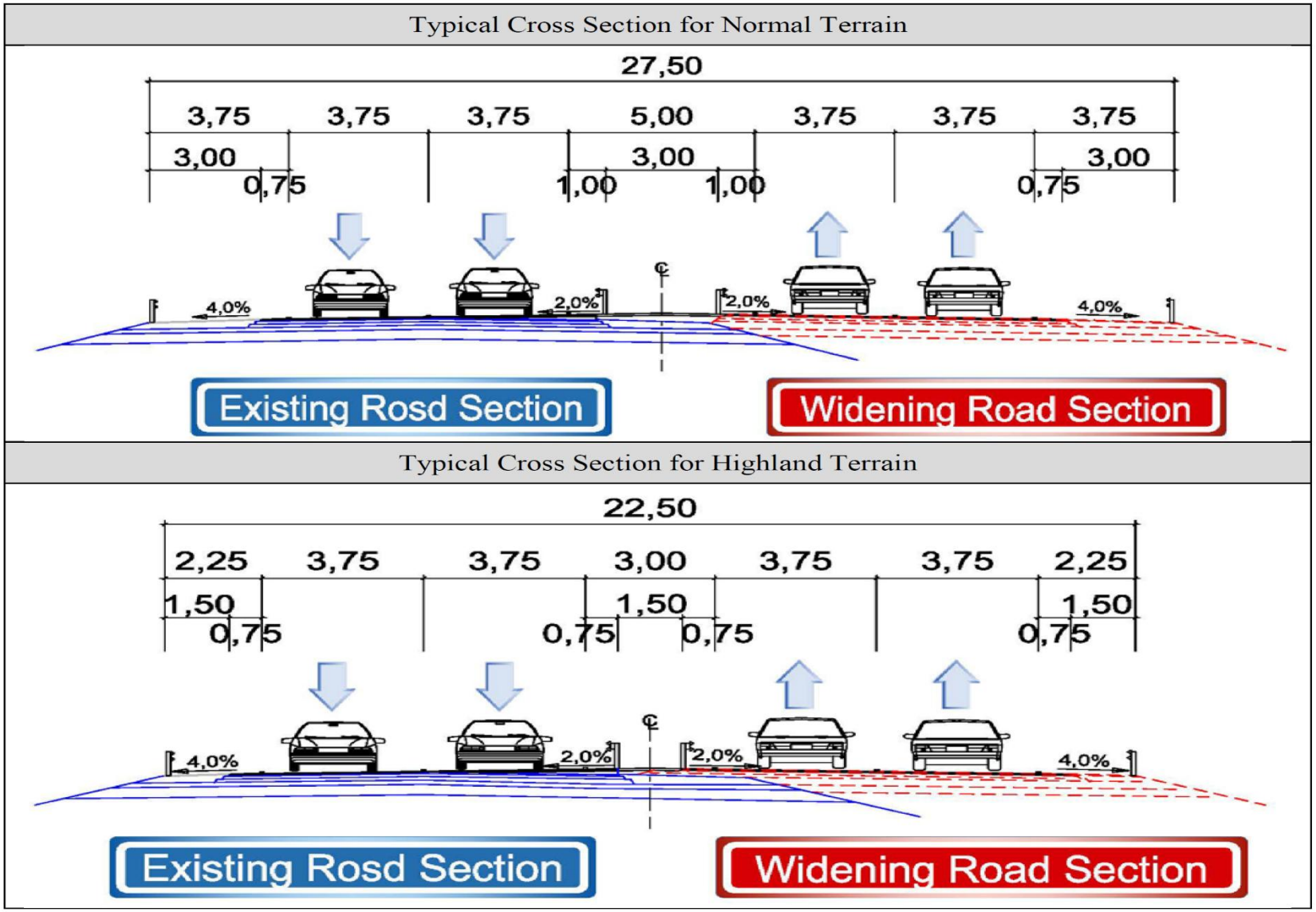

Figure 2: Road Cross-Section

In addition to the four-laning of the roadway, the pavement within the km 91-107 shall be strengthened based on a new design. The pavement strengthening shall entail a new structural pavement design based on new parameters adopted to strengthen the road pavement in anticipation of heavier loadings. Because of this, the road pavement of the 16km section will be rebuilt to conform to the new design parameters. Changes in thicknesses in the New Project Design were introduced by the design engineers. In the construction, this will be implemented by scarifying the pavement structure up to embankment layer and onto which the new design project design. The design modification is shown on the table below and depicted on the subsequent schematics.

Table 6: Road Design Modification

No.	Pavement Component	Existing Road Design		New Project Design
		91+000~99+000	99+000~107+000	
1	Wearing Course	5 cm	5 cm	5 cm
2	Binder Course	9 cm	9 cm	7 cm
3	Bituminous Base Course	10 cm	10 cm	17 cm
4	Crushed Base Course	-	-	20 cm, CBR>80%
5	Granular Subbase	15 cm, CBR>30%	15 cm, CBR>30%	15 cm, CBR>30%
6	Capping Layer	35 cm, CBR>15%	30 cm, CBR>15%	38 cm, CBR>15%
	Total Thickness	**74 cm**	**69 cm**	**102 cm**
7	Embankment	CBR > 3.5%	CBR > 3.5%	CBR > 8.0%

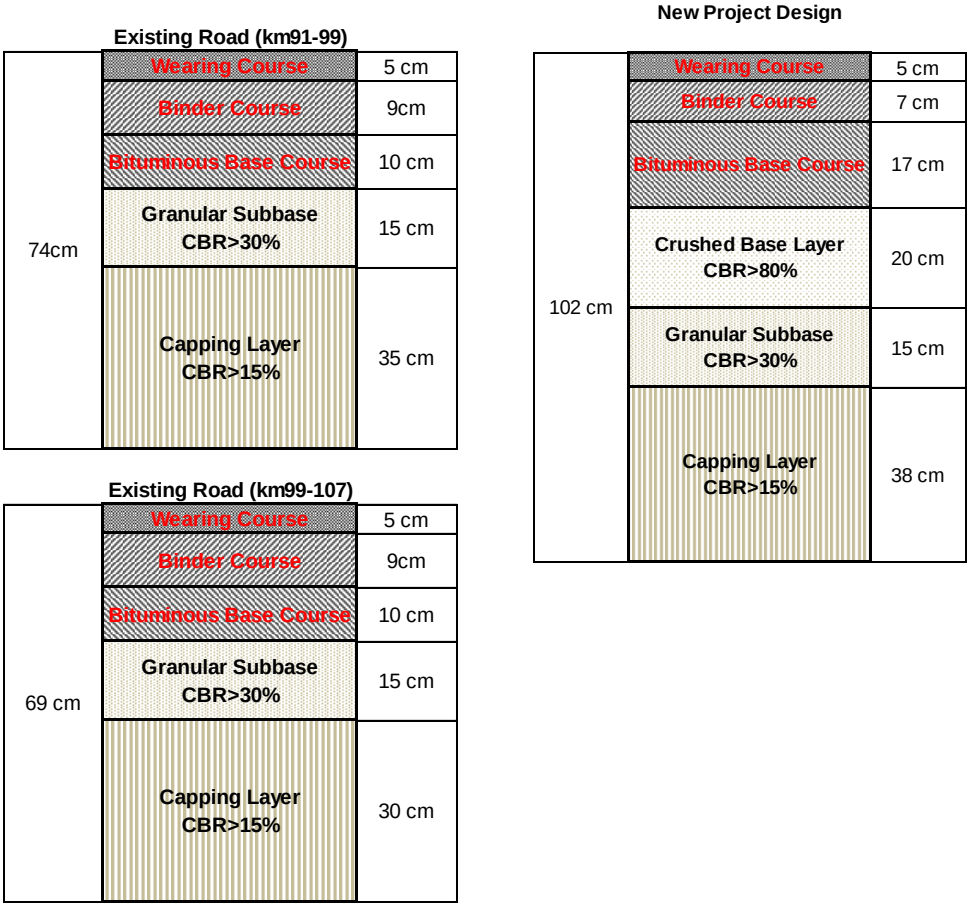

Figure 3: Road Cross-Section

3.3 Description of the Alternatives at the Hairpin Section

As mentioned in the Preliminary Design Report, (Dohwa, March 2015) the consultant has proposed alternative alignments in this subsection (km 97+300 to km 98+100) and comparatively analyzed the alternatives by applying weights on factors considered. The discussion on the alternatives for the ***hair-pin*** section is presented below.

3.3.1 ALTERNATIVE 1: Widening and Improving the Existing Road

This alternative proposes to address the issue by widening and improving existing road by maintaining a horizontal radius of 30m, longitudinal gradient of no more than 6% along with the widening of the bridge over Agidera River (km 97+000). However, such modification does not comply with SNiP Standard. To solve the landslide issue in two locations, the following are proposed: (i) around km 97+420 - stabilization piles and berm (b=1m) for every 5m height; (ii) around km 97+980 - horizontal drain pipes, berm (b=1m) for every 5m height and cutting slopes with gradient of 1:2

3.3.2 ALTERNATIVE 2: New Alignment with Long Bridge

The second alternative considers establishing a new alignment and construction of a long bridge to by-pass the *hair-pin* section. The new alignment will have a gradient of no more than 3% and a horizontal radius of 320m. A long bridge with a length of around 715m and a pier height of 320m will serve as the link of the new alignment over the valley where Agidera River runs through. The long bridge, which will be constructed south of the existing road, will be the main structure. In the preliminary design the bridge design is yet to be finalized but due to the considerably long span, a number of piers are expected to be erected in between.

4. DESCRIPTION OF THE ENVIRONMENT

4.1 Physical Environment

4.1.1 General Geology and Soil

The project area geographically is within the foothills of eastern prongs of Greater Caucasus mountain range. The landscape of this segment of the project corridor in western Gobustan is characterized as hilly and mountainous with a number of spots experiencing landslides and erosion. The area has irregular morphology with hills and deep gullies of Jurassic, Cretaceous, Neogenic and Paleogenic rocks, as well as alluvial-proluvial and deluvial-proluvial depositions with shale, sandstones, and river gravels. As mentioned in the IRD EIA, one of the geological-geo-morphological problems of the region is its high seismicity of the area. The area of the region corresponds to 8 score scale on the seism-tectonic map of Azerbaijan.

The soils in the Gobustan Rayon are mainly chestnut dark and yellow chestnut soils toward Gobustan and Shamakhi region are integrated into biological processes going on hydrosphere, atmosphere and lithosphere. Alkali soils are widely spread on plain areas of Azerbaijan, especially in the north-west of the Caspian Sea and south-east of Gobustan. This is the result of many factors such as eluvial alkalinization or the effect of ground waters, proceeding salinization.

4.1.2 Climate and Water Resources

Contrast to the semi-desert and dry steppe climate of the covers the east-centre lowlands, the summer climate in the Km 91-107 (Gobustan-Shamakhi regions) is moderately warm and semi-arid with corresponding mild and short winter with is and non-persistent snow. The highest temperature is usually recorded in July (32 degrees) while the lowest is in January (-1.6 degrees). The beginnings of spring and summer seasons are characterized with high

concentration of rainfalls; however the annual precipitation is only around 250mm. The western part of Gobustan descends to the Kura lowlands, where there's more precipitation in spring and autumn than eastern Gobustan.

The biggest river in the Baku-Shamakhi road is traversed by km 91-107 segment, which is the Pirsaat Chay (length 199 km; basin area 2280 km2) flowing NW to SE at km104+500 draining the Caucasus Mountains to the north. This river flows through the Ismailli, Shamakhi and Salyan Rayons carrying water mainly from Caucasus snowmelt, precipitation and springs. Currently, the Pirsaat Chay is used as a borrow area by multiple users, and is also a source of drinking water for locals. The tributary rivers of the Pirsaat Chay, mainly formed by rain, snow, groundwater and partially by glaciers, are the Shorderesu, Agiderasu, Zagavala Chay and Ruslar Chay Rivers. There is no regularity in the river regime and intense rains can, in any season of the year, cause flooding, due to the lack of vegetation along the river course and the presence of non-porous rocks in the plain area. The river also dries up completely when groundwater flows recede in the late summer/autumn periods.

Another minor river is the Agidera River at approximately km 97+000 is also traversed by the Km 91-107 project segment. This river has a width of around 13.5 m at the bridge point. The river flows from north to south with its watershed spreading from Takla, Syundi, Jeirly and Gobustan settlement, all within Gobustan Rayon, and covering around 14,000 hectares. The water itself is ephemeral and can become dry during the summer time.

4.2 Biological Environment

Eastern Gobustan is mildly sloping to the west as these are the foothills with of the greater Caucasus with an altitude averaging 300 m. The start of the road segment at km 91 has an elevation of 650 m. The difference in elevation also account for the difference in climate as well as the biota in the area. The eastern part is composed of Artemisia steppe, grass steppe and scrubland; while the western part of Gobustan and the adjacent part of Shamakhi Rayon, with elevated moisture, are grasslands with pastures and farmlands.

4.2.1 Flora

Generally, the flora along the road has two main components, perennial plants and annual ephemeral plants. Flora is composed by saltwort vegetation in first part of the study corridor and arid steppe vegetation and the arable and irrigable agricultural fields are found closer in the Narimankand (part of km 45-91) and Sabir village, which are located at around km 102+100. Beyond Pirsaat River are tracts of agricultural land with a wine factory on the LHS until km 107, the eastern edge of Shamakhi town.

The main vegetal species of the area are represented by:

- Wormwood formations: *Artemisia hanseniania*,
- Saltwort formations: *Salsola Dendroides*,
- Shrub vegetation: Tamarisk, Juniper shrub and
- Ephemeral grasses: Tulips (*Tulipa sp.*), Iris (*Iris sp.*), Feather grass (*Stipa sp*.), Cereals (*Andropogon sp*. etc.) Bushes (*Pirus sp. Amigdalusfenzliana* etc.)
- Flower species: *Euphorbia helioscopia, Veronica chamaedrys, Leontodon hispidus,Cirsium arvensis,Erodium cicutarium, Arnebia linearifolia, Sisymbrium officinadale, Ammi visnaga, Cicorium intibus,Calendula sp*. *Papaver sp. Salsola sp.,Eryngium planum Echinops ritro.*

Thirteen Species of plants can be found in the Red Data Book of Azerbaijan and are present in the Baku-Shamakhi desert/semi-desert region, namely: *Anabasis brachiata, Astragalus bakuensis, Acantholimon schemachense, Avena ventricosa, Cladocheta candissima,Calligonum*

bakuense Ferula persica, Iris acutiloba, Iris reticulata, Muscari elegantulum, Pyracanta coccinea,*Stipa pellita,Tulipa biebersteniana.*

4.2.2 Fauna

Among the main groups of Mammals present in the area the following species are observed in the project area are:

- Mammals: Jackal (*Canis aureus*), Wolf (*Canis lupus*), Red Fox (*Vulpes vulpes*), Badger (*Meles meles),* Wildcat (*Felis libyca),*Hare (*Lepus europaeus*) Western Barbastelle Bat (*Barbastella barbastella*) (Iv), (Vulnerable Species - 2008 IUCN Red List), these nocturnal active mammals, uses surrounding structures as a shelter during the daytime and can be found in the study area except during the summer. Other mammals are: Blasius's Horseshoe Bat (*Rhinolophus blasii),* (Near Threatened Species- 2008 IUCN Red List), *Rhinolophus ferrumequinum*, *Pipstrellus kuhlii, Myotis blythii, Rodens:* House Mouse (*Mus musculus*), Water Vole (*Arvicola terrestris),* Red-tailed Sanderling (*Merioneslybicus*), *Allactaga williamsi,*Social Vole (*Microtus socialis*), White-toothed Shrew (*Crocidura guldenstaedti),* Hedgehogs *(Erinaceus concolor),Hemiechinus auritus.*
- Aviafauna: Short-toed Eagle (*Circaetus gallicus*), Imperial Eagle (*Aquila heliaca*), Pallid Harrier (*Circus macrourus*), migratorySaker (*Falco cherrug*), Common Kestrel (*Falco tinnunculus*), Lanner (*Falco biarmicus),* The Lesser Kestrel (*Falco naumanni*) (Ev) (**Error! Reference source not found.**) (Internationally protected and Vulnerable pecies - 2008 IUCN Red List), it is a common breeding bird in the study area (vicinity of the River and village of JeyrankechmezLittle Bustard (*Tetrax tetrax*). Migratory species include: Chukar (*Alectoris chukar),* Rock Dove *(Columba livia),* Crested Lark (*Galerida cristata*), Chough *(Pyrrhocorax pyrrhocorax).* Are typical resident species: Rooks (*Corvus frugilegus*), Jackdaws (*Corvus monedula*), Common Starlings (*Sturnus vulgaris*), Tree Sparrows (*Passer montanus*), Rose-colored Starlings (*Sturnus roseus*), Common Bee-Eaters (*Merops apiaster*), Rock Sparrows (*Petronia petronia*).
- Amphibians: Green Toad (*Bufo viridis*), Common Frog (*Rana ridibunda*), Spadefooted Toad *(Pelobates syriacus*), - Red Data Book of Azerbaijan, Common Toad (*Bufo bufo*).
- Reptiles: Viper Lebetina (*Vipera lebetina),* Caucasian Agama *(Agama caucasica),* Greek Tortoise *(Testudo graeca*), European Pond Turtle (*Emys Orbicularis*) - (Near Threatened Species - IUCN 2008 Red List) Caspian Turtle (*Mauremys caspica),Lizards:Stellio caucasicus,Ablepharus pannonicus, Eremias arguta, Eumeces scheideri,Cyrtopodion caspius, Snakes:Elaphe quatourlineata, Eirenis collaris, Malpolon monspessulanus,* Grass snake (*Natrix tessellata*).
- Fishes: Caucasian Chub (*Leuciscus cephalus orientalis)*, Kura's Barbel (*Barbus curi)*, Caucasian Bleak (*Alburnus charusini),* Bitterling (*Rhodeus sricous),*Sazan (*Cyprinus carpa),*Kura's Loach (*Nemachilus brandti).* No threatened fish species in the Azerbaijan Red Data Book are present in the rivers and streams of this region.
- Insects: *Beetles: Carabus scabrosus, (*Azerbaijan Red Data Book) *Calosoma sycophanta*, (Azerbaijan Red Data Book)Butterflies:Apollo (*Parnassius Apollo)*, *Colias aurorina,Manduca atropos* Tarantula (*Lycosa*), Phalanges (*Galeodes araneoides*), Scorpions (*Buthus eupeus*), Tick (*Ornithodorus*) Darkling Beetles (Blaps), Locust (*Dociostaurus maroccanus*), Mosquito (Phlebotomus), *Megacephalus euphraticus*, (Azerbaijan Red Data Book) Alpine Swift (*Apusmelba*). (Azerbaijan Red Data Book).

4.3 Socio Economic Background of the Project Area

4.3.1 Administrative Division of Project Area

The Project section from km 91– km107 is part of Baku-Shamakhi road and passes through Daqliq Shirvan Region of Azerbaijan through two of four its rayons: Qobustan and Shamakhi. The road section straddles the western edge of Gobustan Rayon and the eastern edge of Shamakhi Rayon. Within this 16km stretch, 4 km (km91-95) is within Gobustan Rayon while the rest of the 16 km (km 95-107) is within Shamakhi Rayon. Dagliq Shirvan economic region situated in the central part of Azerbaijan consists of the territories of Agsu, Ismayilli, Qobustan and Shamakhi administrative districts (rayons).

4.3.2 Administrative Division and Socio-Economic Conditions of Rayons

Qobustan Rayon is one of four Rayons of Dagliq Shirvan Economic Region (ER), and comprises of 1 town of Qobustan, 1 settlement and 31 villages. Shamakhi rayon on the other hand comprises of 1 town of Shamakhi, 3 settlements and 46 villages. (See Table below).

Table 7: Administrative Division of Project Traversed Rayons

Administrative Unit	Rayons	Towns	Settlements	Villages
Dagliq Shirvan ER	4	4	6	261
Qobustan Rayon		1	1	31
Shamakhi Rayon		1	3	46

Source: http://www.stat.gov.az/source/budget_households/

In terms of territorial area and population Shamakhı Rayon prevails over Qobustan – 1.55 sqkm vs. 1.34km; as well as 97,946 people vs. 43,125 people, respectively (see **Error! Reference ource not found.**). Most of population of Qobustan Rayon (80.69%) lives in the rural area, whereas the population of Shamakhi Rayon is distributed almost equally in urban and rural areas, 47.83% vs. 52.16% respectively.

Table 8: Key Statistics of Qobustan and Shamakhi Rayons

Location	Area sq. km	Population	Urban Pop'n	Rural Pop'n
Qobustan Rayon	1.34	43,125	19.31%	80.69%
Shamakhi Rayon	1.55	97,946	47,83 %	52.16%-

Source: http://qobustan-ih.gov.az/page/12.html / http://shamaxi-ih.gov.az/page/12.html

4.3.3 Socio-Demographic Data of the Rayons and Settlements

Currently, the population of Azerbaijan Republic is around 9.593 million. Dagliq Shirvan Economic Region has a population of 270.2 thousand, with Qobustan Rayon having its own population of 43,125 people, and Shamakhi Rayon with population of 97,946 people. Population density in Shamakhi rayon is twice as much as in Qobustan Rayon (63 vs. 31persons per sq. km) (see Table below).

Table 9: Territory, Population and Density Data

Location	Territory sq.km	Population, (thousand)	Density of population as of Jan. 01, 2015 (1 sq.km)
Azerbaijan Republic	86,600	9,593	111
Dagliq Shirvan Economic region	6,06	270.2	45
Qobustan Rayon	1.34	43.125	31
Shamakhi Rayon	1.55	97.946	63

Source: http://qobustan-ih.gov.az/page/12.html / http://shamaxi-ih.gov.az/page/12.html

The rural population of Qobustan Rayon prominently prevails over the urban one - in .figures, 34,796 people of rural and 8,329 people of urban population (80.69% vs. 19.31%). The proportion of male and female of the population is almost the same, with slightly prevalence of female population, making up 49.89% (21,519) to 50.10% (21,606) respectively.

The population of Shamakhi Rayon is 97,946; males are 47,994 (49.00%), while females are 49,952 (50.99%).

4.3.4 Baseline Socio-economic Conditions of Project Area

The Shamakhi Rayon had been functioning as rayon since 1930. The most developed sectors of the rayon's economy are production and processing of agricultural products. There are 22 farms functioning in the rayon. The volume of the agricultural products in 2010 in Shamakhi makes 36,400.2 thousands AZN. Cultivation and cattle breading are main agricultural activities in the region. Thus, grain, potatoes, vegetables, gourd, grape and fruits cultivation prevails among other products. New grape gardens have been planted in the rayon with total are of 1,500 hectares. Additionally to cattle breading, poultry and bee-farming have been developed in the rayon.

Besides, opening of number of new industrial enterprises caused further economic development in the Shamakhi Rayon. Food and light industry are main sectors of industrial. The main portion in the food industry takes production of vine from locally breaded grapes. Light industry is mainly presented by textile and rug weaving. There are 32 industrial enterprises are registered in Shamakhi rayon and mainly 10 of them are operating. Thus, "Star" consumer electronics, "Azsamand" vehicle and "Azelektronik" fridge and number of other consumer electronics products production plants opened since 2004 and have been operating for a last decade.

Currently there are 817 private retail trade and 69 catering facilities operating in the region. At the moment, one Diagnostic Center, one Central Hospital, one hospital in Goyler village and 21 other medical facilities are operating throughout Shamakhi rayon. There are seventy two (72) schools, twenty two (22) preschools and 5 non-school educational institutions in the region.

The Gobustan rayon is predominantly agriculture oriented with cattle breeding and wine growing activities, with some touristic attraction and commercial structure recently established.

The proper natural grazing conditions in Gobustan during winter and summer seasons serves to development of cattle breading especially to small horned stock. There are also proper conditions for poultry development. There are one Rayon Central Hospital, one Sundu village hospital, one Tekle village hospital, 12 village ambulance and 6 paramedical facilities serve the population of Qobustan rayon.

4.3.5 Income sources

Based on the distribution of income sources by Economic Regions, the monthly income of people in Baku Region is 257 Manats. Whereas, people in Dagli Shirvan ER make around 218.5 Manats per person per month. The highest source incomes in Dagli Shirvan ER come from the private sector, while in Baku the public sector is the highest source of income. Property income is the lowest for both economic regions. (**Error! Reference source not found.**).

Table 10: Source of Monthly Income for Daglig Shirvan ER (2014)

Category	Daglig Shirvan ER		Baku Region	
	Manat	**%**	**Manat**	**%**
All income	**218.5**	**100.0%**	**222.5**	**100.0%**
Hired work in public sector	49.2	22.5%	93.4	47.7%
Hired work in private sector	91.9	42.1%	44.7	25.1%

Category	Daglig Shirvan ER		Baku Region	
Hired work in agriculture	32.4	14.8%	0.2	1.1%
Rent income	2.8	1.3%	0.3	1.6%
Property income	1.3	0.6%	0.1	0.4%
Current transfers	25.8	11.8%	70.4	14.1%
Pension	23.9	10.9%	29.3	12.7%
Social assistance	1.9	0.9%	25.0	1.0%
Social transfers in kind	0.0	0.0%	16.1	0.5%
Other income	15.2	7.0%	13.4	10.0%
Received from other families	10.8	4.9%	11.2	7.6%
From outside of the country	4.4	2.0%	2.3	2.4%

Daglig Shirvan ER economic region is noted for viticulture, winemaking, and animal breeding (mainly cattle breeding. Traditional handcrafting (carpets) is also popular in the region. Great opportunities exists in cultivation and processing of a number of products such as grapes, grain, fruits and vegetables, meat, dairy products, organic honey, as well as various types of juice and other preserved food, construction materials, leather, asphalt, mineral waters, spinning and sewing consumer goods, confectionary, furnishings, woodworks etc.

5. FORECAST ENVIRONMENT IMPACTS AND MITIGATION MEASURES

In the four-laning of the road segment, direct and/or indirect impacts are generated which are rather short-term as they are felt and manifested during the actual performance of the construction activities. Modification of the actual worksites and material sources gives rise to direct impacts, including disturbances to natural environment components such as air and noise, flora and fauna, and water. Social impacts occur along the vicinity of the road nuisance such as impairment of the usual access, community health and safety concerns, plus socio-economic conflicts. Likewise, those temporary facilities allied to the construction, such as quarry sites and borrow pits, excess soil disposal sites, contractor's workers camps, and asphalt plants generate also short-term impacts. It is expected that impacts from these types of activities will cease once the contractor completes the project road and demobilizes from the site.

Considered in this study are those generated during the construction period as well as during the operations period. Those that pertain to the construction shall serve as guidance to the Contractor and Construction Supervision Consultant (CSC) or the Engineer for the implementation of the project. While those for the operation shall be more of guidance to the Client after the handing-over of the project by the Contractor.

5.1 Effects during Construction Period

In this 16km stretch of the Baku-Shamakhi Road (Km 91-107) the primary disturbance along the road corridor will entail generally earthworks such as removal of existing pavement when necessary, removal or relocation of objects that are within the construction strip, laying of subbase and base course layers and asphalt pavement, extension of necessary waterway crossings and installation of road furniture. Detailed impacts are presented in the ensuing discussions.

5.1.1 Physical Environmental aspects

(1) Roadway Earthworks

Since the road will be constructed alongside existing two-lane road and shoulder, a number of major cuts or fills will be done in designated locations to allow for the four-lane. The final design, will also ascertain the road elevations in accordance with the design requirements. Roadway cuts shall entail excavation, removal and reusing, when proved to be suitable, for

embankment/filling work. Unsuitable soil materials shall be disposed in areas where it would be proven to be non-detrimental to adjacent community and the environment. The work scope also includes all excavation necessary for side ditches and relocation of underground utilities. Some excavation and filling will be done at the extension of water way crossings. Taking all of these into consideration, cut and fill works is expected to be minimal.

Since the 16km section of the road will be constructed on existing road and shoulder, impacts on major cut or fill have already been considered in the IRD EIA and also elaborated in this report. The rework on the existing pavement for the four-laning will entail the following to conform to the new design:

(i) Scarifying and milling of the existing asphalt layers: Wearing Course, Binder Course, Bituminous Base Course and Granular Subbase; stockpiling these materials separately for resuse.

(ii) Reworking of capping layer and thickening it from 30/35cm to 38cm with required materials from quarry sites

(iii) Re-laying of 15cm Granular Subbase

(iv) Adding a new layer of 20cm Crushed Base Layer (CBR>80%)

(v) Re-laying of thicker Bituminous Base Course from 10cm to 17cm

(vi) Re-laying of thinner Binder Course from 9cm to 7cm; and

(vii) Re-laying of Wearing Course of the same thickness (5cm)

Where new two-lane portion shall be constructed for the service roads, these will require the following scope of the New Project Design:

(i) Preparation of the road embankment layer as needed;

(ii) Installing 38cm Capping Layer;

(iii) Laying of 15cm Granular Subbase;

(iv) Laying of 20cm Crushed Base Layer;

(v) Laying of 17cm Bituminous Base Course;

(vi) Laying of 7cm Binder Course; and

(vii) Laying of 5cm Wearing Course.

The reconstruction of the new pavement will entail short term disturbance at the site consisting of noise, dust, equipment emission, impairment of local community access. Noise can be mitigated by proper scheduling the usage of equipment, installation of mufflers and regular equipment maintenance and provision of noise barriers when needed. Dust can be routinely minimized by watering of certain exposed areas and covering materials being hauled in trucks. Location for temporary material stockpile can pose some localized issues which the Contractor can resolve by proper planning.

In some areas, cut and fill for the new lanes to conform to the New Project Design may have to be done along with the construction of side ditches for drainage. Roadway cuts shall entail excavation, removal and reusing, when proved to be suitable, for embankment/filling work. Unsuitable soil materials shall be disposed in areas where it would be proven to be non-detrimental to adjacent community and the environment. The work scope also includes all excavation necessary for side ditches and relocation of underground utilities. Some excavation and filling will be done at the extension of water way crossings. The impacts of the cut and fill works will be minimized by proper planning and determining sites to obtain materials or deposit them when they are in excess. Re-cultivation of borrow areas should be done after their usage and deposited materials should be stabilized by proper grading to allow natural re-vegetation.

(2) Slope Stabilization

The Km 91-107 road segment is located in an area that is generally characterized as hilly areas having rolling terrain and unstable slopes that are prone to landslide. These landslides prone areas were noted at km 95.5 ~ km 96.5 where local collapse had occurred. Geotechnical investigation results showed that this section is comprised of silt and clay with soft to firm silty and clayey soil over soil strata at deep layers that are stiff to hard, as per SPT-N.

Since the proposed road passes through a gentle terrain from km 91+000 to 95+700, no high slope-cutting is envisioned. Albeit both side slopes of the existing road show evidence of surficial erosions induced by rain, this do not seem to affect the overall slope stability in this area.

From km 95+700 to 96+200, quite a good number of problematic landslide spots exist where some parts of the road had already been supported by retaining walls as per previous reports (by Zetas (2010) and Finnroad (2011). Slope failures have already occurred in these spots which need to be stabilized and tension cracks are visible on the upper slope of the hill.

The consultant recommends mitigating landslide hazards and minimizing chronic slide problems by establishing benches to decrease driving force for both cut and embankment slopes. It will also be necessary to have a drainage layer with granular materials in embankment slopes to minimize the recurring landslides. The detail measures are as follows for landslide Area (between 95+700 and 96+200):

- Cut Slope : Installation of horizontal drainage with 20~25m length
- Embankment Slope: Installation of stabilizing piles with L=25m depth

In landslide area, when road alignment follows the existing road, widening is recommended to left hand side (LHS) of the existing road, if possible. This is because the widening to LHS can utilize stiffer residual soils than soft surface of original ground below embankment filled by the widening to RHS.

At the hairpin curve area, from km 97+220 to km 98+600, it was said that some rehabilitation/construction works were done due to a landslide that occurred in the past and that no evidence of earth movement is apparent. However in accordance with Alternative 1 - Widening and Improving the Existing Road, the widening of the left-hand side of the hairpin curve will entail high embankment fills, for which the consultant recommends piled retaining walls.

To dissipate excess pore water pressure within the slopes (between 96+580 and 98+000, the following measures are recommended:

- Cut and natural slope : Installation of horizontal drainage with 15~25m length
- Embankment slope: Installation of piled wall H=6m height with piling L=25m depth

The cuts should be in accordance with the slope stability design of the engineer. Further structural measures should be included should other instability issues arises. When suitable or practical, cut materials should be used or blended with fill materials. Any excess materials should be disposed in approved areas and properly stabilized with native vegetation.

Fill embankments should be properly engineered, compacted and will have a stable slope. Embankment near the canal will have adequate structural measures to prevent erosion and collapse such as geo-mattress, riprap revetments, etc. It will be advisable also to undertake re-vegetation in areas along the slope where plants or grasses can survive.

(3) Bridge and Culvert Construction/Extension

Two major bridge construction works are expected in the four-laning from Km 91-107 – (i) 42m Agidera River Bridge (km 96+960-97+002); and (ii) 108m Pirsaat River Bride (km 104+270-104+378). Normal construction will require excavations for foundations, abutment and piers, concrete casting and embankment fill for approach roads.

Even during bridge construction, road access and normal traffic along Baku-Shamakhi Road should be maintained. If any traffic re-routing needs to be done, sufficient advisory and notification should be provided to the people and motorists. Dust and noise nuisances should be minimized during construction. Protective barriers and fencing should be provided to prevent people and animals from loitering at the project site for safety purposes.

The Contractor should also ensure that oil and fuel leakages are prevented and contained at the vicinity of the bridge construction as part of the mitigating measures incorporated in the EMP to prevent potential contamination of these water bodies. Special emphasis in the EMP pertaining to fuels, oils and chemicals on the site should be on storage, handling procedure, and dealing with small and large spills.

Construction at or near bodies of water such as streams, will be done as much as possible during dry seasons where the disturbance to water quality will be negligible. To assure minimal impacts, the contractor should do the following:

- Install cofferdams, silt fence, sediment barriers or other appropriate devices to prevent migration of silt during excavation and boring operation within rivers, streams or lakes.
- Dewatering and cleaning of cofferdams will be performed to prevent siltation, by pumping from cofferdams to a settling basin or a containment unit.
- Discharge of sediment-laden construction water (e.g., from areas containing dredged spoil) directly into surface watercourses will be forbidden.
- Sediment laden construction water will be discharged into settling lagoons or tanks prior to final discharge.

Considering all the necessary earthworks (cut and fill) for all the civil works components, the design engineer (Dohwa) has estimated the volume of earthworks as shown below.

Table 11: Earth Work Volume (km 91 – km 107)

Item	Volumes in Cubic meters		
	Embankment fill (B)	Excavation / Cut (C)	Cut minus Fill [(C) – (B)]
(i) Road	337,100	1,619,500	1,242,500
(ii) Bridges			

(a) Agidera Bridge	2,860	3,400	540
(b) Pirsaat River	3,660	4,300	640
(iii) Culverts	410	1,170	760
(iv) Drainage	160	16,120	15,960

(4) Air and Noise Pollution

The Department of National Environmental Monitoring of the MENR conducts air quality monitoring in a number of designated spots in in accordance with the statute "On the rules of implementation of state monitoring of the environment and natural resources" prepared by the Ministry of Ecology and Natural Resources, and approved by the resolution No.90 of the Cabinet of Ministers of the Republic of Azerbaijan dated 1 July, 2004. The Table below presents the maximum allowable concentrations (MAC) as national limit values for some of the substances in the ambient air.

Table 12: National Limit Values for Air Pollutants (Aze)

Substance/Parameter	Max. Allowable Concentrations (MAC) µ g/m3
Nitrogen Dioxide -NO2	40
Sulfur Dioxide - SO2	50
Carbon Monoxide - CO	3
Dust: PM 10	40 – Annual; 50 Daily
Hydrogen Fluoride - HF	5

Source: Air Quality Governance in the ENPI East Countries National Pilot Project – Azerbaijan. "Improvement of Legislation on Assessment and Management of Ambient Air". March 2014.

During construction phase, it is expected that air quality will undergo some moderate and temporary deterioration. Generally, dust from construction traffic and elevated levels of nitrogen oxide (NOx) and sulphur oxide (SOx) from construction equipment exhaust will be the primary pollutants. The dust will settle on local vegetation, structures and buildings, and may cause some degree of respiratory stress to nearby residents. These impacts will be mitigated by continuously spraying of water on the road construction site and in other areas where dust will have to be controlled. The exhaust fumes from trucks and heavy equipment should meet emission standards. With regards to other impacts, it is important that the contractor and the local officials would be able to work together to control potential problems and minimize complaints from the local population. Among the available measures to reduce air pollution and emission levels are the following:

(i) maintenance of construction equipment to good running condition and avoidance, as much as possible, of idling of engines which can contribute to exhaust emission;

(ii) banning of the use of machinery or equipment that cause excessive pollution (e.g., visible smoke) on account of their age and fuel consumption levels;

(iii) establishment of aggregate, asphalt, and concrete plants as far away as possible (minimum 500 m) from human settlements and operation of such facilities within the terms of Government pollution control guidelines;

(iv) submission of a dust suppression program which provides detailed action to be taken to minimize dust generation and equipment to be used to ESS, PIU and CSC prior to construction;

(v) Bypass roads may be located at considerable distance from residential areas to minimize air quality impacts, among others;

During the road rehabilitation/construction phase, heavy machinery will be used, and although these activities may be intermittent and localized, they nevertheless contribute tremendous amounts of sustained noise during equipment operation. In Azerbaijan noise standards were based on the former Soviet Union standards as shown in the Table below:

Table 13: Maximum Allowable Noise Levels

Maximum allowable noise levels, dBA		Description of Area
23 pm to 7 am	7 am to 23 pm	
45	60	Residential area of settlements
55	65	Industrial areas
35	50	Places of public amusement and tourism areas
30	40	Sanitary areas and resorts
45	50	Agricultural areas
up to 30	up to 35	Strictly protected areas
Note: Project designer may establish stricter maximum allowable noise standards in case of correspondent justification		

Source: TERA International Group on the Environmental Review Framework and Impact Assessment Report. ADB TA 4684-Aze-Phase 2: Preparing the Southern Road Corridor Improvement Project.

A number of mitigating measures to minimize impacts of excessive noise and vibration can be done by the contractor during the conduct of his work as follows:

(i) Work will be restricted to between 0600 to 2100 hours within 500m of the settlements.

(ii) A limit of 70 dBA will be set in the vicinity of the construction site and strictly followed;

(iii) Machinery to be used for the construction should be equipped with mufflers to minimize the generation of noise;

(iv) Whenever possible the local population should be advised of occurrence of elevated noise levels to enable them to take the necessary preparatory measures.

The Contractor should provide additional measures to minimize noise upon the request of the residents.

(5) Water Contamination

During road and bridge construction a number of occurrences can cause water contamination. Wastewater discharged during the construction phase will consist of wash-water from the equipment maintenance shops and sanitary wastewater effluent from the work camps. The sanitary wastewater from smaller camps should be equipped with septic tanks and that there will be no direct discharge of untreated sanitary waste to surface water bodies. Bigger camps should have waste water treatment plant. In addition there are possible contamination concerns that need to be prevented as follows:

a) During construction, provisions should be made to allow the passage thru pipes of raw sewage (existing open sewers) through pipes from villages, as well as irrigation waters, through the embankment.

b) During waterways construction, the Contractor must exercise caution in discharging oily or human waste so as to prevent them from leaching into rivers.

c) It is anticipated that all construction water will be taken from surface sources approved by the construction supervision engineer, and similar care shall be taken to ensure that human and oily waste is not discharged into existing watercourses.

d) On completion of the Works the Contractor shall remove all sewage systems installed by him at work camps unless agreed otherwise with the construction supervision engineer.

Fuel and lubricant spills can, in most instances, occur at the Contractor's work camp and motor pool while maintaining and washing equipment and work vehicles. The oily wash-water should be passed through an adequately sized, gravity oil separator prior to discharge.

As part of the requirement, the Contractor shall furnish the ESS and CSC a description and layout of equipment maintenance areas and lubricant and fuel storage facilities including distance from water sources and irrigation facilities. The storage facilities for fuels and chemicals will be located away from watercourses and will be confined with impermeable lining to contain spillage and prevent soil and water contamination. All fuels and chemicals shall be stored and disposed properly in compliance with MENR requirements.

As part of the TOR indicated in the EMP and civil work contract, the Contractor will prepare the specific prevention and mitigation measures to address potential fuel and oil leakages and accidents that will pose risk to possible contamination of the water bodies nearby.

(6) Solid and Hazardous Waste Management

Specifically on the construction of project road, considerable refuse materials will be generated and have to be managed properly. The Contractor should establish appropriate solid waste or garbage and hazardous waste management at the work camp and at the project site/s. The Contractor shall collect and dispose of all garbage from houses, offices, camps and other buildings occupied by him and the Engineer and from each area where his or the Engineer's employees are working, until completion of the Contract.

Domestic wastes from work camps, spoils from earthwork, and general construction waste will be the responsibility of the Contractor, with regards to collection and disposal in conformance with national and local standards. Spoil disposal sites will be identified prior to the start of construction. Standards for restoration of spoil sites will be detailed in the contract documents.

Hazardous wastes generated during both construction and operation of the Project will likewise be under the responsibility of the Contractor. Potential impacts to the environment are from accidental spillages impacting soil, groundwater, and adjacent water bodies. Mitigation measures to prevent spillage will include proper handling and disposal as well as installation of appropriate hazardous storage facilities, in accordance with relevant standards.

Oil, fuel and chemicals (including bitumen, bridge deck water proofing agents and concrete) are hazardous which could endanger life and would be detrimental to the environment. Spillage of toxic substances could lead to pollution of groundwater and/or water course. During construction, these should be stored properly and labeled directly in appropriate containers. Bitumen, oil and fuel should be stored in tanks with lined bunds to contain spillage. Thus, the construction camp should have a spill contingency plan. Stored waste oil, fuels and chemicals

could be periodically transported for disposal at the hazardous disposal site in Sumqayit, which was constructed under the WB Urgent Environmental Investment Project. [6]

The transport of hazardous materials from the construction site or contractor's work camp need to be regulated and monitored by the CSC and the ESS, with possible restrictions on routes and time of travel to minimize, if not avoid, contact with populated areas. Transport vehicles should certified by MENR with the proper qualification of the hauling contractor. Clear markings should be conspicuous on the transporting vehicle. The transporting personnel should be trained to handle emergency spills on the road for their own safety, as well as for the community and the environment. Proper coordination and communication should be arranged between the transporting company the local authorities and the MENR, especially during transporting process.

The residues of toxic and hazardous materials or chemicals shall not be discharged to the environment but shall be contained and packaged properly to be transported to approved and appropriate disposal facilities. Such approved facility is located in Sumqayit City which is around 30 km northwest of Baku.

The materials or chemicals should be placed or stored in non-corrosive, non-reactive and structurally stable containers for proper containment. These materials and chemicals should be handled by trained personnel wearing proper protective gears for safety. They should be loaded in vehicles with appropriate containment, preferably double skinned and equipped with necessary systems according to the relevant regulations in Azerbaijan. These required systems shall consist of heating, ventilation, isolation, lightning conductor or arresters, alarm and fire extinguishing. Notifications on sides of the vehicles shall be made by appropriate warning signs in languages understandable to the local population (Azeri, English or Russian) and conspicuously displayed for easy recognition. The hazards that might arise during loading, and unloading as well as the corresponding precautions against these hazards shall be posted on the vehicles. The materials and chemical on the vehicles shall be properly labeled with the accompanying Material Safety Data Sheets (MSDS).

During transport, the transporter should choose the safest and shortest distance from the project site to disposal facility. Preferably the route should avoid populated areas where traffic and congestion might occur. The transporter should obtain appropriate clearance from relevant agencies and should coordinate with local officials as precautionary measures against spills. Communication between the transporter, the source of the materials or chemicals as well as the staff of the receiving disposal facility should be maintained during transport.

In case of spill or any accident, the transporter should execute proper action as soon as possible to contain the contamination. It is incumbent upon the transporting company to provide sufficient training to their personnel to adequately respond to the spill at the shortest possible time. Tools, devices and protective gears should be available inside the vehicles compartment for the transporting personnel to effectively execute containment measures. Guidelines should be clear to the transporters putting public safety as their priority.

5.1.2 Ancillary Facilities

The ancillary facilities to the construction works are the material sources, work camps and processing plants. Impacts will be generated by activities in these areas and they have to be considered as part of the roadwork construction.

(1) Borrow and Quarry Areas

[6] World Bank (2005) Urgent Environmental Investment Project: Environmental Protection – Priority Directions and Actions, Baku, 2005.

The four-laning will entail usage of materials in the existing road and additional volumes for the new two lanes. After comparing the New Project Design with the Existing Road Design, it is obvious that even for the reconstruction of existing pavement, new materials would have to be imported from quarries. In the IRD-EIA, sources of aggregate for road pavement were mentioned and these are primarily the rivers near the project road. The primary potential source of materials for Km 91-107 segment is as mentioned in the IRD-EIA - Annex 10 BORROW PIT MANAGEMENT PLAN (Km 45– Km 121) (EMP2):

1. **Pirsaat River**
   Location/Setting: 2.5 km east of the town of Shamakhi the M4 highway crosses the Pirsaat River. At the bridge, to the north of the highway, two private and governmental enterprises are extracting and processing material from the active river terrace. The material is sandy gravel with little fines and larger stones.
   Resource Volume: The available material quantity for a 1 km long stretch of the Pirsaat River with an assumed average width of the active river terrace of 100 m and an average excavation depth of 3.0 m can be estimated to 300,000 – 4,500,000 m3. The theoretically usable quantities of such a volume will be much smaller.
   Quantities Suitable for Use: Production of crushed aggregates for asphalt production, natural aggregate for concrete cement stabilized based course, Sub-base, natural sand and aggregate for concrete production, a combination of fine and coarse aggregates as general fill and natural granular material as drainage layer.

2. **Garajuzlu Borrow Area**
   Location/Setting: 24 km north of Cengi.
   Resource Volume: The riverbed is estimated to have an average width of 50 meters and an area of 50 ha. The estimable mineable depth is 3 m and the estimated recoverable quantity for material > 40 mm is between 150,000 to 500,000 m^3.
   Quantities Suitable for Use: Production of crushed aggregates for asphalt production, natural aggregate for concrete cement stabilized based course, Sub-base, natural sand and aggregate for concrete production, a combination of fine and coarse aggregates as general fill and natural granular material as drainage layer.

3. **Hilmili Borrow Area**
   Location/Setting: Located 24 km north of Maraza, at the village of Hilmili. The borrow area can be accessed over a surfaced/gravel road.
   Resource Volume: The riverbed has an estimated width of 100 meters and has abundant deposits of gravel. Material will be extracted from the riverbed. The estimated recoverable quantity for material >40 mm is between 300,000 and 1,000,000 m^3.
   Quantities Suitable for Use: Production of crushed aggregates for asphalt production, natural aggregate for concrete cement stabilized based course, Sub-base, natural sand and aggregate for concrete production, a combination of fine and coarse aggregates as general fill and natural granular material as drainage layer. The Quantity of Borrow Materials used on the project shall be updated.

These three sources can sufficiently supply the materials for the additional two more lanes. Obtaining these materials from any of these sources will result in very minimal decrease in available resources.

What needs to be given more consideration is the manner of quarrying. Proper planning should be done to minimize effect on the topography as well as the natural hydrology of the river. Mitigation measures to minimize or avoid bank erosion and/or localized scouring should be undertaken. When all materials are obtained, the quarries used should be reinstated to better or improved conditions.

After comparing the New Project Design with the Existing Road for the 16km section, it is likely that for the reconstruction of existing pavement, new materials would have to be imported from quarries. The volume of materials that will be used for the road substructure can be estimated by simplified computations base on the road geometry as shown below:

Table 14: Computation Table for Road Material Requirements

Pavement Layer	Designs (cm)			
	Existing Road (Ave Thickness)	New Project	Difference	In (m)
(A)	(B)	(C)	(D)=(C)-(B)	(D)/100
Wearing Course	5	5	0	0
Binder Course	9	7	-2	-0.02
Bituminous Base Course	10	17	7	0.07
Crushed Base Layer CBR>80%	0	20	20	0.2
Granular Subbase CBR>30%	15	15	0	0
Capping Layer CBR>15%	32.5	38	5.5	0.055
	71.5	102		
Assumed Ave Width of Pavement		27.50	meters	
Assumed Ave Length of Pavement	16 km	16,000	meters	

Pavement Layer	Volume (m3)	Est. 15m3 Truckloads
Wearing Course	0	0
Binder Course	(8,800)	-587
Bituminous Base Course	30,800	2,053
Crushed Base Course CBR>80%	88,000	5,867
Granular Subbase CBR>30%	0	0
Capping Layer CBR>15%	24,200	1,613
Total	**134,200**	**8,947**

The excess milled materials from the asphalt layers of the Existing Road can be used in the New Project Pavement layers, after verification in accordance with specified parameters. From the environmental point of view the recycling of old asphalt as raw materials in new asphalt mix proves to be beneficial. Savings in the bitumen can likewise be realized with the reuse of old asphalt pavement. As shown, the amount of materials will not be a lot and this will not significantly impact the existing quarries near the project road.

If materials from the existing road will not be sufficient or if unsuitable materials are found along the new carriage ways, suitable materials will have to be transported from borrow or quarry areas. Materials from borrow areas and will be used for fill, capping layer, granular subbase, crushed base course, and bituminous base course

The prospective Contractor can identify his source of materials. However, the materials need to be approved by the Construction Supervision Engineer prior to using them for the project road. Should the Contractor be sourcing the materials from existing and operational quarry site, he will be required to exert influence on the operator that proper operational and management measures be instituted to minimize impacts to the general environment. Should the Contractor decide to open a new borrow site, the guidelines below should be followed in order to minimize impacts associated with the operation of borrow areas:

- All of the required environmental approvals should be secured and extraction and rehabilitation/construction activities consistent with the requirements of MENR and/or permit conditions be carried out;

- Prior to operation of the borrow areas, the contractor should submit to ESS and construction supervision consultant (CSC) the following:

    1) A plan indicating the location of the proposed extraction site as well as rehabilitation/construction measures to be implemented for the borrow areas and access roads upon project completion;

    2) A dust management plan which shall include schedule for spraying water on access road and schedule of the equipment to be used;

    3) A schedule of regular dust suppression on all unpaved access roads during the construction period, particularly in sections where critical receptors, such as settlements, are located;

    4) Location map of stockpiles which should be away from watercourses to avoid obstruction of flow and siltation;

    5) Cover on haul trucks to minimize dust emission and material spillage;

    6) Plan to undertake regular maintenance and repair of access roads to their original condition whenever necessary.

The EMP will provide specific guideline to ensure that these prevention and /or mitigating measures are carried out and the proper authorities will undertake regular monitoring of its implementation and compliance by the Contractor.

(2) Asphalt Plant Operation

An asphalt plant is where aggregate materials and asphalt are heated, mixed and combined to produce a paving mix. The primary ingredient in the process consists of crushed stone, sand, and asphalt oil, which is a by-product of petroleum. The entire mixture is heated to approximately 300 degrees Fahrenheit in a revolving tubular drum. Generally, the resulting emissions are:

a) Steam from moisture naturally contained within the sand and/or stone;

b) Heat due to the temperatures;

c) Minute dust particles from the aggregate during mixing;

d) Gaseous odour.

Due to the above reasons, a number of considerations need to be followed in determining the site for a prospective asphalt plant to minimize impact to the environment and the adjacent communities such as:

1) Asphalt plants must be located downwind of settlements at a distance of 500 meters or more and ensure that the prevailing winds will not carry solid emissions to the community ;

2) The Contractor shall secure approval from the MENR for installation and operation of asphalt plants;

3) Asphalt plants shall not be located close to plantations and productive land.

4) Petroleum products stored at batch plant sites are to be contained properly and appropriate measures must be taken to ensure the protection of surface and ground water;

5) Dust control measures should be performed on gravel roads used for the transportation of material to and from temporary asphalt plants;

1) Any discarded asphalt, tar mix, heavy oil, etc. must be disposed of in an environmentally friendly manner and/or reused wherever possible.

2) the Contractor shall have provisions for spill and fire protection equipment and shall submit an Emergency Response Plan (in case of spills, accidents, fires and the like) to the ESS and CSC prior to operation of the plant; and

6) Prior to dismantling the facility the asphalt plant site shall be left in an aesthetically acceptable condition.

One of possible concerns relating to asphalt plants is the contamination of surrounding water bodies, which may be caused by spilled bitumen or any petroleum products used to thin the bitumen. Long periods of storage can increase the propensity of leakages which can cause contamination. Precautionary measures should be exercised to prevent bitumen from spilling into running or dry streambeds, ditches, or solid waste disposal sites prepared by the contractor. The storage and mixing areas for bitumen must be protected against spills and all contaminated soil must be properly handled according to the requirements of the MENR. These areas must be contained, such that any spills can be immediately mitigated and cleaned up as soon as such incident arises.

(3) Contractor's Work Camp

The impacts from Contractor's work camp become significant especially when there are a lot of people staying at the camp. The main concerns for water contamination are the sanitary facilities or ablution including toilets, urinals, showers, washstands and a laundry area. Water should be provided in adequate quantity and acceptable quality complying with the national standards. Provisions of such facilities should conform to local and cultural traditions of the project site. In addition, safety and security of the area should be maintained at all times. Areas to be used as work camps or for purposes of the project should be approved by the local authorities and the construction supervision engineer.

The civil works contract will require the Contractor to be responsible for temporary acquisition and reinstatements of all lands needed outside the road reserve – for construction camps, offices, borrow pits, material storage/processing sites and haul roads. The Contractor will select the land parcels required and negotiate directly with the landowner.

Within the work camp, the Contractor should exercise reasonable measures to prevent harm and to minimize the impact of his operations on the environment and socio-economic conditions along the road, and shall ensure that his employees do likewise. The Contractor shall make his employees aware that the hunting, trapping or dealing in wildlife will not be tolerated and shall take all possible steps to ensure that his employees and those of his sub-contractors do not engage in these activities. The contractor is expected to provide means to minimize work camp environmental problems as follows:

1. The Contractor shall prepare a layout of the work camp and details of the proposed measures to address adverse environmental impacts resulting from its installation. Such plans shall be submitted to the ARS/PIU-ESS and construction supervision engineer prior to establishment of the work camps and implement provisions of such plans. Prior

to establishment of the work camps, conduct consultations with local authorities to identify sources of water that will not compete with the local population.

2. The Contractor shall establish a solid waste management plan covering provision of garbage bins, regular collection and disposal in a hygienic manner, as well as proposed disposal sites for various types of wastes (e.g., domestic waste, used tires, etc.) consistent with appropriate local and national regulations. In addition, spoil from earthwork, and general construction wastes are the responsibility of the contractor to collect and dispose of in conformance with local standards. Spoil disposal sites will be identified prior to the start of construction.

3. To control dust nuisance within the work camp and to minimize impact in the surrounding community the contractor shall undertake measures such as watering of the areas, covering of any nearby stockpiles and provision of any re-vegetation measures.

4. All water used in the work camp shall be discharged in a manner which does not cause erosion, pollution or nuisance to landowners, or other persons within or adjacent to the work camp. The Contractor shall take all measures necessary to prevent the discharge into rivers, streams or existing irrigation or drainage systems of any water containing pollutants or visible suspended matter. The contractor shall not interfere with the natural flow of rivers, streams, or existing irrigation or drainage systems for any purpose without the prior consent of the construction supervision engineer.

5. The Contractor shall come up with sewage management plan for provision of sanitary latrines and proper sewage collection and disposal system to prevent pollution of watercourses and subsurface waters.

6. The Contractor shall provide a description and layout of equipment maintenance areas and lubricant and fuel storage facilities including distance from water sources and irrigation facilities. Storage facilities for fuels and chemicals will be located away from watercourses. Such facilities will be bounded and provided with impermeable lining to contain spillage and prevent soil and water contamination.

7. In terms of erosion and siltation concerns, the Contractor shall take all precautions to prevent the erosion of soil from any land used or occupied by him, and from the bed or banks or any river, stream, irrigation or drainage system. Likewise, the contractor shall take all precautions to prevent the deposition of excavated or eroded material in any river, stream, irrigation or drainage system.

8. In the interests of preserving native vegetation, the contractor is prohibited from using tree parts from the site for any aspect of the construction of his facilities or those for the Engineer. This includes props and other items needed to cast lintels and the like. Further the contractor shall not use wood burning stoves for cooking or heating.

9. The Contractor shall realize that local markets will not be able to supply bulk food supplies for his labor force without causing severe shortages for the local population. Bulk food supplies shall only be purchased from towns approved by the construction supervision engineer.

5.1.3 Community Social Impacts

(1) General Community Impacts

To avoid any conflicts between construction workers and nearby communities with respect to social amenities, the Contractor shall provide temporary worksite facilities such as health care,

eating space, and praying places preferably within the work camp. Likewise, in anticipation of effectively handling social issues, the contractor shall also submit to ESS and CSC a plan (mechanism and organizational structure) for handling and resolution of communities' grievances arising from the construction processes – Grievance Redress Mechanism (GRM). Avenues for dialogues and consultations should be provided at all times to deal with community issues.

Whenever possible, the Contractor shall employ local labor to benefit local communities and to promote the overall acceptance of the project. For Baku-Shamakhi (Km 91-107) Road the Contractor shall look into the possibility of hiring local groups to undertake cleaning of drains during this construction period. As part of the maintenance of the road the ARS should also look into the possibility of employing the local people for the maintenance of roadside drains upon completion of rehabilitation/construction works.

During the construction phase, it may be inevitable that existing traffic will be disrupted and local accessibility will be impaired, which can cause problems with the local community. To mitigate this situation the Contractor should: (1) Submit a traffic management plan to local traffic authorities prior to mobilization; (2) Provide information to the public about the scope and schedule of construction activities and expected disruptions and access restrictions; (3) Allow for adequate traffic flow around construction areas; (4) Provide adequate signalization, appropriate lighting, well-designed traffic safety signs, barriers and flag persons for traffic control; and (5) Provide temporary access where accessibility is temporarily restricted due to civil works.

Should the Contractor use any areas for borrow materials, any access roads should be maintained during the construction phase and rehabilitated at the end of construction by the contractor and his workers to the satisfaction of the local authorities and in compliance with the contract. Compliance shall be monitored by the construction supervision engineer.

Since there are a number of establishments along the road, the Contractor should be able to maintain accessibility to these establishments to minimize economic impacts on such businesses. Along the alignment itself, no impacts on cultural property, e.g. graveyards and cultural monuments, adjacent to the ROW are anticipated. However, access by the local community to these areas should be maintained by the contractor.

(2) Health and Safety

Work camps and construction sites need to be properly managed in terms of general sanitation in order to avoid any health and safety hazards to surrounding communities. The Contractor should designate a qualified environmental, health and safety personnel who will anticipate and address hygienic issues in coordination with the MOH's Regional Disinfection Centre and the local health and safety officer. Extra precautions should be exercised to prevent the entry and transmission of diseases into the work camp and the surrounding communities. It will be the responsibility of the Contractor to provide the following:

(i) Adequate health care facilities (including first aid facilities) within construction sites and work camps;

(ii) Training of all construction workers in basic sanitation and health care matters, and on the specific hazards of their work;

(iii) Issuing personal protection gadget, gears, clothing and equipment for workers, such as safety boots, helmets, gloves, protective clothing, goggles, and ear protection in accordance with SNIP III 4-80;

(iv) Clean drinking water to all workers at all times;

(v) Adequate protection for the general public, including safety barriers and marking of hazardous areas in accordance with safety regulations for construction, rehabilitation/construction and maintenance;

(vi) Safe access through the construction site to people whose residences/shelters and routes are temporarily severed by road construction;

(vii) Adequate drainage throughout the camps to ensure that stagnant water bodies and puddles that may serve as breeding ground for any disease vectors do not form; and

(viii) Sanitary latrines and garbage bins in construction site, which will be periodically maintained and cleared for safe disposal by the contractors to prevent outbreak of diseases. Where feasible the contractor will arrange for safe disposal of waste generated at the work sites into existing waste collection systems and disposal facilities of nearby communities.

As part of the general health preparation, the Contractor should coordinate this with the AIDS Centre in Baku to obtain practical advice regarding general health care. Awareness campaign on the avoidance of HIV/AIDS and STD involving both the local community and the construction workers should be undertaken in conformance to the requirements of the Department of Hygiene and Environmental Protection.

Applicable HIV/AIDS prevention activities recommended in the Scott Wilson Report for the Alat Astara Motorway Project shall be adopted as part of the Baku-Shamakhi (Km 91-107) Project intervention and incorporated as EMP activities. These activities will focus primarily on information campaign, condom distribution for the contractor's workers and staff as well as liaison and coordination with the local and national health authorities especially the AIDS Monitoring Centers for monitoring and appropriate action.

(3) Land Acquisition

For the four-laning of the Baku-Shamakhi Highway into Category I, a 60m (30m on each side) Right of Way will be necessary. This is in in accordance with the resolution *No 18 of the Cabinet of Ministers dated February 28, 2004*. Accordingly, the ROW should be cleared of any objects (e.g. canteens, industrial buildings and auxiliary, buildings, orchards, vineyards, etc.) from all affected lands, including municipal lands, residential and non-residential. Municipal and land allocations that are the part of the construction area under the state needs should be bought from the owner in a voluntary or mandatory way by state compensation payment according to current market rates in accordance with the clause 1.1.1 of the Law on the Purchase of Municipal Lands and Allocations for state needs.

In the Preliminary Design Report, (Dohwa, March 2015) the consultant presented an estimate of objects that may be affected along the ROW. The relocation of objects (municipal and allocations, residential and non-residential objects, cafe, industrial and auxiliary buildings) from within the ROW (30 m for each side from the road centerline) will give way for the intended four-lane road construction of the Baku-Shamakhi Road. In the km 91-107 segment the following findings were outlined by the Dohwa consultants:

(i) Between km 91 and km 95 (Gobustan region)

- Km 91–95 section of Baku-Shamakhi highway passes through the territory of Gobustan Rayon with a relief of high ground elevation and steep slope and wherein which some deep cuts will be done for the road

- There are 22 hectares (excluding the area of the existing road) of the land area under the construction area within the territory of Gobustan Rayon.
- Around 19 hectares of the abovementioned area are municipal lands, and the remained 3 hectares are forest areas under the Ministry of Ecology and Natural Resources.
- At the section km 91+360 – km 91+550 (RHS) there is one canteen/restaurant within the ROW of the road which is under process for relocation outside of the ROW.

(ii) Between km 95 and km 107 (Shamakhi region)

- The section km 95–107 passes through the municipal lands of Marzandiyya, Sabir and Shahriyar of the Shamakhi Rayon. The section km 95–97 is within Marzandiyya municipal lands where some deep cuts will be needed.
- Road construction area includes 10.3 ha of the Marzandiyya municipal lands (excluding the area of the existing road).
- Around 8.3 ha from the abovementioned 10.3 ha area belongs to municipal lands and 2 ha of the area are the allocations of 4 persons.
- The section km 97–107 is on the municipal and allocations of Sabir village.
- With Alternative 1 in the section km 96–98, the road centerline is designed along the existing road centerline.
- The section km 97+100–97+300 includes 4 butcher shops in an industrial building (LHS).
- At the section km 97–99+100 due to local topography the road will be constructed on deep cuts. The road will pass through the 21.0 hectares of the Sabir village territory; 8.5 hectares of which are municipal lands, and 12.5 hectares are allocations of 250 persons.
- There is one fuel station on the left side of the road at the section km 99+050 and another on the right side of the road at the section km 104+560.
- By the agreement of the owners the industrial building at the section km 97+100–97+300 and two fuel stations at the sections km 99+050 and km 104+560 (currently non-operational) will be process for relocation outside of the ROW.
- From km 104+900 to Shamakhi town, the existing road was already widened to 4 lanes though the median strip is quite narrow.
- Between km 105+000 and km 107+300 – several sporadic roadside developments can be noted.
- Between km 105+800 and 106+200, a large wine factory on the left hand side is located.

When the detailed design of Baku-Shamakhy highway will be developed on cadastral map the documentation process along the construction area for the obstacles/objects within the ROW will be carried out as follows:

- The construction organization should send written apply for the documentation of the all indicated works to Chief Executives of Gobustan and Shamakhi regions evaluation committee will be organized by the order of the region executive power.
- Documents of municipal lands indicated on cadastral map will be submitted to evaluation committee.
- State acts of allocations under construction area will be gathered, changed by another proper land and returned to allocation owners. In case if the owner is not agree with this offer the allocation will be evaluated and sale contract will be signed for the mentioned allocation in a notary way.
- Documents for 3.0 ha of wood lands under construction area will be sent to the Ministry of Ecology and Natural Resources for the agreement. Wood lands will be removed from the construction area when the sum is paid.
- Residential buildings, industrial houses and other structures under the construction area will be evaluated by evaluation committee organized by the Region Executive Power order, sale contracts for those will be signed with the owners in a notary way and then the abovementioned structures will be destroyed.

- When collecting of the documents is finished the documents will be sent to the Ministry of Finance for fund allocation.

5.1.4 Biological Aspects - Impacts on Flora and Fauna

For the 16km segment of the Baku-Shamakhi (Km 91-107) Road the impacts to vegetation and wildlife will be minimal since most of the areas alongside the road are agricultural lands and graze lands. Roadside vegetation from km 91 up to Sabir village is limited to grasses and bushes which are quite common in the area (saltwort and arid steppe vegetation) and ecologically unimportant. From around km 99 up to the entrance on Sabir village, both sides of the road turn from graze land to farmlands. Beyond Sabir and Pirsaat Bridge, most of the areas are farmlands, with a wine factory at km 106 (LHS). A few small trees were planted along the road which can be relocated to the periphery of the construction strips should they be affected. Since these trees were planted in recent past, hence their relocation will not be too difficult.

In terms of natural faunal impacts, it is perceived to be insignificant due to anthropogenic activities such as farming, establishment of settlements, and commercial activities. In addition, the road has been in existence for decades already such that animals then to avoid the areas and prefer undisturbed natural grounds for their habitats.

Disturbance on flora and fauna can occur at the ancillary facilities. The Contractor should follow guidelines on protecting and not disturbing any flora and fauna in the vicinity of his ancillary facilities.

5.1.5 Socio-economic Impacts

During the site inspection along the road, certain observations indicate foreseeable potential direct and indirect impact during the construction of phase of the road. These should be taken into consideration by the Contractor in his works with the supervision of the Construction Supervision Consultant or the Engineer.

Since the project within km 91-107 is an upgrading of a recently rehabilitated road, it is anticipated that most of the impacts are indirect. Based on the Dohwa's Preliminary Engineering Design Report, the potential indirect impacts are as follows:

Table 15: Potentially Impacted Roadside Objects within km91-107

Chainage	Object Description	Location
91+500	Restaurant	LHS
92+900	House	LHS
93+960	Butcher / meat seller	RHS
94+800	Milestone	LHS
95+200	Butcher / meat seller	LHS
95+300	Butcher / meat seller	LHS
95+440	Butcher / meat seller	RHS
95+740	Butcher / meat seller	LHS
96+340	Butcher / meat seller	LHS
97+060	Stone mason	RHS
97+200	Buildings	LHS
97+180	Car repair shop	LHS
97+320	memorial	RHS
97+340	Building	LHS
97+940	Butcher / meat seller	LHS
98+170	Butcher / meat seller	LHS
98+420	Butcher / meat seller	LHS

Chainage	Object Description	Location
98+890	Stone mason	RHS
98+920	Small power substation	RHS
99+020	Hotel, restaurant and petrol station	LHS
99+000	Garage	RHS
99+110	Butcher / meat seller	LHS
99+590	Milestone	RHS
101+000	Restaurant	RHS
102+300 – 102+800	Buildings	LHS
103+000	School	LHS
103+220	Wireless repeater tower	LHS
103+000 – 104+200	Sabir village	LHS
103+500	Market	RHS
103+660	Cemetery	RHS
104+560	Petrol station (non-operational)	RHS
104+800	Market and buildings	LHS and RHS
105+760	Car repair shop	RHS
105+840	Wine factory	LHS
106+820	Carwash shop	RHS

Indirectly impacted objects are outside of the construction strip but their proximity causes the impacts to be felt. These consist of structures, houses, utilities, businesses, cemetery, etc. Mitigation measures for these identified objects include ensuring that levels of dust and noise are kept at the minimum, access is not impaired, businesses are not disrupted, structures are not damaged and residents and the general public sufficiently notified of safety hazards. The Contractor should ensure that complaints from the residents, owners, occupants and operators of these objects are responded to promptly. The objective is to avoid any impact; followed by minimization and compensation if the impacts cannot be minimized. These indirect impacts are mainly due to the construction activities and they will diminish once construction is completed.

The project also recognizes some indirect impacts to outlying villages, as their access roads may be linked to the project road. Dohwa's Preliminary Design Report identifies a number of these villages as follows:

Table 16: Potentially and Indirectly Impacted Villages

GOBUSTAN RAYON				SHAMAKHI RAYON		
Village	**Distance from Road**	**Population**		**Village**	**Distance from Road**	**Population**
Darakand	1.7	432		Carkhan	8.1	2.890
Takla-Mir	8.3	2.219		Garavelli	2.7	1.254
Jam-Jam	7.8	1.272		Malcek	1.9	434
Arabshalt	9.33	4.230		Angikharan,	6.1	860
Takla	3.5	2.035		Boyuk Kinisli	4.7	483
Chalov	6.2	1.600		Nuydu	11.6	714
Chukhani	5.6	810		Chiraqli	3.3	248
Jayrli	8	2.500		Marzaddiya	1.2	1.131
Badelli	2.3	738		Adnali	8.7	961
Sadafli	2	358		Sabirli	13.3	376
Uzumchu	2.1	370		Karkanc	10.4	742
				Kakakhana	6	362
				Madrasa	5.3	2.157

GOBUSTAN RAYON				SHAMAKHI RAYON		
Village	**Distance from Road**	**Population**		**Village**	**Distance from Road**	**Population**
				Nirikand	0.6	994
Total Villages		***11***		***Total Villages***		***14***
Total Population		***16.564***		***Total Population***		***13.606***

5.2 Impacts & Measures during Operation and Maintenance Period

Over the operations period of the road segment, along with the entire Baku-Shamakhi Road, the impacts to the environment are rather viewed as cumulative on account of the functions of the road components and can be in conjunction with other activities. Time-wise these impacts can also be long-term as they may manifest after construction and continue to persist for the entire usage and operation of the road. Considering the short stretch of the road most of the impacts anticipated will be on the social environment, as the physical and environmental features are shielded by the cluster of settlements alongside the alignment.

5.2.1 Effects on Biodiversity

As mentioned, due to prominent presence of the anthropogenic activities, animals tend to avoid the area. The road segment (km 91-107) does not traverse any natural species habitat and due to the presence of the road for decades already, it is presumed that wild animals have avoided the area. Animal raising and usage of the outlying areas for graze land is perceived as the reasons for undomesticated animals to avoid the area. Hence, the chances that animals will roam the road are highly unlikely.

Some animals may loiter along the waterways of the Pirsaat River and Agidiera River adjacent to the road. However the lower watersheds of these rivers are not really forested since had been mainly used for agricultural purposes. Also, quarry operations had been going on in areas close to Pirsaat River Bridge and such activities repulse the presence of animals in the area.

Nevertheless, to minimize animal migration up the road, the designers should install some barriers along the waterway to discourage reptiles and amphibians from getting onto the roadway.

5.2.2 Water Quality

Concerns on water contamination and pollution arise when effluents and discharges leach into waterways and water bodies. During the operational phase of the road, it is expected that traffic will increase and businesses along the roadside will flourish such as small shops, restaurants, vehicle repair shops and other service-related establishments. Production and manufacturing businesses will also intensify in the area due to improved accessibility other similar establishments will be set up along the road or close to the road. It can be expected that with the construction of a better road the population will also increase and the current settlement can expand or new settlements and villages will be established. With the increase in population and intensification of economic activities, wastewater from these establishments, if unmanaged and uncontrolled properly, will eventually cause pollution of existing water bodies. This will translate to adverse effects on the ecosystem and on the welfare of the people.

To mitigate this, the national and local government should work together to implement programs and projects that would curb water contamination and pollution. This will entail formulation of environmental policies and regulations on proper wastewater management. In addition, wastewater infrastructure should be constructed and operated properly, especially in the populated areas and where commercial activities are concentrated along the project road.

For water quality and to improve safety also, traffic management should be implemented such as regulation of speed and checking of vehicles carrying toxic and hazardous substances by responsible traffic personnel to see if adequate safety measures are being adhered to during transport. Spills along the road should be promptly reported to proper authorities, who should be able to respond quickly in removing deleterious substances from the road.

5.2.3 Air Quality and Noise

With the four-laning of the Baku-Shamakhi Road (Km 91-107), the vehicular traffic is expected to increase. Because of this, vehicular emissions and noise levels are anticipated to heighten. Attenuation measures against exhaust emissions and noise pollution should be implemented in areas with sensitive receptors such as residential areas, particularly schools, health centers, and hospitals. This can be done by planting trees and shrubs with dense leaves to deflect noise and provide absorption capacities for exhaust emissions. Certain species of trees, that can thrive in the study region should be planted and cared for until maturity by the community. Planting of trees in the general vicinity, wherever possible, should be encouraged.

In the future should the noise level reach intolerable levels, some structural noise barriers can be constructed along the edge of the road to deflect traffic noise and minimize nuisance in the populated areas. Areas where structural measures may be needed, subject to the design specifications, shall be in the vicinity of vicinity of the sensitive receptors like schools, hospitals, etc.

5.3 'Without Project' Scenario

The Baku-Shamakhi Road (Km 91-107) serves at the connecting link between the four-lane stretches of the Baku-Shamakhi road. If this road will not be reconstructed to a four-lane, in the future, this can be a traffic chokepoint. Congestion of vehicles will occur and heavy traffic may be experienced on both sides. With heavy traffic, delays will be incurred and can result to economic loss. The continuous burning of fuel when vehicles are idle because of the traffic can cause degradation of air quality and elevation of noise. In the end, whatever gains that would be garnered by the entire Baku-Shamakhi Road can be diminished by the non-upgrading of the Km 91-107 segment; hence, this project is essential.

6. SUPPLEMENTAL ENVIRONMENTAL MANAGEMENT PLAN

The Supplemental Environmental Management Plan (EMP) identifies the mitigation measures, monitoring activities and institutional arrangements to be implemented to prevent, eliminate, or reduce to acceptable levels any adverse environmental and social impacts of the road rehabilitation/construction project. The ERD EIA consists of the EIA Report document and EMPs as follow:

- Flora, Fauna and Reforestation Plan – EMP1
- Borrow Pit Management Plan – EMP2
- Water Supply Management Plan – EMP3
- Noise Suppression Plan – EMP4
- Construction Traffic & Access Management Plan – EMP5
- Material Management & Erosion Control Plan – EMP7
- Emergency Response Plan – EMP8
- Waste Management Plan – EMP9
- Location and Campsite Management Plan – EMP10

In addition, Annex 6 in the IRD EIA includes Management Plan Forms and Monitoring Plan Forms. These forms are considered still relevant and applicable with the four-laning project works and may be used in the environmental management and monitoring works during the construction.

In this supplemental EIA, a number of additional provisions are being included to improve the management and monitoring aspects of the four-laning construction activities to take into account the change in scope. These additional items are found in the Annexes of this Supplementary EIA Report.

6.1 Environmental Mitigation and Monitoring Program

The Supplemental environmental mitigation and monitoring programs summarized in Annexes A and B have been devised to ensure proper response with the identified project impacts, which may arise during the construction phase of the project road. Prior to the construction, the ESS with the assistance of the Construction Supervision Consultant will do the following for the Baku-Shamakhi Road (Km 91-107):

- Establish baseline information on the existing environmental conditions and parameters for the specific road project;
- Develop an environmental auditing protocol for the construction period as well as a detailed monitoring and management plan;
- Provide guidance and formulate a report outline that will be used by the contractor as a guide in the preparation of monthly environmental progress reports; and
- Undertake regular and periodic monitoring of contractor's implementation of the mitigation measures during the construction stage, consistent with the monitoring program, and submit to PIU-ARS quarterly monitoring reports. Special separate reports should be prepared in the event a significant environment related incident will arise.
- The PIU will provide the WB a summary of the monitoring results on a quarterly basis.

In addition, environmental management activities should form part of the Internal Monitoring System. The purpose of such system is to track progress of as well as changes in civil work activities as well as monitor effects and impact of the road construction and rehabilitation/construction on the households and communities along the road. The ARS OJSC will be responsible for the establishment of the monitoring system with the assistance of the Supervision Consultant and the Civil Works Contractor, whose scope will be specified in the terms of reference for the work contract.

6.2 Institutional Arrangements and Reporting

To ensure that the proposed mitigation measures will be implemented by the Contractor/s during the construction stage, the detailed engineering consultant will undertake the following:

- Clearly define in the tender and contract documents the Contractor's obligation to undertake and implement environmental mitigation measures as specified in the IRD EIA EMPs and Supplemental Environmental Mitigation Measures outlined in **Annex A.** The same shall be appended in Contract Specifications;
- The cost for the recommended environmental mitigation measures will, where possible, be itemized as cost items in the Bill of Quantities. Such allocation of a cost item to specific environmental mitigation measure will be crucial to assure their actual implementation. During procurement or bidding, the bidders will be specifically instructed to include these cost items as line items in the Bill of Quantities to form part of their financial bids; and

- Explicitly require the Contractor to recruit an environmental, health and safety (EHS) personnel who will be specifically responsible in handling environmental issues of the project.

The Contractor will be responsible for the implementation of environmental mitigation measures during construction and shall employ EHS personnel who will supervise implementation of the Contractor's environmental responsibilities as stipulated in the contract and liaise with the ESS and the district ARS on such matters. Likewise, the EHS personnel will also be responsible for health and safety aspects of work sites and shall submit monthly reports to ESS on the status of implementation of mitigation measures, including complaints received and actions taken as well as other environmental issues relating to the project. The Contractor, in coordination with the construction supervision consultant, shall set-up a grievance redress committee that will deal with any complaints during project implementation.

Also, during project implementation, the ESS with the assistance of the CSC shall monitor the compliance of the Contractor in accordance with the EMP provisions. The ESS shall submit quarterly reports to ARS and the MENR describing the status of implementation of environmental mitigation measures by the contractors. Included in the reports are additional mitigation measures that may need to be implemented, incidents of non-compliance with applicable environmental permits, complaints received from local residents, NGOs, etc. and ways and means by which, they were addressed or settled.

It is advisable that the CSC shall employ an expatriate environment specialist (with civil engineering/environmental management background) to assist the ESS in the monitoring the progress of the construction on its environmental aspect. The CSC, through its environment specialist, shall provide hands-on training to the ESS throughout various stages of the construction. The CSC shall also assist the ESS in preparing monitoring reports regarding the performance of the contractors in terms of compliance with the relevant national environmental regulations, quality standards and the implementation of environmental specifications in accordance with the contract provisions. The Terms of Reference (ToR) for the environmental specialist shall be drawn-up by the detailed engineering consultants for the road project. During project implementation, the ARS (through the PIU) will report to the World Bank-IBRD every three (3) months on the progress of the project based on the monitoring reports submitted by the ESS/CSC and the Contractor.

Upon project completion and subsequent acceptance by the ARS, the same will be responsible on the operation and maintenance of the Project Road. Routine and random environmental monitoring will be undertaken by ARS district offices as scheduled in the monitoring plan (**Annex B**). Parallel to this the MENR will conduct random monitoring of the project to assess compliance with the required mitigation measures and applicable environmental laws and regulations. Should the ARS plan for full public participation activities, a detailed action plan should be devised with adequate funding from Azerbaijan government.

The following Table summarizes the various institutional responsibilities for the implementation of the environmental management plan at various stages of the Project Road rehabilitation/construction.

Table 17: Responsibilities for Implementing the Supplemental EMP

Project Stage	Responsible Organization	Responsibilities
Detailed Design	ARS with the detailed engineering consultant	Incorporate mitigation measures into engineering design and technical specification
	ARS and MENR	Review and approve environmental mitigation and management measures

Project Stage	Responsible Organization	Responsibilities
	Investment Department of ARS	Allocate appropriate budget to undertake environmental monitoring and capacity building for ESS
Construction	Contractor (with the through its EHS Manager)	Implement required environmental measures and submit monthly reports to ESS regarding status of such implementation. Set-up a grievance redress committee in coordination with the CSC.
	ESS with the assistance of CSC	Supervise contractor's implementation of environmental measures on a daily basis. Enforce contractual requirements
	ESS and CSC	Audit construction phase through environmental inspections and collect monitoring data. Submit quarterly reports to ARS and MENR.
	CSC	Assist the Contractor in the formulation of a grievance redress committee. Provide awareness/training to workers and technology transfer to the Contractor.
	ESS and CSC	Ensure compliance with Government legal requirements during construction. Review complicated issues arising from the Project.
	ARS	Submit quarterly progress reports to WB
	MENR and MOH	Undertake periodic monitoring of the project
Operation	ESS / District Maintenance Unit	Undertake routine environmental monitoring and prepare corresponding reports.

6.3 Cost Estimate

The estimated cost for a period assumed as thirty (18) months (equivalent to 1.5 years of construction) in implementing the mitigation measures and monitoring plan necessary in the Baku-Shamakhi Road (Km 91-107) four-laning project is provided in the Table below. The costs during construction shall be part of Contractor's civil works package, while the costs associated in assisting the ESS in the implementation of the EMP and conducting relevant environmental training shall be included in the construction supervision cost.

Table 18: Estimated Environmental Monitoring and Mitigation Cost

	Item	Unit	Qty	Unit Cost	Total
Environmental Costs - Civil Works (included in contractor's civil work package)[a]					
	Dust suppression measures	day	450	125	56,250
	Planting of trees[b]	km	16	4,000	64,000
	Grass revegetation	m^2	16,000	2	32,000
	Provision of biodiversity crossings	units	0	5,000	0
	Land management measures at dumping sites for excess material	m^3	30,000	1	30,000
	Stripping of top soil (0-200 mm) and storage for reuse[c]	m^3	30,000	3	90,000
	Rehabilitation (Landscaping) of borrow areas	No	3	25,000	75,000
	Provision of EHS Manager	MM	30	3,000	90,000

	Item	Unit	Qty	Unit Cost	Total
	Conduct of seminar/orientation on HIV, AIDS and STD awareness among workers and nearby communities, condom supply, coordination with HIV monitoring centers and basic supply provision	lump sum	4	5,000	20,000
				Total	**457,250**
Environmental Management, Monitoring and Training Costs during Construction (Included in construction supervision cost)					
	Remuneration and per diems				
	International Environment Specialist	MM	5	20,000	100,000
	Local Environmental Specialist	MM	10	6,000	60,000
	Travel				
	Intl. Travel	trip	5	2,500	12,500
	Domestic Travel	lump sum	1	10,000	10,000
	Training materials and logistics	lump sum	1	5,000	5,000
	Periodic construction site water quality, air quality and noise monitoring	M	10	1,500	15,000
				Total	**202,500**
Environmental Mitigation during Operation - ARS Budget					
	Purchase of water truck for maintenance of roadside vegetation	unit	6	35,000	210,000

[a]estimated cost during the construction period (4 months)
[b]total length of tree/shrub plantations to be provided in some designated places by ARS.
[c]including seeding or other means of protection during stockpiling to preserve fertility

6.4 Implementation Schedule

The environmental measures are determined during the detailed design phase when the environmental assessment is undertaken. These measures will then form part of work items for the project. In addition, the other environmental activities related to road rehabilitation/construction are presented in the succeeding Table below:

Table 19: Implementation Schedule

Project Phase	Issue	Schedule
Prior to commencement of construction activities	ESS (with assistance from CSC) to review and approve Contractor's method statements	once
Upon mobilization of the CSC	Training for ARS'S ESS and district offices (hands-on training will also be provided by the CSC during monitoring of the performance of Contractors)	once
During construction	Monitoring	Refer to Annex B
During construction	Reporting: • Contractor to ESS • ESS to ARS/MENR	 monthly quarterly quarterly

Project Phase	Issue	Schedule
	• ARS (through PIU) to WB	
During Operation	Monitoring	Refer to Annex B

6.5 Institutional Strengthening

In the implementation of projects, often one major issue is the incorporation of the requirements for environmental mitigation and monitoring in the contract documents even though the EMP was adequately prepared. Accordingly, it becomes difficult to enforce the needed environmental mitigating measures in projects, particularly due to lack of reference of these items in the project contract. It is important that this item be adequately emphasized on the part of ESS for compliance by the Contractor. Furthermore, the level of expertise of ESS to undertake environmental management and monitoring should also be upgraded.

In the past some training had been formulated and implemented in line with institutional building and capacity building of staff from various agencies dealing with environmental regulations and control, especially the ESS-ARS OJSC. The topics elaborated in the training covered a range of environmental management and related issues relevant to the road construction sector in Azerbaijan such as Introduction to Construction Noise, Ecology, Environmental Good Practice, Waste Management; Good Practice on site – Dust, Ecology, Noise, Smoke & Odours, Trees, Water Management, Map Reading, Borrow Pit/Quarry, Oils & Chemicals; and Traffic Impacts on Air Quality.

To respond to the requirements of the environmental monitoring activities, the gaps in the previous training should be assessed. Accordingly, based on these identified gaps, it is proposed that additional measures be provided to address these gaps, as guide to good practices in ensuring compliance by Contractors to the environmental regulatory measures.

On this note the assistance of an international environmental specialist will be useful. The matter of capability and capacity building on the part of the ESS should form part of the proposed Terms of Reference of the international environment specialist who will conduct the ESS/district ARS training and orientation for contractors. The following are the basic scope of the international environment specialist among others:

- Assess the capacity of the ESS and district ARS and determine the specific additional training needs to respond to the requirements in conducting environmental monitoring and implementation of mitigation measures of road projects;

- Prepare a short-term staff training prospectus and associated materials to meet immediate needs;

- Undertake training workshops that will include the following topics:

  - Establishment of baseline data at the start of the project for reckoning project environmental impacts.

  - Preparation of EMPs and incorporation of the mitigating measures in contract documents and specifications for Consulting Services and Works contracts;

- Procedures for monitoring the implementation of mitigating measures including target parameters, frequency, responsibilities and means of monitoring;

- Health and safety procedures in project implementation.

- Conduct orientation/workshop for contractors on construction-related environmental issues on road projects, implementation of mitigation measures and monitoring, and preparation of monitoring reports;

- Evaluate the effectiveness of the training measuring improvements in attitudes and skills achieved through a combination of feedback questionnaires and performance evaluation; and

- Prepare outline proposals for the longer-term organizational and capability development of ESS and district ARS.

A typical ESS/ARS staff training will consist of lecture-type presentation of the general procedure and requirements for effective environmental monitoring. This will be followed by a more detailed on-the-job and hands-on training at the construction site where the trainees will participate in the activities of the international environmental specialist/construction supervision staff in reviewing the contractor's reports, periodic monitoring inspections, and deliberation of environmental issues involving the contractor and the project stakeholders, and finally the accomplishment of environmental reports. The field trainings should coincide with peak work activity at the site to provide a first-hand observation of the following environmental issues:

- Erosion and slope stability issues;
- Discharges to water bodies;
- Disturbance on biodiversity;
- Dust suppression;
- Exhaust emissions;
- Noise abatement measures;
- Protection against oil spillage;
- Quarry, borrow pits and asphalt plant operations;
- Site health and safety, sanitary facilities, etc.;
- Public safety, traffic management, child safety, etc.
- Documentation in dealing with public complaints and conflict resolution.

7. PUBLIC CONSULTATIONS

7.1 Stakeholder Consultations

In conformity with the Operational Policy (OP)/Bank Procedure (BP) 4.01: Environmental Assessment of the WB-IBRD, public consultation for the Four-laning of the Baku-Shamakhi km 91-107 Section was scheduled on 23 October 2015 at 10:00 am at Shamakhi Executive Power Office, part of Shamakhi Rayon. The PIU-ARS coordinated the holding of public consultation with the Local Executive Power of Shamakhi Rayon, wherein local residents, village officials/representatives, local NGOs, and other stakeholders were invited.

Around of 40 participants attended the public consultation in Shamakhi. The Consultant elaborated the rehabilitation/construction works, project's environmental, social impacts, and land issues along with WB and GoA policies in minimizing and mitigating projected impacts in a

slide presentation (PowerPoint), maps, graphics, and handouts. Comments were later solicited from the participants in an open forum and both by means of written documentation filled out by the participants themselves. Comments, responses and recommendations, photos and list of participants have been separately documented.

7.2 Information Disclosure

Upon finalization of this EIA document for Baku-Shamakhi km91-107 project briefs shall be made available (in Azeri language) available in public places for the project-affected and local NGOs. Accordingly, ARS shall see the approval from MENR who will issue the Environmental Permission for the project. Subsequently, the Bank shall post the approved EA report in their Infoshop.

During the actual rehabilitation/construction (four-laning) work, monitoring of the environmental impacts and the implementation mitigation measures will be done by the ESS/CSC. Reports shall be submitted by ESS-ARS to the World Bank on (a) compliance with measures agreed with the Bank on the basis of the findings and results of the EA, including implementation of any EMP, as set out in the project documents; (b) the status of mitigatory measures; and (c) the findings of monitoring programs.

In the interest of the people who may be affected as well as the environment, a grievance redress committee with a representation from the affected people shall be set up by the contractor in association with ESS/CSC to address public complaints that may arise during the construction stage.

ANNEX A: MITIGATION MEASURES DURING DESIGN, CONSTRUCTION/REHABILITATION AND OPERATION

Annex A. SUPPLEMENTAL MITIGATION MEASURES DURING DESIGN, CONSTRUCTION/REHABILITATION AND OPERATION				
Activity	**Potential Impact**	**Mitigation measures**	**Institutional Responsibility**	
			Implement	Monitor
CONSTRUCTION PHASE				
Operation of borrow areas	Disfigurement of landscape and damage to access roads	Secure MENR's approval for the operation of the borrow areas. Prior to operation of borrow areas, submit a plan to ESS indicating the location of the proposed extraction site as well as rehabilitation/construction measures and implementation schedule for the borrow areas and access roads. Undertake rehabilitation of borrow areas and access roads upon project completion.	Contractor	ESS/CSC
	Increased dust emission	Prior to operation of borrow areas; submit a dust management plan which shall include schedule for spraying on access road and details of the equipment to be used. Spray water on all unpaved access roads particularly in sections where critical receptors, such as settlements, schools and the like, are located.		
	Siltation and obstruction of watercourses	Wet aggregates and/or provide cover on haul trucks to minimize dust emission and material spillage. Locate stockpiles away from watercourses.		
Operation of asphalt plant	Odor emission and safety risks	Asphalt plants shall be 500 m downwind from settlements. Provide spill and fire protection equipment and submit an Emergency Response Plan (in case of spills, accidents, fires and the like) to the ESS prior to operation of the plant. Secure approval from the MENR for installation and operation of asphalt plants.	Contractor	ESS/CSC
	Water pollution due to spilled bitumen	Bitumen will not be allowed to enter either running or dry streambeds and nor can be disposed of in ditches or small waste disposal sites prepared by the contractor. Bitumen storage and mixing areas must be protected against spills and all contaminated soil must be properly handled according to MENR requirements. Such storage areas must be contained so that any spills can be immediately contained and cleaned up.		
Earthworks and various construction activities	Loss of topsoil	Topsoil shall be stripped and reused to cover areas where excess materials will be dumped and along road sections where roadside vegetation will be provided. Long-term stockpiles of topsoil will be immediately provided with a grass cover and protected to prevent erosion or loss of fertility.	Contractor	ESS/CSC

Annex A. SUPPLEMENTAL MITIGATION MEASURES DURING DESIGN, CONSTRUCTION/REHABILITATION AND OPERATION				
Activity	**Potential Impact**	**Mitigation measures**	**Institutional Responsibility**	
			Implement	Monitor
		Submit to ESS a soil management plan detailing measures to be undertaken to minimize effects of wind and water erosion on stockpiles, measures to minimize loss of fertility of top soil, timeframes, haul routes, and disposal sites.		
	Dust emission along routes to and from final disposal sites	Regularly spray water on haul roads to suppress dust, especially along sections that will pass close to settlements and sensitive receptors.	Contractor	ESS/CSC
	Air pollution due to exhaust emission from the operation of construction machinery	Maintain construction equipment to good running condition and avoidance, as much as possible, idling of engines. Banning of the use of machinery or equipment that cause excessive pollution (e.g., visible smoke).	Contractor	ESS/CSC
Earthworks and various construction activities	Disturbance of adjacent settlements due to elevated noise levels	Restrict work between 0600 to 2100 hours within 500m of the settlements. In addition, a limit of 70 dBA will be set in the vicinity of the construction site and strictly followed. Machinery to be used for the construction should be equipped with mufflers to minimize the generation of noise; Whenever possible the local population should be advised of occurrence of elevated noise levels to enable them to take the necessary preparatory measures.	Contractor	ESS/CSC
	Social grievance	Formulation of a grievance redress committee in association with affected population before starting the civil works.	Contractor	ESS/CSC
OPERATION PHASE				
Increased traffic flow	Elevated levels of gaseous and noise emissions due to increased traffic	Along sections of the road with sensitive receptors such as settlements, school, hospitals, etc., provision of roadside vegetation using densely leafed shrubs and trees should provide some attenuation. The ESS of ARS recommended planting of local and indigenous species such as Pine, Cypress, Loester, Tamarisk, and Olive which are suitable for the area, particularly near settlements along km 91-107. The Detailed plans should be produced by Contractor and CSC (the Engineer), in consultation with the local people/officials		

Prior to construction works, the following method statements/plans shall be submitted by the Contractor to the ESS for approval:

- A plan indicating the location of the proposed extraction site as well as rehabilitation/construction measures to be implemented for the borrow areas and access roads upon project completion

- A plan (Grievance Redress Mechanism) detailing the means by which local people can raise grievances arising from the construction process and how these will be addressed (e.g., through dialogues, consultations, etc.).

ANNEX B: ENVIRONMENTAL MONITORING PLAN

Annex B. SUPPLEMENTAL ENVIRONMENTAL MONITORING PLAN					
Aspect	**Parameters to be monitored**	**Location**	**Methodology**	**Timing and Frequency**	**Institutional Responsibility for Monitoring**
Borrow areas and access roads	Watercourses in the vicinity (obstruction, siltation, etc.) Dust emission along access roads, particularly near settlements.	At site and access roads	Inspections, observations, consultation with nearby communities	Unannounced inspections during construction and after complaint. At least twice a week	ESS/CSC
Asphalt plant	Exhaust fumes	At asphalt plant site	Inspections, observations, consultation with nearby communities	Unannounced inspections during construction and after complaint. At least twice a week	ESS/CSC
Worker's Safety	Provision and use of appropriate personnel safety equipment	Job site	Inspections; observations and interviews	Unannounced inspections during construction. At least once a week	ESS/CSC
Air Quality	The following parameters shall be measured by the Contractor: TSP, Sulphur Dioxide (SO2), Nitrogen Dioxide (NO2) and Carbon Monoxide (CO). Other parameters maybe warranted as and when requested by the Engineer.	Vicinity of populated settlements of project road. Asphalt plant	Obtain air samples from the field and analysis in laboratory for air quality measurement	Monitoring to be undertaken monthly	ESS/CSC
Noise	The Contractor shall ensure that routine noise monitoring is undertaken throughout the construction period. Parameters to be monitored to establish a baseline include: Laeq 1h (dBA) Average Daily Noise level	Vicinity of populated settlements of project road. Asphalt plant	Noise meter gadget	Monthly throughout construction.	ESS/CSC

ANNEX C: PUBLIC CONSULTATION PHOTOS