AZERBAIJAN REPUBLIC
MINISTRY OF TRANSPORT
AZERROADSERVICE OJCC

Azerbaijan Highway II Project
Contract No. ICB No. CW - 2007 - 2

KURDAMIR - UJAR HIGHWAY
Km 0+000 - km 21+000
(Section I)

Environmental Report
Final Version

May 2008
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## Acronyms

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<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARS</td>
<td>Azer Road Service</td>
</tr>
<tr>
<td>CSC</td>
<td>Construction Supervision Consultant</td>
</tr>
<tr>
<td>EA</td>
<td>Environmental Assessment</td>
</tr>
<tr>
<td>EHS</td>
<td>Environment, Health and Safety Manager</td>
</tr>
<tr>
<td>EIA</td>
<td>Environmental Impact Assessment</td>
</tr>
<tr>
<td>EMP</td>
<td>Environmental Management Plan</td>
</tr>
<tr>
<td>ESS</td>
<td>Ecology and Safety Sector</td>
</tr>
<tr>
<td>IUCN</td>
<td>International Union for Conservation of Nature and Natural Resources</td>
</tr>
<tr>
<td>MENR</td>
<td>Ministry of Ecology and Natural Resources</td>
</tr>
<tr>
<td>MoH</td>
<td>Ministry of Health</td>
</tr>
<tr>
<td>MoT</td>
<td>Ministry of Transport</td>
</tr>
<tr>
<td>OP</td>
<td>Operational Policy</td>
</tr>
<tr>
<td>PIU</td>
<td>Project Implementation Unit</td>
</tr>
<tr>
<td>RoW</td>
<td>Right of Way</td>
</tr>
</tbody>
</table>

Kurdamir - Ujar Highway Improvement Project, km 0 - km 21 (Section I)
1 INTRODUCTION

1.1 Project Background and Objective of the Study

This Environmental Assessment (EA) forms part of the detailed engineering design for the proposed rehabilitation of a 21 km section of the M4 Highway, which links Azerbaijan to Georgia. The road segment under study represents the eastern section of the 42 km Kurdamir – Ujar Road Project. At present, the Project road is classified as a Category II road. In the future the M 4 may be upgraded to a 4-lane Motorway. For this reason several aspects of Category 1 had to be taken into consideration during the detailed design of this Project. The project proponent is the Azer Road Service (ARS) of the Ministry of Transport (MoT).

The objective of this EA is to address the environmental impacts and management issues associated with the proposed road rehabilitation. The EA Report, which includes an environmental management plan, addresses the needs of applicable laws and regulations of the Government of Azerbaijan and the relevant provisions of the World Bank’s Environmental Assessment: OP 4.01, January 1999.

1.2 Methodology and Scope of the Study

The preparation of this EA is based on field investigations, consultations with ARS, the Ministry of Ecology and Natural Resources (MENR) and stakeholder consultations.

Further references used for this EA are studies prepared by other consultants such as the ‘Feasibility Study of the Kurdamir to Ujar Road Project’ (IN ENG CO, 2000), the EA on the Yevlakh – Ganja Road Section of the M 4 (Kocks Consult GmbH, 2007) and the EA on the proposed rehabilitation of the Baku – Shamakhi Road (Kocks Consult GmbH, 2006).

The present study report considers the applicable national and WB environmental policies and guidelines, provides a description of existing environmental conditions and the environmental impacts associated with road rehabilitation. The recommended mitigation measures are compiled in the Environmental Management Plan (EMP).

1.3 Location of the Project

The road under study comprises the section between km 127+790 and km 147+800 The total length is 21.00 km. (Due to incongruence in the road chainage the project end is not, as expected, at km 148+800, but at km 147+800.) It passes through two administrative districts, namely Kurdamir in the eastern and Ujar in the western part of the road under study.

1.4 Study Area

The present study comprised the area that will be directly or indirectly affected during reconstruction of road embankment and embankment slopes as well as bridge constructions. As the width of the existing road will remain more or less unchanged, direct interventions will generally take place within the existing 60 m Right of Way (RoW) of the M4, i.e. 2 x 30 m from the centreline of the existing road. The extended area of influence includes the borrow areas for construction material and access roads to these sites, contractor’s yard, asphalt plant, temporary material storage sites and disposal sites for excavation spoils which may also be located outside the RoW.

A workers’ camp will probably not be installed, given the proximity of the Project to Kurdamir town.

Sensitive receptors along the Project corridor, such as settlements, may also be affected by increased levels of noise, dust and gaseous emissions during construction.
Figure 1: Project Location Area

Road Kurdamir - Ujar (Section I)

- Borrow area Goycay
- Borrow area Girdimancay
- Ujar
- Qarabucaq
- Teze Silvan
- Kurdamir

Kurdamir - Ujar Highway Improvement Project, km 0 - km 21 (Section I)
2 POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

2.1 World Bank Environmental Policies and Guidelines

The Project would be classified as a Category B project under the provisions of the WB’s OP 4.01. The potential adverse impacts of Category B projects on human populations or environmentally important areas are considered less adverse than those of Category A projects. Most impacts are site-specific; few if any of them are irreversible and in most cases mitigation measures can be designed more readily than for Category A projects. The scope of EA examines the project’s potential negative and positive environmental impacts and recommends measures needed to prevent, minimize, mitigate or compensate for adverse impacts and improve environmental performance\(^1\). An EMP detailing the mitigation measures, monitoring program, institutional strengthening, implementation schedule and costs must be included in the EA.

The EA report will be presented to both the Government of Azerbaijan and WB and shall serve as a background document for approval by the competent environmental authority (MENR). The borrower (i.e. the Government of Azerbaijan) will have to make the draft EA Report available in Azerbaijan at a public place 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 before the Bank begins formal appraisal of the project. Once the EA report has been locally disclosed and officially received by the Bank, the Bank will also make it available to the public before it begins formal appraisal of the project\(^2\).

2.2 Government Environmental Laws, Regulations and Guidelines

Environmental protection in Azerbaijan is governed by the Law on Environmental Protection of 1999. The Law states that State Ecological Expertise (SEE) is the official EIA procedure in Azerbaijan, but it is not a specific EIA-related legislative document. According to Article 54.2 of the Law, EAs are subject to SEE which means that the MENR is responsible for the review and approval of EA reports submitted by developers. The Law defines SEE as ‘the identification of conformity of the environmental conditions with qualitative standards and ecological requirements in order to identify, prevent and forecast the possible negative impact of an economic activity on the environment and related consequences’.

The Law on Environmental Protection establishes the basis for the SEE procedure, which can be seen as a stand-alone check of compliance of the proposed activity with the relevant environmental standards (e.g. for pollution levels and discharges, noise). All EA reports prepared by developers are submitted to MENR which is responsible for SEE in accordance with Article 54.2 of the Law. In addition, the Law on EP indicates that projects cannot be approved without a positive SEE decision.

Upon submission of the EA report the MENR decides on whether to refuse the application or to approve it, with or without conditions. Conditions for the approval that might be typically considered in the present context mainly 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. If the application is approved with conditions, either the activity starts or the developer decides to appeal against the conditions. If the application is accepted, the developer must provide a report to MENR on progress within 12 months of the MENR’s decision.

During construction of the project, the developer may have to monitor parameters as indicated in MENR’s approval. Controls can be made by MENR on the accuracy and the reliability of the

developer's monitoring results. If it appears that there is a risk of the conditions being breached, the MENR will issue a warning on the developer. If the conditions are breached, the developer is obliged to stop whatever activity is causing the breach of the conditions. In such a case the MENR may reconsider the approval and the conditions of approval may be reviewed.

Provided below is a compilation of the national legal and regulatory framework related to road rehabilitation and improvement.

Table 1: Relevant Laws and Regulations on Environmental Protection in the Road Sector

<table>
<thead>
<tr>
<th>Reference</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The Law of the Republic of Azerbaijan on Environment Protection, 9 February 1999</strong></td>
<td>The general framework for all national objectives in the area of environmental protection. 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.</td>
</tr>
<tr>
<td>Article 50: Ecological Expertise</td>
<td></td>
</tr>
<tr>
<td>Article 54: Objects of the State Ecological Expertise</td>
<td>Defines the types of project which require compulsory “State Ecological Expertise (SEE)”, i.e. to undergo the systematic EIA process.</td>
</tr>
<tr>
<td>Articles 35, 36, 37, and 38: Ecological Demands during Project Design and Implementation.</td>
<td>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</td>
</tr>
<tr>
<td><strong>EIA Handbook for Azerbaijan (UNDP), 1996</strong></td>
<td>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 process.</td>
</tr>
<tr>
<td><strong>Azeri Law on Automobile Roads: Section 39: Protection of Environment, March 10, 2000</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>Guidelines for Road Construction, Management and Design, February 7, 2000</strong></td>
<td>Addresses environmental issues in road design, construction and maintenance. Requires minimizing the impacts on the ecological, geological, hydro-geological and other natural conditions, by implementing adequate protection measures.</td>
</tr>
<tr>
<td>Part I: Planning of Automobile Roads</td>
<td></td>
</tr>
<tr>
<td>Part II: Construction and Reconstruction of Automobile Roads</td>
<td>Requires consideration of appropriate protection measures, which shall contribute to the maintenance of stable ecological and geological conditions as well as natural balance. General overview on the protection of environment.</td>
</tr>
<tr>
<td>Section II.3: Protection of the Environment</td>
<td></td>
</tr>
<tr>
<td><strong>Reg. 514-1Q-98: Regulation on Industrial and Municipal Waste</strong></td>
<td>Requirements for industry and enterprises for implementation of standards and norms of environmental protection for waste when designing, constructing or reconstructing.</td>
</tr>
<tr>
<td>Reference</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>SNIP III-4-80: Norms of Construction Safety</td>
<td>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.</td>
</tr>
<tr>
<td>SNIP 2.05.02-85 Building Code &amp; Regulations for Automobile Roads Ch. 3: Environmental Protection</td>
<td>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);</td>
</tr>
<tr>
<td>Safety Regulations for Construction, Rehabilitation, and Maintenance of Roads, 1978</td>
<td>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.</td>
</tr>
<tr>
<td>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</td>
<td>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).</td>
</tr>
<tr>
<td>BCH 8-89 Regulations on Environmental Protection in Construction, Rehabilitation and Maintenance of Roads</td>
<td>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 states 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.</td>
</tr>
<tr>
<td>Sanitary Norms CH 2.2.4/2.1.8.562-96; 1997</td>
<td>Provides ambient noise quality standards for residential, commercial and industrial areas, hospitals and schools (day/night standards);</td>
</tr>
<tr>
<td>Rules for use, protection and preservation of trees and bushes which are not included to the Forestry Fund of Azerbaijan, Decision No. 173, 19th Sept. 2005</td>
<td>Includes rules for strengthening preservation of trees and shrubs to improve the planting works and responsibilities for possible damage activities.</td>
</tr>
</tbody>
</table>
2.3 Administrative Framework

The management and monitoring of environmental aspects of the proposed road rehabilitation project shall involve the following government agencies:

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

Local Authorities will have responsibilities in providing selected official approvals for the use of natural resources.

The ESS and the district offices of ARS in Kurdamir 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 in Kurdamir shall undertake routine and random monitoring of the project to determine compliance with environmental regulations and standards.

During the operational phase of the Project, ARS will undertake routine monitoring on road safety, the storm water drainage system, the condition of plantations if any, etc.
3 PROJECT DESCRIPTION

3.1 Objective of the Project

The main objective of the Project is to reduce road transport costs and improve access, transit and safety within Azerbaijan’s East-West corridor, through the rehabilitation of the Project road. For road users, the Project would lead to better road quality meeting mid-term traffic projections, better safety standards, lower travel costs and a shorter travel time.

3.2 Proposed Road Rehabilitation Measures

All of the proposed works will be accommodated within the existing right of way (RoW), which extends 30 m to either side of the centerline of the road (i.e. 60 m wide in total). The proposed rehabilitation works will have the following features:

- Total width of road embankment: ..................................... 15 m;
- Width of carriageway: .......................2 x 3.75 m = 7.5 m;
- Width of shoulder: ...................................................2 x 3.75 m;
  Shoulder paved with asphalt concrete:..........................2 x 0.75 m;
  Shoulder covered with crushed stone: .....................2 x 3.00 m;
- Cross-fall in the carriageway on both sides:................. 2%;
- Cross-fall in the shoulders .................................................. 4%;
- Design speed: ........................................................... 120 km/h;
- Replacement of five defunct bridges by new bridges or by box culverts of approximately same width as appropriate;
- Replacement of 19 damaged culverts structures to improve drainage; and
- Traffic safety features such as pedestrian crossing, road signs, road marking, livestock crossing, bus stop and road furniture, including appropriate road safety barriers (guardrails).

The recommended rehabilitation options for the bridges are as follows:

<table>
<thead>
<tr>
<th>No</th>
<th>Bridge over</th>
<th>Chainage (km)</th>
<th>Length (m)</th>
<th>Total width (m)</th>
<th>Proposed Rehabilitation Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Drainage channel</td>
<td>8+511</td>
<td>3 x 8.60</td>
<td>8.50</td>
<td>Construction of new bridge of 2 x 15m to replace existing structure</td>
</tr>
<tr>
<td>2</td>
<td>Irrigation channel</td>
<td>11+334</td>
<td>1 x 6.00</td>
<td>11.10</td>
<td>Replacement of bridge by box culvert of 2 x 2.00m x 2.00m</td>
</tr>
<tr>
<td>3</td>
<td>Drainage channel</td>
<td>13+327</td>
<td>2 x 5.70</td>
<td>7.80</td>
<td>Replacement of bridge by box culvert of 2 x 2.00m x 2.00m</td>
</tr>
<tr>
<td>4</td>
<td>Drainage channel</td>
<td>13+394</td>
<td>3 x 8.60</td>
<td>8.90</td>
<td>Construction of new bridge of 1 x 33m to replace existing defunct structure</td>
</tr>
<tr>
<td>5</td>
<td>Irrigation channel</td>
<td>16+900</td>
<td>1 x 6.00</td>
<td>10.00</td>
<td>Replacement of bridge by box culvert of 2 x 2.00m x 2.00m</td>
</tr>
</tbody>
</table>

3.3 Bridges

Bridges will be in pre-cast reinforced concrete, the culverts in situ fabricated concrete, but it will be up to the choice of the contractor.
3.4 Construction Materials and Potential Borrow Areas

Implementation of the proposed rehabilitation measures is estimated to require about 450,000 m³ of gravel materials. There are at least two potential quarry sites within reasonable distance to the project.

On is the borrow area Girdimancay, about 34 km north of Kurdamir and some 25 km away from the project road. Access to this quarry is possible by existing rural earth roads, which meet the Project road at the beginning of the village Qarabucaq at km 8 (km 156+000). The other borrow area is Goycay, about 16 km north of the town Ujar, where several organisations are extracting and processing granular material from different, government owned quarry sites.

Both borrow areas contain river gravel and gravel-sand mixture, suitable to be used in road construction works for fill, capping layer and sub-base construction but requires some processing (screening). The suitability for asphalt concrete and cement production has to be tested in detail.

3.5 Traffic Forecast

A traffic forecast has been done based on previous data and new traffic counts, which were conducted during the design phase of this Project.

Due to the inconveniences caused by the construction works on the Hadjiqubul-Kurdamir section, some light traffic presently uses a detour through the mountains via Shamaka. Including this traffic, the present traffic is about 3,500 vehicles/day or 6,300 PCU/day. Heavy traffic is very important, i.e. in the range of 40 % of total traffic.

Based on the usual growth rates the 20 years traffic- forecast is 12,000 vehicles/day for 2028, equivalent to 22,000 PCU/day.

3.6 Proposed Schedule for Implementation

The Project is scheduled to commence in 2008 and is forecasted to take 18 months.

3.7 Life Span of the Project

The proposed project is designed for a life span of 20 years provided that routine and periodic maintenance is carried out.
ENVIRONMENTAL CHARACTERISTICS OF THE PROJECT AREA

4.1 Physical Environment

4.1.1 Geology, Topography and Soils

The East-West Highway runs through the extensive Kura-Araz Lowland of Azerbaijan, which are located between the Greater Caucasus in the north and the Lesser Caucasus and Talish Mountains in the south. Study section is located on Shirvan plain, restricted by Kura River at the south and by foothills of Greater Caucasus at the north and pertains to Kudru-Shirvan geographical district.

The regional structure is dominated by compressional deformation of sedimentary rock, which led to the formation of nappes verging towards the south-east.

The overall area is covered by alluvium. The alluvial plain is still accreting due to the high sediment load of the rivers with catchments in the Great and Lesser Caucasus mountains, which sediment loads are among the highest of any rivers in the world. The flood plains of the Kura River are typically underlain by mainly loose, unconsolidated sand and alluvium as well as some occurrence of mountain outwash deposits and lacustrine sediments.

Altitude of the area is range between –10m up to +2m with lowest part located in depression between Mususlu and Garabujag villages. The landscape in the study corridor is a monotonous wide and flat plain and covered with young sediments of holocene and quaternary age. The sediments are terrestrial and marine clays, sand and gravel deposits.

There are two types of soils within the study area:

- Meadow gray soil and
- Meadow soils

Most part of the study corridor is formed by sierozem (meadow gray soil), which is the predominant type of soil on the Kura-Araz lowlands. Meadow grey soil is typical for altitudes of up to 150 m and dry climate with maximum precipitation of 200 mm. Moisture content is 0.10 - 0.15; humus coefficient: 1 - 2% (with depth of occurrence 5 - 50 cm); bio-climate potential coefficient: 0.8 - 1.8; ph: 8.4 - 8.9; water-stability of structure: 26. Granulometric composition: loamy - 0.78; heavy-loam - 0.60; medium-loamy - 1.0; light-loamy - 0.73; loamy sand is absent. Erodibility of meadow gray soil is very low (0.2 - 1.0 km/km²) and salinity ranges between 0.42 and 1.0 g/m³.

Generally the soil is semi-dry, dry steppe, light loamy kind, which is suitable for winter pastures and arable land (cereals, cotton). The agricultural potential is classified as low to medium (these soils generally have good source of all necessary elements for plants and mostly need in nitrogen only). The prevailing type of land use is animal husbandry in its traditional extensive form.

Meadow soils are located just as narrow stripes (about 500 m width) along the Goychay riverbed and it is existing and former tributaries. Meadow soils typically occur at average altitudes of around 100 m with average precipitation volumes of 250 mm; bio-climate potential coefficient: 0.8 - 2.0; degree of moisture: 0.10 - 0.15; water-stability of structure: 40; humus coefficient: 1.7 (with depth of occurrence till 40 cm), ph: 7.4 - 8.6. Granulometric composition: loamy - 0.36; heavy-loam - 0.91; medium-loamy - 1.0; light-loamy - 0.89; loamy sand - 0.60. Salinity ranges between 0.55 and 1.0 g/m³.
Meadow soils are lowland semi-dry arid steppe, with light loamy structure, medium degree of salinity, are not susceptible to erosion and have low bio-climate potential. This type of soil is mainly suitable for winter pastures and arable land (cotton).

All soils react vigorously with diluted hydrochloric acid, which classifies them as calcareous. The soils observed are predominantly clayey and dense; in many cases they are also saline.

4.1.2 Seismicity

Deep seated faults are located at a depth of 3 - 7 km and have a north/south or north-west / south-east direction. They are not cutting through Pliocene to Quaternary sediments, but are a source for seismic events e.g. the Western Caspian Fault, which is situated in a depth of 3.0 km - 3.5 km. The amount of dislocation along these faults is uncertain, and it is unclear whether some of the faults are still active.

The study corridor is pertaining to Yevlah-Kurdamir seismic group. Seismic activity of the region is not very high and just few earthquakes with force of maximum 6-7 were registered within this area. As whole region has huge Quaternary sediments cover, the tectonics of more deep levels was not studied.

4.1.3 Climate

According to data from the meteorological station Goycay, some 16 km north of Ujar, the climate can be characterized as semi-desert and dry steppe with average annual precipitation of up to 300 mm. Distribution of precipitations within the year is quite uniform – it is least in August (a little bit less than 25 mm) and maximal in March-May (around 40 mm).

Summers are very hot and dry and the winters are moderately cold. Highest temperature is usually registered in July and the lowest in January. Average annual temperature is about 10°C and the main directions of wind are west and north-west throughout the year. The following table shows the “High and Low Temperature Mean Value” for Goycay.

<table>
<thead>
<tr>
<th>Mean Value in °C</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Temperature</td>
<td>7.0</td>
<td>8.3</td>
<td>13.1</td>
<td>20.7</td>
<td>25.5</td>
<td>30.2</td>
<td>32.5</td>
<td>32.0</td>
<td>27.9</td>
<td>21.1</td>
<td>14.1</td>
<td>9.1</td>
<td>20.18</td>
</tr>
<tr>
<td>Low Temperature</td>
<td>-0.9</td>
<td>0.2</td>
<td>3.6</td>
<td>8.9</td>
<td>13.4</td>
<td>17.6</td>
<td>20.3</td>
<td>19.4</td>
<td>15.9</td>
<td>10.3</td>
<td>5.6</td>
<td>1.1</td>
<td>9.62</td>
</tr>
</tbody>
</table>

4.1.4 Air Quality and Noise

Baseline data on background levels of air pollution do not exist for the area under study. As there are no stationary sources of significant air pollution, vehicular traffic can be assumed as the major source of emissions and ambient air pollution.

Emissions and potential air pollution along the study corridor are thus more related to low quality of fuel used and to the obsolete car fleet, in which the average age is about 15 years and about 90% of all vehicles are more than 5 years old. In addition, poor vehicle inspection-maintenance systems have lead to an increase in 'gross-polluter' cars.
Given the currently low level of road traffic and lack of industrial activity along the study road, noise is not considered to be a key environmental issue in the area.

4.1.5 Hydrology and Water Resources

There are no natural streams in the study area; but several secondary collectors cross the road. These channels used for irrigation and drainage are the main surface water arterials in the study corridor. Water quality in the collectors is characterized by high silt loads, relatively high salinity and reported to be polluted by chemicals from agriculture.

Irrigation channels are fast running streams, partly made of concrete slaps. Drainage channels are regularly maintained with the excavated material being heaped up alongside the streams. These features, together with the dam of the existing road, disrupt the natural drainage of the land between the road and the channels leading to the formation of stagnant shallow water bodies during the wet periods of the year.

The groundwater table in the region ranges between 2.0 to 2.5 m below surface level. The natural groundwater level has been lowered through the collector-drainage system, which criss-crosses the landscape. As the upper 20m are formed by quaternary marine deposits, groundwater is highly saline and unsuitable for human consumption as drinking water or economical use.

According to a representative from the district Local Executive Power water supply is a major problem in the area. The villages are not connected to a regional water-supply system. Drinking water is therefore supplied by trucks at rates of 20 AZM per truck. Water for washing and other household purposes is taken from the channels, if there are any in the near vicinity. At some locations children were observed bathing in these channels. Fishing is occasionally done in these channels as a pastime rather than for human consumption.

4.1.6 Land Use

The land adjacent to the M4 / inside the RoW is generally not being used for any specific purpose. The cattle owned by the local villagers usually grazes in the wider surroundings and the various channels and some ponds located in the area / adjacent to the road serve for the water supply of these animals. Previously existing agricultural land has been abandoned, probably due to the increased salinity of the local soils. In some sections drainage channels and the materials excavated from these channels occupy almost the entire RoW.

Two villages are located close to the study road. For more details see section 4.4.

4.1.7 Biological Environment

Fauna

Fauna biodiversity is not particularly high in the area of the study corridor. While some threatened animal species (of both national and international importance) have their natural habitat in the wider part of the region, these are not expected to be affected by the Project as the rehabilitation will be confined within the existing 60 m RoW.

The following information on the fauna of the Project area is mainly based on the Red Book of Azerbaijan, the IUCN Red Data List and publications of Birdlife International. The superscript ‘a’ after a scientific name indicates species listed in the Red Book of Azerbaijan; ‘b’ indicates IUCN species (World Red Data Book) and ‘c’ indicates species included in both the national and international Red Data Books.
According to these sources, common mammals of the area are jackal *Canis aureus* and wolf *Canis lupus*, which follow sheep flocks to their winter pastures in the lowlands and red fox *Vulpes vulpes*, a resident species of this area. Further characteristic mammals are the Eared Hedgehog (*Hemiechinus auritus*) bat *Pipistrellus kuhlii*, Barbastella barbastellab, hare *Lepus europaeus* and rodents *Mus muscus*, *Meriones erythrouros*, *M. vinogradovi* and *Microtus socialis*. African Wildcat (*Felis libyca*) and Marbled Polecat (*Vormela peregusna*) are quite rare here. American Nutria is one of most typical mammals occurring in the numerous water canals.

Most characteristic resident species of the area are Common Kestrel (*Falco tinnunculus*), Rock Dove (*Columba livia*), Turtle Dove (*Streptopelia turtur*), Little Owl (*Athene noctua*), Hoopoe (*Upupa epops*), Crested Lark (*Galerida cristata*) and Isabelline Wheatear (*Oenanthe isabellina*). Many breeding species are also occurring in the area within summer time: Lesser Kestrel (*Falco naumanni*), European (*Merops apiaster*) and Blue-Cheeked Bee-Eaters (*Merops superciliosus*), Black-bellied Sandgrouse (*Pterocles orientalis*), Rufous Bushchat (*Cercotrichas galactotes*), Penduline Tit (*Remiz pendulinus*), Red-Backed (*Lanius collurio*) and Lesser Grey Shrikes (*Lanius minor*), Goldfinch (*Carduelis carduelis*) and many others. A Couple of nests of White Stock (*Ciconia ciconia*) have been observed on an electricity pole at a distance of approximately 100 m to the North of the road. Spanish Sparrow (*Passer hispaniolensis*) is typical breeding species of the area using White Stock nests and organizing big colonies inside of lower part of nest among twigs. Such birds as Little White (*Egretta garzetta*) and Cattle Egrets (*Bubulcus ibis*) are also present on the study area within breeding season, but these species have their core habitats and breeding sites in different areas. Little Bustard (*Tetrax tetrix*) is only species that can have important concentration in the area in wintertime. Flocks of these birds are usually concentrating on the fields for foraging.

Characteristic amphibian species are Green Toad (*Bufo viridis*), Tree Frog (*Hyla savigni*) and the Common Frog (*Rana ridibunda*), which are found in the vicinity of canals and ponds.

Reptiles of the area are very dangerous poison Blunt Nosed Viper (*Vipera lebetina*) that mainly active in warm seasons of the year with peak of activity in May; lizards – Caspian Gecko (*Cyltopodion caspius*), Grozny Lacerta (*Lacerta strigata*), European Glass Lizard (*Pseudopodopus apodus*), the Greek tortoise *Testudo graeca* and the Caspian turtle *Mauremis caspica*. European Pond Turtle (*Emys orbicularis*) is one of most numerous inhabitants of natural and artificial water streams.

In the rivers and channels of the region mainly common species occur, as *Elox lucius*, *Rutilus rutilus*, *Albumus charusiini*, *Scardinius erythrophthalmus*, *Barbus cyri*, *B. capito*, *Cobitis caspia* etc. In the relatively small channels the local population does some fishing, but according to information obtained from local people it is not a source of regular alimentation, it is more a sportive occupation.

**Flora**

The original vegetation of the study corridor can be classified as semi-desert. Typical species are saltwort (*Salsola spec.*), *Salicornia europaea* and various species of wormwood (*Artemisia spec.*). Higher shares of *Tamarix ramosissima* or *Poa bulbosa* indicate areas with increasingly dry conditions. *Halocnemum strobilaceum* and *Halostachys caspia* are developing on especially salt soils. Numerous agricultural fields are replaced natural vegetation in most of places at the present time. Original semi-desert areas are also under the strong pressure of overgrazing in wintertime.

As mentioned earlier in this report a widely branched network of irrigation channels presently criss-crosses the land in the wider surroundings of the road. Abundant growths of reed (*Phragmites communis*, *Typha spec.*, *Scirpus acutus*) demarcate the courses of these channels and fringes of some shallow artificial ponds which are occasionally found along the Project road.
Narrow strips of trees and shrubs occur alongside the road, mainly within the territories of villages. Most of this is artificially planted but some trees may also be natural. Although such plants as Elm (*Caragana arborescens*), Loester (*Salix* spec.), Tamarisk (*Tamarix ramosissima*), Willow (*Salix alba*) and some others (*Eleagnus caspica*, *Morus* spec., *Populus alba*, *Quercus longipes*, *Acacia* sp., etc.) are naturally present in local flora, plantations alongside the road are mainly artificial. Numerous planted fruit trees are present here. They are Quince, Apple, Pear, Fig, Mulberry, Pomegranate and some others. Blackberry bushes are also one of plants preferable by local population using for food and as green hedge.

4.1.8 Protected Areas and Other Ecologically Significant Sites

Areas designated under National legislation or do areas of specifically high botanical or zoological value do not exist within the study corridor.

4.1.9 Human Environment

There are two settlements on the road section under study:

**Quarabucaq** (km 6+400 - km 8+400) in the District Kurdamir is located to the North of the M4 at a distance of 50-100 m from the road. No private properties are located inside the RoW;

**Teza Silyan Kendi** (km 16+000 - km 17+500) in the District Ujar is located on both sides of the M4. Between km 16+350 - km 16+630 the RoW is more or less occupied by fenced private gardens with some fruit trees and bushes. At km 16+500 and km16+650, two properties (an old house and a barn) are located inside the RoW to the North of the road. The distance of these buildings to the center-line of the Project road is approximately 20,0 m. Both these buildings will be preserved despite their nearness to the road and construction site.

Road Safety

Statements about road safety are rather difficult, because basic data is sometimes not as complete as it should. The Consultant received results about accidents on the road for 2005-2007, concerning the whole motorway Baku-Alat-Gensha-Georgian Border.

- 22 major accidents in 2 years on 450 km of road.
- 8 people dead
- 23 people injured

The main reasons given for these accidents are the following:

- overspeading, loose of control,.............................. 27,3%
- overspeading and crash with pedestrians ........... 27,3%
- too few distance to the vehicle in front ............. 18,2 %
- disobediance to not overtaking prescription ........ 18,2 %
- alcohol ................................................................. 9,0%

These accident figures are not specific for our section. On our section very few pedestrians are seen on the road. Therefore the accidents with pedestrians are probably less. But it is sure, that most of the accidents occur for overspeeding and trying to overtake where it should not be done.
Cultural Heritage / Common Property
Common property resources located near the proposed route are as follows:

Table 4. Common Property Along the Project Road

<table>
<thead>
<tr>
<th>Property</th>
<th>Quantity</th>
<th>Distance from road (km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>School</td>
<td>2</td>
<td>more than 200m</td>
</tr>
<tr>
<td>Mosque</td>
<td>1</td>
<td>more than 200m</td>
</tr>
<tr>
<td>Graveyards or monuments</td>
<td>none</td>
<td></td>
</tr>
</tbody>
</table>
5 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

The planned rehabilitation of the present 21 km section of the M 4 is classified a Category B project under the provisions of WB's OP 4.01, which means that no significant and irreversible impacts are expected as a result of the proposed interventions.

All proposed interventions will be undertaken within the existing RoW and shall not impact on any critical areas such as wetlands, forests, protected areas or the like. As the road already exists and will not be widened, the expected Project impacts will be largely experienced during the construction phase and are thus considered temporary.

An overview of the type and extent of the expected construction-related impacts and measures proposed for their mitigation is provided below.

5.1 Construction Impacts and Mitigation

5.1.1 Contractor’s Work Camp

The establishment and operation of the Contractor’s work camps may cause temporary adverse environmental impacts if various aspects such as liquid and solid waste handling and disposal, equipment maintenance, materials’ storage etc. are not properly taken into consideration. To ensure that only minimal impacts will arise from the operation of such areas, the Contractor shall provide a method statement on the design and operation of his work camp and obtain approval thereon from the MENR. This statement should provide the following information.

- Location map and layout of the work camp.
- Distance to the nearest settlement;
- Sewage management (wastewater from offices and associated facilities at the site);
- Waste management (waste collection and disposal, e.g. domestic waste, used tires, used oils etc.) consistent with appropriate regulations;
- Description and layout of equipment maintenance areas and lubricant and fuel storage facilities including distance from nearest water channels;
- Storage facilities for fuels and chemicals will be located away from existing watercourses. Such facilities will be designed such as to prevent soil and water contamination at source (e.g. bounded and provided with impermeable lining to contain spillage).

5.1.2 Worker’s Camp

Given the proximity to Kurdamir it is assumed that unskilled or semi-skilled workforce will be hired from there or the surrounding villages. Therefore no separate worker’s camp will need to be established for the implementation of this Project.

5.1.3 Asphalt Plant

The establishment of a new plant shall take into consideration the following measures to ensure that there will be minimal impacts on settlements and productive land:

(i) asphalt plants must be located downwind of settlements at a distance of 500 meters or more;

(ii) the Contractor shall secure an environmental permit from the MENR for the siting, the installation and operation of asphalt plants;
(iii) 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 starting the operation of the plant.

In road rehabilitation the most severe possible water quality impact could come from spilled
bitumen or any petroleum products used to thin the bitumen. Bitumen is stored in drums which
may leak or which are often punctured during handling after long periods of storage. Bitumen
will not be allowed to enter either running or dry channels. Bitumen storage and mixing areas
must be protected against spills and all contaminated soil must be properly handled according
to requirements of the MENR. As a minimum, these areas must be contained, such that any
spills can be immediately contained and cleaned up.

5.1.4 Construction Material / Construction Waste
The volume of borrow materials required for road rehabilitation is estimated at 450,000 m³ for
the construction of capping layer, sub-base, base, asphalt surface and cover of shoulders.
Extraction will most likely be undertaken from already operational, officially licensed quarries.
While the contractor will be sourcing the borrow materials under his own arrangement a plan
should be submitted indicating the location of the proposed extraction site. The Contractor will
have to secure that all required environmental permits / licenses have been obtained prior to the
beginning of any operations and carry out extraction and rehabilitation activities consistent with
permit conditions and/or any other requirement of MENR. Additional testing will be done by the
Contractor, when identifying the construction materials, before starting the works.

Construction debris (e.g. from the demolition of bridges, culverts and the existing road layers
and embankments that cannot be recycled) will be removed from the site and disposed of at a
site officially approved by the local Authorities.

During the field investigation for the road section Kurdamir-Ujar, two existing borrow areas have
been located which are in reasonable distance to this road section at or near to. Both are
indicated in Figure 1 to this report.

Borrow area Girdimancay
About 34 km north of Kurdamir, near the village of Arabmehdibay at the river Girdimancay
material is extracted from the river bed and nearby hills. The borrow area stretches for about
0.5 km along the Girdimancay river and the adjacent small hills. This large existing borrow area
has been in use for a very long time and at the time of the visit extraction of material was
ongoing for the construction of another road section of the east west highway east of Kurdamir.

The distance to the project road is about 25 km following a gravel road which joins the project
road at around km 6+500.

The borrow area contains in general two different type of materials predetermined by the
location. The river bed and riverbanks contain nearly clean river gravel, whereas from the
adjacent small hills a gravel-sand mixture with some fines is extracted.

The nearly clean river gravel containing cobbles and some boulders can be used and is
presently used to produce aggregates for cement concrete and asphalt production. The water
level of the river is varying depending on the season of the year and at some times during the
year extraction might not be possible due to extreme high water level.

On-going extraction of material from the small hills is usually done by excavator and wheel
loader. Depending on the location, the gravelly sandy material might vary from general fill to
subbase quality. Careful selection and frequent testing during extraction of material is therefore
required.
The total usable material deposit is estimated at more than 50 Million m³ and is replenish by the river during times of high water flow.

The river gravel and gravel-sand mixture of the whole area is generally suitable to be used in road construction works for fill, capping layer and sub-base construction but requires some processing (screening). The suitability of crushed aggregates from river gravel for asphalt concrete and cement production can be assumed but has to be tested in detail.

Permission and licences for the use of the borrow area and exploitation of material have to be obtained from the relevant authorities in agreement with the landowner.

**Borrow area Goycay**

North of the town of Ujar in the vicinity of the town of Goycay several organisations are extracting and processing granular material. There are several locations where organizations work on the government owned quarry sites. The distance to Ujar is about 16 km.

The borrow areas are located close to or at the river Goycay. The extracted materials are river deposits. Processing includes washing and screening followed by crushing of the larger stones. Aggregates of different sizes and fraction are produced.

The total usable material deposit is estimated at more than 15 Million m³ and is replenish by the river during times of high water flow.

The river gravel and gravel-sand mixture of the whole area is generally suitable to be used in road construction works for fill, capping layer and sub-base construction but requires some processing (screening). The suitability of crushed aggregates from river gravel area for asphalt concrete production can be assumed but has to be tested in detail.

Permission and licences for the use of the borrow area and exploitation of material have to be obtained from the relevant authorities in agreement with the landowner.

**5.1.5 Earthworks**

Site preparation will involve stripping and temporary storage of about 25,000 m³ of topsoil. Such materials, if not properly managed will contribute to erosion and siltation and obstruction of irrigation and drainage channels.

The provisions of SNIP 2.05.02.85 will be complied with to minimize negative impacts associated with earthworks. Specifically, stripped topsoil shall be reused to cover areas where excess materials may be dumped or to cover embankments. Long-term stockpiles of topsoil will be immediately protected to prevent erosion.

All reclaimed asphalt pavement (estimated at 15,000-20,000 m³) will be recycled for the construction of new pavement (shoulders) or service roads during construction. This will reduce the volume of borrow materials required and also reduce the impact that would result from the required transportation of these volumes. Materials that will not be used will be transported to the final disposal sites as officially approved by the local Authority in accordance with the applicable regulations. During earthworks the Contractor shall also undertake regular spraying of the site to suppress dust emission and protect the health and safety of his workforce and the local population.
Before site preparation activities commence, the Contractor shall submit to ESS and CSC a soil management plan detailing timeframes, haul routes, material stockpiles and disposal sites. The selection of disposal sites will be made in consultation with local authorities and landowners.

5.1.6 Bridge Construction/Rehabilitation

The demolishing of five bridges and their reconstruction as 2 bridges and 3 major culverts along the project road may alter the local drainage pattern and may also cause impairment of the quality of surface waters as a result of increased erosion in disturbed areas.

To mitigate such impacts, the project specifications will prescribe to the Contractor the installation of cofferdams, silt fences, sediment barriers or other appropriate devices to prevent migration of silt during excavation and boring operation within channel sections. In general, the consultant chooses appropriate length of bridge spans, to avoid boreholes in the bed of the channel. For bridge n° 1 this was not possible, due to the limited possible height in the neighbouring village Qarabucaq. During bridge demolition, the Contractor shall avoid "dropping the bridge" into canals. This will be done by "sawing" appropriate sections of the bridge and using cranes to lift these sections or alternatively construct a platform onto which the bridge could be dropped. 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.

The Contractor shall submit a method statement or plan for the execution of bridge construction works including measures that will be undertaken to address adverse environmental impacts such as erosion of river embankment and siltation / pollution of watercourses that may result from such activities. The plan shall be submitted to the CSC and ESS for approval.

5.1.7 Water Consumption / Pollution

Various activities (refer to sections on borrow areas, earthworks, bridge construction and asphalt plant operation) associated with the road Project may cause deterioration of surface water quality if appropriate measures are not implemented. This may affect cattle and villagers who use the water for household and leisure purposes. Identification of potential impacts on water quality and the proposed mitigation measures have been presented in the previous sections.

Water for construction use
The total need of water for construction purposes will be about 200,000 m³ or some 250-300 m³ per day, or 7-8 l/s. The water will be bought in Kurdamir or in Ujar, or it will be taken from the existing channels, upon prior authorization of the irrigation authorities. In any case, the water use for construction purposes cannot be taken from the quantities of water designated for irrigation purposes.

5.1.8 Air Pollution

Impacts on air quality are expected to occur as a result of exhaust emissions from the operation of construction machinery; fugitive emissions from aggregates, concrete, and asphalt plants; and dust generated from road construction/rehabilitation works, along haul roads, exposed soils, and material stock piles. The following mitigation measures will be implemented by the Contractor to reduce emission levels:

- maintenance of construction equipment to good standard 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);
• 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.

Dust nuisance will be an issue where traffic will be diverted to temporary roads and where material transport will take place in the vicinity of settlements. Such dust exposure has implications not only on worker's health and safety, but may also affect the health and safety of all other road users. To minimize such impact the Contractor will submit a dust suppression program, which provides detailed description of action proposed to minimize dust generation at the construction site and, if required, along haul routes. To assure that there will be sufficient resources for the timely implementation of the dust control program the Contractor will provide a method statement for effective dust control during construction and material transport. This statement shall include information on the number and type of watering trucks and the proposed sources of the water and will be included in the contract documents.

5.1.9 Noise Pollution

During construction, the operation of heavy machinery can generate high noise levels. In order to minimize impacts due to excessive noise and vibration, work will be restricted to 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.

5.1.10 Impacts on Flora and Fauna

Impacts to vegetation and wildlife along the project road are not expected to be significant since the rehabilitation will be undertaken with the existing 60 m RoW. Further, there are no protected and densely vegetated areas within the influence area of the Project as well as in the proposed borrow areas.

There will be some loss of trees and shrubs in the embankments of the first 2 km of the study road. The estimated quantity is 100. As was mentioned earlier, most of this vegetation seems to be wild growth but some of it may have been planted. As the M4 will be widened in the near future, it was agreed with the MENR that plantations should be done at the future edge of the construction area for the upgrading to Category I. To fulfill the Azerbaijan rules these plantations shall be replanted at a ratio 1:1.5 of what will be lost due to construction.

5.1.11 Land Acquisition

As the proposed road rehabilitation will be undertaken within the existing 60 m RoW, the Project is not expected to require any land acquisition, permanent resettlement, and removal of permanent structures in the project influence area.

During discussions with ARS, it was agreed, that the scale of Category I rehabilitation, does not require resettlement actions according to World Bank Guidelines.

Impacts on cultural property, e.g. graveyards and cultural monuments, are not anticipated.

5.1.12 Health and Safety

If not properly managed, work camps and construction sites can pose health and safety risks. Transmission of diseases is likely under conditions with inadequate health and safety facilities and practices. The Contractor shall be required to employ an Environment, Health and Safety
Manager to address such concerns and to coordinate with the MoH’s Regional Disinfection Centre. The Contractor shall provide the following:

(i) adequate health care facilities (including first aid facilities) within construction sites;
(ii) training of all construction workers in basic sanitation and health care issues, general health and safety matters, and on the specific hazards of their work;
(iii) personal protection equipment for workers, such as safety boots, helmets, gloves, protective clothing, goggles, and ear protection (in accordance with SNIP III 4-80 or equivalent);
(iv) clean drinking water to all workers;
(v) dust suppression measures at the worksite as required;
(vi) adequate drainage throughout the camps to ensure that disease vectors such as stagnant water bodies and puddles do not form; and
(vii) sanitary latrines in construction site, which will be periodically cleared by the Contractor to prevent outbreak of diseases.

The Department of Hygiene and Environmental Protection of the MoH as well as WB policies require an awareness campaign on the avoidance of HIV/AIDS and STD involving both the local community and the construction workers. To this regards the Contractor should coordinate this with the AIDS Centre in Baku to obtain practical advice.

### 5.1.13 Traffic Management and Control

During construction the Contractor will be responsible for the permanent free flow of traffic in both directions. Traffic safety measures must be in accordance with the ‘Instruction on Traffic Management in the Places of Works Execution on the Roads of Azerbaijan’.

The Contractor will appoint a suitably qualified Traffic Safety Specialist from his team, who will be responsible for keeping a high standard of traffic safety throughout the construction period.

The Traffic Safety Specialist will

- Analyse the Project with regard to specific effective traffic safety requirements;
- Regularly check the construction site, storage sites and use of plan and equipment and transportation of construction materials to assure compliance with traffic safety norms;
- Eliminate all failures and drawbacks that may occur at the site;
- exercise coordination between the Engineer and road police on the matters of traffic safety;
- provide weekly training on traffic safety measures to workers and employees.

Prior to the beginning of works the Contractor shall submit a Traffic Management Plan to the Engineer. This plan includes schemes of the proposed organization of traffic and traffic control, including a description of all construction details, the proposed temporary means of traffic control and road signs related to the program of works.

### 5.1.14 Community Impacts

The Contractor shall submit to ESS and CSC a plan (mechanism and organizational structure) 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.). The use of local labor for employment during the construction will increase benefits to the local community and contribute to the overall acceptance of the Project.
During transport of borrow materials and spoils, damage to access or haul roads is expected. The Contractor shall be responsible for the rehabilitation of such roads to their prior condition and to the satisfaction of the local authorities. The Contractor will comply with contract procedures and specifications and shall ensure compliance of his subcontractors to applicable contract provision. The CSC shall monitor compliance of the Contractor with contract specifications.

5.2 Operation Impacts and Mitigation

5.2.1 Traffic Safety

During the operation stage of the Project, accident rates may increase as a result of increased speeds and unsafe driver behavior. The Project design includes road signs and markings, guardrails, improved horizontal alignments and traffic control structures, replacement of unsafe bridges, and provision of pedestrian facilities which all together will contribute to improve operational safety of the road. Moreover, pedestrian and animal crossings will be provided, which so far have been significant sources of accidents on the M4. To become effective and to ultimately reduce accident rates on the M4 regular speed control should be envisaged by traffic police.

As a result of improved road overall economic conditions the average age of the car fleet is expected to decrease, which will ultimately result in reduced rates of ambient air and noise pollution per vehicle.

5.2.2 Air Pollution and Noise

Calculation of the expected levels of vehicle emissions during Project operation was not undertaken. It is expected, however, that the projected increase in traffic volume will result to higher noise levels and vehicular emissions.
6 ENVIRONMENTAL MANAGEMENT PLAN

6.1 Institutional Arrangements and Reporting

To ensure that the proposed mitigation measures will be carried out by the Contractors during the construction stage, the design consultant will clearly set out in the tender and contract documents the Contractor’s obligation to undertake environmental mitigation measures as specified in the Environmental Mitigation Plan in Annex A (to be appended to Contract specifications);

The cost for the recommended environmental mitigation measures will, where possible, be made separate items in the Bill of Quantities. Such allocation of a separate budget for carrying out environmental mitigation measures will be crucial to assure their ultimate implementation. During procurement, contractors will be specifically encouraged to include these costs in their rates and present the mitigation cost as a line item in the Bill of Quantities.

ARS, upon receiving the draft detailed design documents from the consultant will verify that all environmental mitigation measures have been incorporated into the technical specifications and allocate appropriate budget to undertake environmental monitoring during the implementation phase.

The Contractor will be responsible for the implementation of environmental mitigation measures during construction and shall employ an environment, health and safety manager (EHS) who will supervise implementation of the contractor’s environmental responsibilities and coordinate with the ESS and the district ARS. The EHS 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, complaints received and actions taken as well as other environmental issues relating to the Project.

The Contractor, in coordination with the CSC, shall set-up a grievance redress committee that will address any complaints during project implementation.

During construction, the CSC’s Project Manager will include one Environmentalist for a period of at least 4 months of the total construction period to monitor and evaluate the environmental aspects of the Project.

During project implementation, the ESS shall monitor the compliance of the Contractor with the EMP provisions. The ESS will also be responsible checking that all necessary environmental approvals and permits that are required under Azeri legislation are obtained by the Contractor.

Permits / licenses will be required for:
- Quarries and borrow operations (MENR);
- Asphalt plant operations (MENR);
- Material stockpiles (local Authority) and
- Tree cutting (MENR).

Reporting: The Contractor, with support from his EHS, will produce monthly reports on the status and implementation of environmental protection measures and submit these reports to the CSC/ESS. The ESS shall provide quarterly reports to ARS and the MENR regarding the status of implementation of mitigation measures by the Contractors, additional mitigation measures that may need to be implemented, incidents of non-compliance with applicable environmental permits, complaints received from local residents, etc. and how these were addressed.
During project implementation, the ARS (through the PIU) will report to the IBRD every three months on the progress of the Project by submitting progress report based on the monitoring report submitted by the ESS/CSC and the Contractor.

Upon Project completion, the ARS will be in charge of the operation and maintenance of the Project Road. Routine and random monitoring will be regularly undertaken by ARS district offices (Annex B).

The MENR will conduct random monitoring of the Project to assess compliance with required mitigation measures and applicable environmental laws and regulations.

The following table summarizes the various institutional responsibilities for the implementation of the environmental management plan.

Table 4: Responsibilities for Implementing the Environmental Management Plan

<table>
<thead>
<tr>
<th>Project Stage</th>
<th>Responsible Organization</th>
<th>Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detailed Design</td>
<td>ARS</td>
<td>Verify that all mitigation environmental mitigation measures are incorporated into the technical specifications</td>
</tr>
<tr>
<td></td>
<td>ARS and MENR</td>
<td>Review and approve proposed environmental mitigation and management measures</td>
</tr>
<tr>
<td></td>
<td>Investment Department of ARS</td>
<td>Allocate appropriate budget to undertake environmental monitoring</td>
</tr>
<tr>
<td>Construction</td>
<td>Contractor (with the support of its EHS Manager)</td>
<td>Implement required environmental measures and submit monthly reports to ESS regarding status of such implementation. Formulate a grievance redress committee in coordination with the CSC.</td>
</tr>
<tr>
<td></td>
<td>ESS with the assistance of CSC</td>
<td>Supervise contractor’s implementation of environmental measures on a daily basis. Enforce contractual requirements</td>
</tr>
<tr>
<td></td>
<td>ESS and CSC</td>
<td>Audit construction phase through environmental inspections and collect monitoring data. Submit quarterly reports to ARS and the MENR</td>
</tr>
<tr>
<td></td>
<td>CSC</td>
<td>Assist the contractor in setting up a grievance redress committee; Provide awareness/training to workers and technology transfer to the contractor.</td>
</tr>
<tr>
<td></td>
<td>ESS and CSC</td>
<td>Ensure compliance with Government legal requirements during construction; Review complicated issues arising from the Project.</td>
</tr>
<tr>
<td></td>
<td>ARS</td>
<td>Submit quarterly progress reports to WB</td>
</tr>
<tr>
<td></td>
<td>MENR and MOH</td>
<td>Undertake periodic monitoring of the project</td>
</tr>
<tr>
<td>Operation</td>
<td>ESS / District Maintenance Unit</td>
<td>Undertake routine environmental monitoring and prepare corresponding reports.</td>
</tr>
</tbody>
</table>
6.2 Environmental Mitigation and Monitoring Program

The environmental mitigation and monitoring program presented in Annexes A and B has been designed to ensure that impacts that may result from the Project are properly addressed and that environmental controls are implemented during the construction and operation phases of the Project.

6.3 Cost Estimate

The estimated cost for implementing the mitigation measures and monitoring plan are provided in the table below. Costs during construction shall be in the Contractor's civil work's package.

Table 5: Environmental Mitigation and Monitoring Cost

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit</th>
<th>Qty</th>
<th>Unit Cost</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tree planting</td>
<td>nr</td>
<td>150</td>
<td>150</td>
<td>22,500</td>
</tr>
<tr>
<td>Dust Control</td>
<td>l.s.</td>
<td>1</td>
<td>50,000</td>
<td>50,000</td>
</tr>
<tr>
<td>Stripping of top soil (0-200 mm) and storage for reuse</td>
<td>m³</td>
<td>39,000</td>
<td>2,5</td>
<td>97,500</td>
</tr>
<tr>
<td>Conduct of seminar/orientation on HIV, AIDS and STD awareness</td>
<td>lump sum</td>
<td>1</td>
<td>18,000</td>
<td>18,000</td>
</tr>
</tbody>
</table>

Environmental Costs - Civil Works (included in contractor's civil work package)a

<table>
<thead>
<tr>
<th>Assignment of an EHS Manager</th>
<th>month</th>
<th>18</th>
<th>2,000</th>
<th>36,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>224,000</td>
<td></td>
</tr>
</tbody>
</table>

a estimated cost during the construction period (1.5 years)

The table below presents the schedule for implementation of various environmental requirements during different phases of the Project.

Table 6: Implementation Schedule

<table>
<thead>
<tr>
<th>Project Phase</th>
<th>Issue</th>
<th>Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detailed design</td>
<td>Inclusion of engineering measures to improve environmental performance</td>
<td></td>
</tr>
<tr>
<td>Prior to commencement of construction activities</td>
<td>ESS (with assistance from CSC) to review and approve contractor's method statements</td>
<td>once</td>
</tr>
<tr>
<td>During construction</td>
<td>Monitoring</td>
<td>Refer to Annex B</td>
</tr>
<tr>
<td>During construction</td>
<td>Reporting: Contractor to ESS, ESS to ARS/MENR, ARS (through PIU) to IBRD</td>
<td>monthly quarterly quarterly</td>
</tr>
<tr>
<td>During Operation</td>
<td>Monitoring</td>
<td>Refer to Annex B</td>
</tr>
</tbody>
</table>
7 STAKEHOLDER CONSULTATION AND INFORMATION DISCLOSURE

7.1 Stakeholder Consultations

Consistent with the provisions of the WB’s OP/BP 4.01, both informal and formal public consultations were conducted in settlements along the study section.

The detailed design Consultant organized a meeting on the 4th of September with MENR (Ms. Tatyana Javanshir and Ms. Rafiga Mirmofsumova) during the preparation of the environmental assessment report. MENR representatives presented their requirements for the report, which were mostly taken into account, keeping in mind the phase of the Project.

Informal public consultation was held on March, 19th 2008 by the Detailed Design Consultant at the study area. See Annex C.

The consultation will be coordinated by the Consultant through the Office of the Chief of the Road Transport Service Department, which in turn, will request the Local Executive Powers of Kurdamir and Ujar districts to invite local residents, village officials/representatives, NGOs and other stakeholders to the meetings. The consultations will possibly be held at the Office of the Local Executive Powers in Kurdamir and in Ujar. The Consultant will be represented by the team leader and the deputy team leader.

During the meeting, the team leader will introduce the Project and provide general technical details of the proposed road rehabilitation and present the results of the impact assessment along with the proposed environmental mitigation measures and monitoring plan. Annexes C to D will present the comments and corresponding response during the consultation.

7.2 Information Disclosure

The draft EA report will be presented to both the Government of Azerbaijan and the Bank and will serve as a background document for approval by the MENR. In accordance with OP/BP 4.01, ARS shall make the draft EA Report (in Azeri language) available at a place accessible to members of the public affected by the project and local NGOs. The ARS shall also officially transmit the EA report to the Bank in English for review and clearance. Once this is locally disclosed and officially transmitted by ARS the Bank will make the entire EA and summary version available to the public through their Infoshop before providing the ‘no objection’ to the financing.
### Annex A. MITIGATION MEASURES DURING DESIGN, CONSTRUCTION AND OPERATION

<table>
<thead>
<tr>
<th>Activity</th>
<th>Potential Impact</th>
<th>Mitigation measures</th>
<th>Institutional Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DETAILED DESIGN PHASE</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increased traffic</td>
<td>Increased pedestrian vs. vehicle accidents due to traffic volume and higher speed as a result of improved road</td>
<td>Integrate in the engineering design safety features such as speed control signs, proper road markings, streetlights, pedestrian crossing, livestock crossing and other visual means at the entrance and through the settlements, particularly along schools.</td>
<td>Design Consultants</td>
</tr>
<tr>
<td>Installation of asphalt plants</td>
<td>Sitting of asphalt plants may endanger the green areas (rows of trees and shrubs) and settlements and agricultural land.</td>
<td>Location of asphalt plants will be at least 500 m downwind of settlements and away from productive land and green areas. Such specifications shall be included in the tender documents.</td>
<td>Design Consultants ARS</td>
</tr>
<tr>
<td><strong>CONSTRUCTION PHASE</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Establishment and operation of contractor’s work camps</td>
<td>Potential soil and water pollution</td>
<td>Submit the following plans to ESS prior to establishment of the work camps and implement provisions of such plans:</td>
<td>Contractor ESS/CSC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Location map indicating distance to nearest settlement and layout of the work camp with details of the measures proposed to address adverse environmental impacts resulting from its installation and operation in compliance with construction norms BCH 8-89;</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Sewage management plan consistent with applicable national regulations.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Waste management plan consistent with applicable national regulations. Provide information on the proposed organization of waste collection and disposal, provide arrangements for various types of wastes (e.g., domestic waste, used tires, etc.);</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 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</td>
<td></td>
</tr>
<tr>
<td>Competition for water resources</td>
<td>Prior to establishment of the work camps, conduct consultations with local authorities to identify sources of water that will not compete with the needs of the local population.</td>
<td></td>
<td>Contractor ESS/CSC</td>
</tr>
</tbody>
</table>
# Annex A. MITIGATION MEASURES DURING DESIGN, CONSTRUCTION AND OPERATION

<table>
<thead>
<tr>
<th>Activity</th>
<th>Potential Impact</th>
<th>Mitigation measures</th>
<th>Institutional Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation of borrow areas</td>
<td>Disfigurement of landscape and damage to access roads</td>
<td>Secure MENR’s approval for the operation of the borrow areas. Prior to operation of borrow area, submit a plan to ESS indicating the location of the proposed extraction site as well as rehabilitation measures and implementation schedule for the borrow areas and access roads. Undertake rehabilitation of access roads upon project completion.</td>
<td>Contractor ESS/CSC</td>
</tr>
<tr>
<td>Increased dust emission</td>
<td></td>
<td>Prior to operation of borrow area, 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. Wet aggregates and/or provide cover on haul trucks to minimize dust emission and material spillage.</td>
<td>Contractor ESS/CSC</td>
</tr>
<tr>
<td>Siltation and obstruction of watercourses</td>
<td>Locate stockpiles away from watercourses.</td>
<td></td>
<td>Contractor ESS/CSC</td>
</tr>
<tr>
<td>Siting and operation of asphalt plant</td>
<td>Odor emission and safety risks</td>
<td>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.</td>
<td>Contractor ESS/CSC</td>
</tr>
<tr>
<td>Water pollution due to spilled bitumen</td>
<td></td>
<td>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.</td>
<td>Contractor ESS/CSC</td>
</tr>
</tbody>
</table>
## Annex A. MITIGATION MEASURES DURING DESIGN, CONSTRUCTION AND OPERATION

<table>
<thead>
<tr>
<th>Activity</th>
<th>Potential Impact</th>
<th>Mitigation measures</th>
<th>Institutional Responsibility</th>
</tr>
</thead>
</table>
| **Establishment and operation of contractor’s work camps (continuation)** | Health and safety risks to workers and adjacent communities | Secure approval from the MoH’s Central Disinfection Centre and the District Disinfection Centre on the general living conditions and sanitary provisions in the worker’s camp. Provide the following:  
- adequate health care facilities (including first aid facilities) within construction sites;  
- training of all construction workers in basic sanitation and health care issues, general health and safety matters, and on the specific hazards of their work;  
- personal protection equipment for workers, such as safety boots, helmets, gloves, protective clothing, goggles, and ear protection in accordance with SNIP III 4-80;  
- clean drinking water to all workers;  
- adequate protection to the general public, including safety barriers and marking of hazardous areas in accordance with Safety Regulations for Construction, Rehabilitation and Maintenance, 1978;  
- safe access across the construction site to people whose settlements and access are temporarily severed by road construction;  
- adequate drainage throughout the camps so that stagnant water bodies and puddles do not form;  
- sanitary latrines and garbage bins in construction site, which will be periodically cleared by the contractors to prevent outbreak of diseases. Where feasible the contractor will arrange the temporary integration of waste collection from work sites into existing waste collection systems and disposal facilities of nearby communities;  
- awareness campaign on the avoidance of HIV/AIDS and STD involving both the local community and the construction workers | Contractor  
ESS/CSC |
| **Operation of equipment maintenance and fuel storage areas** | Water pollution | Submit to ESS a description and layout of equipment maintenance areas and lubricant and fuel storage facilities including distance from water sources and irrigation facilities. Locate storage facilities for fuels and chemicals away from watercourses. Such facilities will be bounded and provided with impermeable lining to contain spillage and prevent soil and water contamination. Store and dispose waste/used oil consistent with MENR requirements. | Contractor  
ESS/CSC |
### Annex A. MITIGATION MEASURES DURING DESIGN, CONSTRUCTION AND OPERATION

<table>
<thead>
<tr>
<th>Activity</th>
<th>Potential Impact</th>
<th>Mitigation measures</th>
<th>Institutional Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earthworks and various construction activities</td>
<td>Loss of topsoil</td>
<td>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 protected against wind or water erosion. 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.</td>
<td>Contractor ESS/CSC</td>
</tr>
<tr>
<td></td>
<td>Siltation and obstruction of watercourses and drainage due to improper disposal of excess materials</td>
<td>Conduct consultation with local authorities and landowners on the selection of disposal sites and secure MENR's approval. All reclaimed asphalt pavement (estimated at 20,000 m³) will be recycled for the construction of new pavement to reduce the volume of spoils that need to be disposed of. Transport excess materials to the final disposal sites as extraction proceeds to minimize exposure to the elements that could cause erosion. Prevent earthworks and stone works related to road construction from impeding the flow of rivers / streams and canals or existing irrigation and drainage systems. Hire local groups to undertake cleaning of drains during the construction period.</td>
<td>Contractor ESS/CSC</td>
</tr>
<tr>
<td>Dust emission along routes to and from final disposal sites</td>
<td>Dust emission along routes to and from final disposal sites</td>
<td>Regularly spray water on haul roads to suppress dust, especially along sections that will pass close to settlements.</td>
<td>Contractor ESS/CSC</td>
</tr>
<tr>
<td>Competition for water resources</td>
<td>Competition for water resources</td>
<td>Conduct consultation with local authorities to identify sources of water (for spraying and other construction requirements) that will not compete with the local population.</td>
<td>Contractor ESS/CSC</td>
</tr>
<tr>
<td>Air pollution due to exhaust emission from the operation of construction machinery</td>
<td>Air pollution due to exhaust emission from the operation of construction machinery</td>
<td>Maintain construction equipment to good standard 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).</td>
<td>Contractor ESS/CSC</td>
</tr>
<tr>
<td>Disturbance of adjacent settlements due to elevated noise levels</td>
<td>Disturbance of adjacent settlements due to elevated noise levels</td>
<td>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.</td>
<td>Contractor ESS/CSC</td>
</tr>
<tr>
<td>Soil compaction due to operation of heavy equipment</td>
<td>Soil compaction due to operation of heavy equipment</td>
<td>Confine operation of heavy equipment within the ROW, as much as possible, to avoid soil compaction and damage to agricultural land.</td>
<td>Contractor ESS/CSC</td>
</tr>
<tr>
<td>Social grievance</td>
<td>Social grievance</td>
<td>Formulation of a grievance redress committee in association with affected population before starting the civil work.</td>
<td>Contractor ESS/CSC</td>
</tr>
</tbody>
</table>
## Annex A. MITIGATION MEASURES DURING DESIGN, CONSTRUCTION AND OPERATION

<table>
<thead>
<tr>
<th>Activity</th>
<th>Potential Impact</th>
<th>Mitigation measures</th>
<th>Institutional Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earthworks and various construction activities</td>
<td>Traffic impairment</td>
<td>Submit traffic management plan to local traffic authorities prior to mobilization. Provide information to the public about the scope and schedule of construction activities and expected disruptions and access restrictions. Allow for adequate traffic flow around construction areas. Provide adequate signalisation, appropriate lighting, well-designed traffic safety signs, barriers and flag persons for traffic control.</td>
<td>Contractor</td>
</tr>
<tr>
<td>Temporary disturbance of small roadside businesses (kiosks/wooden stalls) that are positioned very close to the road.</td>
<td></td>
<td>The stalls for selling local products and meat can be easily lifted and transferred outside the construction areas. Assistance for physical relocation of roadside stalls/kiosks shall be provided.</td>
<td>Contractor</td>
</tr>
<tr>
<td>Impairment of surface water quality</td>
<td></td>
<td>Submit a method statement or plan for the execution of bridge construction works including measures that will be undertaken to address adverse environmental impacts such as erosion of river embankment and siltation of watercourses that may result from such activities. Install cofferdams, silt fence, sediment barriers or other appropriate devices to prevent migration of silt during excavation and boring operation within rivers or streams. Avoid &quot;dropping the bridge&quot; into rivers/streams. This will be done by &quot;sawing&quot; appropriate sections of the bridge and using cranes to lift these sections or alternatively construct a platform onto which the bridge could be dropped. 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.</td>
<td>Contractor</td>
</tr>
</tbody>
</table>

### OPERATION PHASE

<table>
<thead>
<tr>
<th>Activity</th>
<th>Potential Impact</th>
<th>Mitigation measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased traffic flow</td>
<td>Elevated levels of gaseous and noise emissions due to increased traffic</td>
<td>Along sections of the road with sensitive receptors such as settlements and schools, provision of roadside vegetation using densely leafed shrubs and trees should provide some attenuation. The ESS of ARS recommended planting of species are suitable for the area</td>
</tr>
</tbody>
</table>
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 sites proposed for material extraction. The plan should also provide a description on the transport routes proposed and provide information on any settlements and their respective distance to the haul route;

- A dust management plan which shall include schedule for spraying on access road and details of the equipment to be used

- Layout of the work camp and details of the proposed measures to address adverse environmental impacts resulting from its installation. The plan shall be consistent with the provisions of the construction norms BCH 8-89

- A sewage management plan for provision of sanitary latrines and proper sewage collection and disposal system to prevent pollution of watercourses

- A 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 regulations

- 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

- A Soil Management Plan detailing measures to be undertaken to minimize effects of wind and water erosion on stockpiles of topsoil and excess materials, measures to minimize loss of fertility of top soil, timeframes, haul routes and disposal sites for excess materials.

- A plan for the execution of bridge construction works including measures that will be undertaken to address adverse environmental impacts such as erosion of river embankment and siltation of watercourses that may result from such activities.

- An emergency response plan (in case of spills, accidents, fires and the like) for the operation of the asphalt plant;

- A plan (mechanism and organizational structure) 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.).

- A method statement stating how and when the HIV/AIDS campaign is going to be carried out and how the AIDS Centre in Baku will be involved in setting up the campaign;

- Grievance redress procedures describing the mechanism and the means by which the local population can raise grievance on the construction process and how these can be addressed.
## Annex B. ENVIRONMENTAL MONITORING PLAN

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Parameters to be monitored</th>
<th>Location</th>
<th>Methodology</th>
<th>Timing</th>
<th>Institutional Responsibility for Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permits/Clearances</td>
<td>Existence of permits from MENR for borrow areas, asphalt plants, disposal sites and tree cutting as well as clearance from the MOH for establishment and operation of work camps.</td>
<td></td>
<td>Inspection</td>
<td>Before commencement of site works or installation of facilities</td>
<td>ESS/CSC</td>
</tr>
<tr>
<td>Contractor’s yard</td>
<td>Solid waste handling and disposal facilities</td>
<td>Contractor’s yard</td>
<td>Inspections, observations</td>
<td>Unannounced inspections during construction</td>
<td>ESS/CSC</td>
</tr>
<tr>
<td></td>
<td>Drainage conditions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sanitation facilities and sewage disposal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Health facilities</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equipment maintenance and fuel storage areas</td>
<td>Storage and handling practices</td>
<td>Contractor’s yard</td>
<td>Inspections, observations</td>
<td>Unannounced inspections during construction</td>
<td>ESS/CSC</td>
</tr>
<tr>
<td></td>
<td>Condition of storage facilities of fuel, lubricants and paints</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Spillage</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Drainage conditions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Borrow areas and access roads</td>
<td>Watercourses in the vicinity (obstruction, siltation, etc.)</td>
<td>At site and access roads</td>
<td>Inspections, observations, consultation with nearby communities</td>
<td>Unannounced inspections during construction and after complaint</td>
<td>ESS/CSC</td>
</tr>
<tr>
<td></td>
<td>Dust emission along access roads, particularly near settlements.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asphalt plant</td>
<td>Exhaust fumes</td>
<td>At site</td>
<td>Inspections, observations, consultation with nearby communities</td>
<td>Unannounced inspections during construction and after complaint</td>
<td>ESS/CSC</td>
</tr>
<tr>
<td>Worker’s Safety</td>
<td>Provision and use of appropriate personnel safety equipment</td>
<td>Job site</td>
<td>Inspections; observations and interviews</td>
<td>Unannounced inspections during construction</td>
<td>ESS/CSC</td>
</tr>
</tbody>
</table>
## Annex B. ENVIRONMENTAL MONITORING PLAN

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Parameters to be monitored</th>
<th>Location</th>
<th>Methodology</th>
<th>Timing</th>
<th>Institutional Responsibility for Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top soil preservation and final disposal site of excess materials</td>
<td>Stockpiling and means of protection</td>
<td>Job site</td>
<td>Inspections, observations</td>
<td>Upon preparation of the construction site, after stockpiling and after completion of works on embankment slopes</td>
<td>ESS/CSC</td>
</tr>
<tr>
<td>Traffic safety</td>
<td>Existence of traffic management plan approved by the local traffic authority</td>
<td>Job site</td>
<td>Inspection,</td>
<td>Before commencement of site works</td>
<td>ESS/CSC</td>
</tr>
<tr>
<td></td>
<td>Implementation of various provisions in the traffic management plan.</td>
<td>Job site</td>
<td>Inspection, observations and consultations with nearby communities</td>
<td>During construction period (twice a week, i.e., once during daytime and another during nighttime)</td>
<td>ESS/CSC</td>
</tr>
<tr>
<td>Worker’s education on HIV/AIDS and STD</td>
<td>Implementation of the awareness campaign and worker’s knowledge</td>
<td>Worker’s camp</td>
<td>Interviews</td>
<td>After beginning of works and at appropriate intervals throughout construction</td>
<td>ESS/CSC</td>
</tr>
<tr>
<td>Transport of materials</td>
<td>Dust emission</td>
<td>Throughout project road, access roads and construction</td>
<td>Inspections, consultation with communities</td>
<td>Unannounced inspections during construction</td>
<td>ESS/CSC</td>
</tr>
<tr>
<td>Bridge Construction</td>
<td>Compliance with the construction methods described in the method statement</td>
<td>Bridge construction sites</td>
<td>Meeting with contractor, inspections and observation</td>
<td>At the beginning of and during bridge construction</td>
<td>ESS/CSC</td>
</tr>
<tr>
<td></td>
<td>Surface water protection</td>
<td>Bridge construction sites</td>
<td>Inspections, observations</td>
<td>Unannounced inspections during bridge works</td>
<td>ESS/CSC</td>
</tr>
<tr>
<td>Various construction activities</td>
<td>Exhaust fumes and noise due to operation of heavy equipment</td>
<td>At site</td>
<td>Inspection, observations and consultations with nearby communities</td>
<td>Unannounced inspections during works</td>
<td>ESS/CSC</td>
</tr>
<tr>
<td>Provision of vegetation</td>
<td>Progress/status of provision of vegetation cover in erosion/landslide prone areas and roadsides along settlements, particularly in the vicinity of Maraza and Shamakhi</td>
<td>Along project road</td>
<td>Inspections, observations</td>
<td>Monthly during construction Quarterly during operation</td>
<td>ESS/CSC</td>
</tr>
</tbody>
</table>
## Annex C. Results of Public Consultation and List of Participants (location / date)

<table>
<thead>
<tr>
<th>Date (2008)</th>
<th>Stakeholders</th>
<th>Form of Consultation</th>
<th>Issue</th>
<th>Result</th>
</tr>
</thead>
</table>
| 19 March    | District, municipal and village officials, and some villagers of Kurdamir and Ujar | Meeting with officials and key informant survey and discussions | Road Rehabilitation and Perceived Impact | - Information on road reserve usage and inventory of structures along side of the road  
- Stakeholder/ community appreciation of the proposed rehabilitation  
- Obtained information on general SE of the area |
| 19 March    | Pedestrians, shepherd and fruit/livestock vendors | Discussion | Road Rehabilitation and Perceived Impact | - Information on road reserve usage  
- Stakeholder and community appreciation of the proposed rehabilitation  
- livelihood opportunities |

### Participants to the key informant interview, and local meetings/discussions

<table>
<thead>
<tr>
<th>No</th>
<th>Name, surname</th>
<th>Position</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Arzu Shahbazov</td>
<td>Socio-economic deputy of the head of executive power of Kurdamir</td>
<td>19 March, 2008</td>
</tr>
<tr>
<td>2</td>
<td>Gulamali Huseynov</td>
<td>Head of RMU (Road Maintenance Unit in Kurdamir)</td>
<td>19 March, 2008</td>
</tr>
<tr>
<td>3</td>
<td>Abbasov Boyukaga</td>
<td>Head of Garabucaq village municipality</td>
<td>19 March, 2008</td>
</tr>
<tr>
<td>4</td>
<td>Telman Samedov</td>
<td>Road side vendor</td>
<td>19 March, 2008</td>
</tr>
<tr>
<td>5</td>
<td>Mezahir Huseynov</td>
<td>Shepherd</td>
<td>19 March 2008</td>
</tr>
</tbody>
</table>