REPUBLIC OF AZERBAIJAN

AZERROADSERVICE OJC

Road Network Development Program:

Project of Dualization of Ganja-Gazakh-Georgian border Road

ENVIRONMENTAL ASSESMENT REPORT

2014

NIPPON KOEI UK
INTERNATIONAL CONSULTING ENGINEERS

CURRENCY EQUIVALENTS

(1 dekabr, 2014)

Currency unit	–	Azerbaijan New Manat (AZN)
1.00 AZN	=	1.27275 ABŞ
1.00 USD	=	0.78470 AZN

ABBREVIATIONS

ADB	–	Asian Development Bank
ARS	–	Azerbaijan Road Service
BTC		Baku-Tbilisi-Ceyhan Pipeline
EA	–	Environmental Assessment
EIA	–	Environmental Impact Assessment
EMP	–	Environmental Management Plan
EIRR	–	Economic Internal Rate of Return
EU	–	European Union
IFI	–	International Finance Institution
IUCN	–	International Union for the Conservation of Nature (World Conservation Union)
MENR	–	Ministry Of Ecology And Natural Resources
MFF	–	Multitranche Financing Facility
MOT	–	Ministry of Transport
NO_x	–	Nitrogen Oxides
OM	–	Operations Manual
PPE	–	Personal Protective Equipment
RCC	–	Reinforced Cement Concrete
RMU	–	Road Maintenance Unit
RNDP	–	Road Network Development Program
ROW	–	Right Of Way
RP	–	Resettlement Plan
SEIA	–	Summary Environmental Impact Assessment
SER	–	State Environmental Review
SC	–	Supervising Consultant
SPPRED	–	State Program on Poverty Reduction and Economic Development
SO_x	–	Sulphur Oxides
STD	–	Sexually transmitted Disease
TRACECA	–	Transport Corridor Europe-Caucasus-Asia
VOC	–	Volatile organic compound
WWF	–	World Wildlife Fund

WEIGHTS AND MEASURES

C – Centigrade
MW – Megawatt
m – Metre
m^2 – Square metre
m^3 – Cubic metre
km – Kilometre

VPD – Vehicles per day

TABLE OF CONTENTS

List of pictures

List of tables

I. Introduction

A. Overview and purpose of project

1. This Environmental Impact Assessment (EIA) report relates to the Dualization of Gazakh-Gerogia border Road. The Ganja-Gazakh-Georgia border road is a 130+150 km with considering the by-passes M-2 highway that links the capital city, Baku, to the east with the Georgian border to the west.

2. The purpose of this report is to clearly and fully describe the project and its likely effects on the environment in the project area, providing proposed mitigation measures for any negative impacts, and an outline Environmental Management Plan (EMP) for eventual use by the Contractor.

3. Improvement of the road network in Azerbaijan is recognised by the Government as being critical to the economic development of the country. As such the Ministry of Transport (MOT) initiated the Road Network Development Program (RNDP) in July 2006, which aims to upgrade and rehabilitate the road system[1] and to reform the management and operation practices currently in place, via training, private sector participation and the updating of procedures and regulations. The intended result of the program is a modern road network that provides safe, efficient, and sustainable transport which is in turn predicted to stimulate economic and social development.

4. The overall budget for the RNDP is 3.4 billion US Dollars over ten years. Of that sum, the Asian Development Bank (ADB) will be financing around 15 %, with the remainder financed by the Government and other International Finance Institutions (IFIs). The ADB finance is provided under a Multitranche Finance Facility (MFF)2. The Executing Agency is the Azeri Road Service (ARS) Open Joint Stock Company[3].

B. Report Structure

5. This report follows as closely as possible the outline structure provided in the Annex to Appendix 1 of the ADB Safeguard Policy Statement (2009) and Appendix 2 of the ADB Environmental Assessment Guidelines (2003). Where deemed necessary, section headings and content have been altered so as to best fit the characteristics of the project and project area.

C. Extent of EIA Study

6. This is the EIA for the *Dualization of Gazakh-Georgian border Road* as a part of the RNDP. It discusses the environmental impacts and mitigation measures relating to the location, design, construction and operation of all physical works proposed. The majority of the study was undertaken in September 2008 and July 2009 and September-October 2012 by National and International Environmental Specialists. Initial scoping suggested that due to the nature and location of the development, no specialist surveys were required, and the EIA was therefore based on two field reconnaissance surveys and information gathered from previous reports, domestic and international research and

[1] By constructing, upgrading, and rehabilitating around 9,500 km of 124 priority roads, comprising 3,570 km of 64 state roads and 5,928 km of 58 secondary roads

[2] An MFF establishes a partnership between ADB and a client for the purposes of working in a sector or sectors. It has features of a standby letter of credit, and can be used to extend debt finance and advice for (a) large stand-alone projects with interrelated components, (b) investment programs with interconnected components in a sector or sectors, and (c) credit lines for small and medium sized enterprises and local governments.

[3] Formerly called “The Road Transport Service Department” (The change of name took effect on 22nd February 2007)

monitoring institutions, and government information. Further information was provided via discussion with various stakeholders and officials.

7. Following the establishment in 2009 of a preferred alignment route via initial engineering study and environmental and social assessment, the more detailed engineering investigations carried out as part of the subsequent preliminary design study concluded that the selected route option for the Agstafa / Gazakh bypass was not economically feasible, and would demand extensive engineering solutions, due to the very rough nature of the terrain. A further visit was made by the International Environmental Specialist in March 2011 to review this change to the project design, and a third field visit was undertaken to view the revised alignment options. Full details of this process are provided in Section V- B (paragraph 135 onwards).The present draft report was duly updated to include the further work and analysis[4].

8. The completion of project is planned for 2 years since the commencement day of project. Azeri law and ADB policy require that the environmental impacts of development projects are identified and assessed as part of the planning and design process, and that action is taken to reduce those impacts to acceptable levels. This is achieved through the Environmental Assessment (EA) process, which has become an integral part of lending operations and project development and implementation worldwide.

[4] All data, legislation, sources etc, were also checked during the update exercise, and thus the present draft is fully up to date.

II. Description of Ganja-Gazakh-Georgia border road

A. Type, Category and Need

9. The Dualization of the Ganja-Gazakh Road is a transportation project, and as explained above it has been classified by ADB as Category A, principally due to the anticipated resettlement issues triggering the ADB *Policy on Involuntary Resettlement* (1995). Under ADB procedures such projects require an EIA to examine the project's potential impacts, and to recommend an environmentally sound project by comparing all possible alternatives.

10. Azerbaijan's road system plays a key role in the transport network of the Caucuses. From the capital city and port at Baku, there are strategic transport routes that run westwards to Georgia, Turkey and Western Europe, northwards to Russia and southwards to Iran

11. In its 2005 *Country Environmental Analysis for Azerbaijan* document, the ADB identifies the transport sector as one of 4 key strategic sector priorities, and highlights the urgent need for improving road transport links, reducing vehicular emissions and congestion, and improving road safety. The 2006 ADB document *Azerbaijan Country Strategy and Program Update* outlines the need to target development outside the oil sector, in particular regional economic growth and the development of the road network. The State Program on Poverty Reduction and Economic Development (SPPRED) has as one of its strategic pillars the improvement to infrastructure (roads, utilities and irrigation).

12. The present condition and layout of the M-2 highway are restraining factors on international and local trade, and therefore economic and social development. The project is needed primarily to address this situation and permit the economic growth of the region and country as a whole, by encouraging and facilitating local and international trade and travel, and reducing transport costs. The project will provide the necessary capacity to cater for the significant future increase in international traffic that is forecast as a result of the spectacular economic growth that has been generated by Azerbaijan's oil sector over the last four years.

13. Road safety in Azerbaijan is poor, and road safety on the Gazakh – Georgian border Road is well below the national average. The upgraded highway will offer marked improvements in road safety conditions that will make a significant contribution towards the promotion of regional economic growth and development in the regions of Azerbaijan that are presently lagging behind Baku's prosperity.

14. This report follows as closely as possible the outline structure provided in the Annex to Appendix 1 of the ADB *Safeguard Policy Statement* (2009) and Appendix 2 of the ADB *Environmental Assessment Guidelines* (2003). Where deemed necessary, section headings and content have been altered so as to best fit the characteristics of the project and project area.

15. The objectives of the dualization of the Ganja-Gazakh-Georgian border Road are to

- Provide the increased traffic capacity to that will assist in sustaining national economic growth in Azerbaijan and regional economic growth in the project area;
- Provide the significant improvement in road safety conditions on the Ganja-Gazakh-Georgian border road; and
- Minimize and mitigate short and long term environmental and social impacts of the presence of the highway within the project area.

16. Due primarily to safety issues [5] the dualization of the road will necessitate the construction of a several bypasses around existing settlements and villages

B. Location, Size and Implementation Schedule

17. The M-2 highway runs east-west between Azerbaijan's capital city, Baku, and the main border crossing into Georgia. The road is an important trade route, and forms part of the Transport Corridor Europe-Caucasus-Asia (TRACECA[6]). The present project is to be dualized project with 102+196 km of Ganja-Gazakh and 27+951 km of Gazakh-Georgia, totally it makes up 130+150km. Picture 1 describes the location of project.

18. Ganja is Azerbaijan's second largest city with a population of around 300,000 and is the regional centre for the western part of the country. Gazakh is one of Azerbaijan's large cities (699 km²) with a population of around 112,597. Apart from being an important international route, the Ganja – Gazakh-Georgia road is the also the region's primary traffic distributor, connecting the towns of Shamkir, Tovus and Agstafa to Ganja, Gazakh and Georgia.

19. The project road is presently a two lane single carriageway with a shoulder on either side but no median (central reservation[7]). The width of each lane and each shoulder is 3.75 m making a total road width of around 15 m. The existing road is situated on a Right of Way (ROW) that extends around 30 m on either side of the centre-point of the road. The total width of the existing road corridor is therefore 60 m. Picture 4 shows the configuration of the existing and proposed road.

20. Dualization of the road following the Russian design standard[8] will require the addition of a second 7.50 m carriageway and a 5 metre median, increasing the total road width from 15 m to 27.50 m. The increase in width is generally accommodated within the existing ROW but it is not presently known whether or not that ROW will be extended, meaning that whist the dualized road will be considerably wider than the present road, the total road corridor may remain the same width. The overall project size also includes the borrow pits required for aggregate extraction; land used for storage of materials and equipment, and any construction yards or camps.

21. As described above, the dualization of the road will necessitate the construction of a several bypasses around existing settlements and villages. At these locations a new strip of land at least 60 m wide will be required for the ROW along the entire length of each bypass section.

22. The completion of project is planned for 2 years since the commencement date of project.

[5] also due to encroachment of housing, noise levels and unacceptable corner radii.

[6] http://www.traceca-org.org/

[7] Full length of Ganja-Gazakh road with the existing road with single carrieagway was rehabilitated by using the financial means from the loan on World Bank Highway Road Project. These rehabilitation works include full restoration of road pavement as well as repair of the existing bridge and pipes. Restoration works were finished in 2004-2006 and carried out within the framework of four construction contracts.

[8] Re, SNiP 2.05.02-85 – Construction Norms and Standards Applied on Highways published in 1986 by the USSR State Committee on Construction Affairs. This design standard is currently adopted by AzerRoadService.

Picture 1. Map showing project location

C. Description of the Project

i. Description

23. Figure 2 and Table 3 show the various components of the infrastructure planned under this project. For ease of reference, the project is described in Table 1 and Table 2. The two main types of works proposed are:

The parallel widening of the existing road along roughly 45-700 km; and

The construction of around 56+496 km of new bypasses around the towns of Shamkir / Dallyar Dzheir, Asagi Ayublu and Agstafa / Gazakh[9/10] Konullu village.

For Gazakh-Georgia border section:

- The parallel widening of the existing road along roughly 13+454 km; and
- The construction of around 14+500 km of new bypasses around the villages of Yukharı Salahlı, I Shıkhlı.

24. The project will also include:

- 13 bridges covering the river Zeyemchay in Eyyublu and north part of Duyerli and the river Tovuzchay in the north of Tovuz which is being the biggest one;
- 44 underpasses for local access, and numerous drainage culverts;
- 22 interchanges, permitting traffic to safely cross, exit and join the dual carriageway road (see Figure 4);
- 12 flyovers, allowing minor roads to cross over the dual carriageway road; and
- 3 rest zones[11]
- Road marking, road signs and road furniture requirements for a four lane Category IB highway.

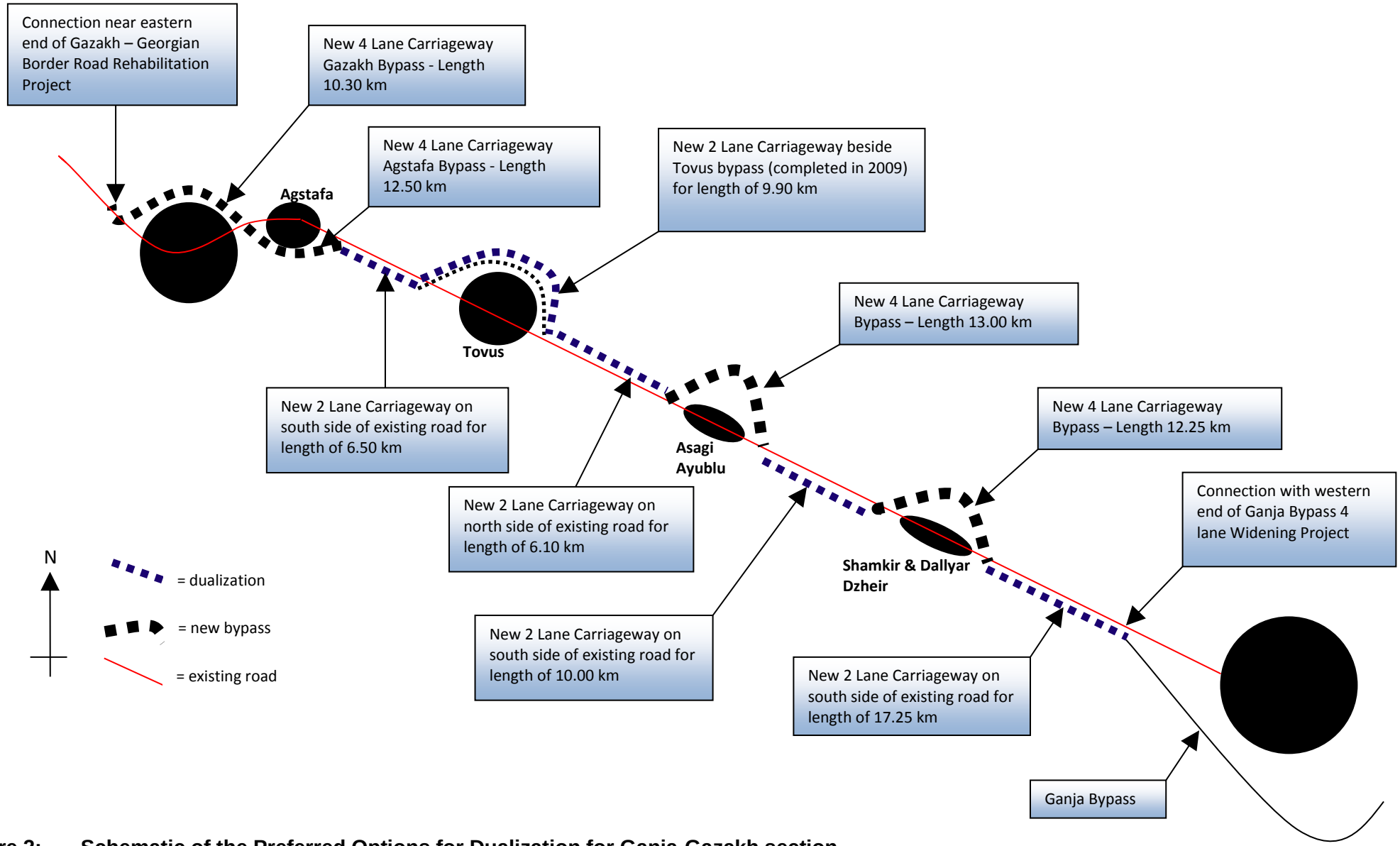
25. As well as the main dualization infrastructure, the project will also include a local road component. This component is yet to be defined but will essentially consist of minor alterations, repairs and periodic maintenance to local roads linking up to new interchanges, and running alongside the new road alignment.

[9] A new 10.6 km bypass around the town of Tovus and including a 300 m long river bridge has recently been completed and opened to traffic.

[10] At present it is not known whether the final project will include the Agstafa / Gazakh bypass, however to err on the side of caution, the EIA report has assumed that the Agstafa / Gazakh bypass will be included in the project.

[11] Rest zones include only parking and toilet. Other two rest zones include fuel station and café/restoran (the project does not include construction of these two structures).

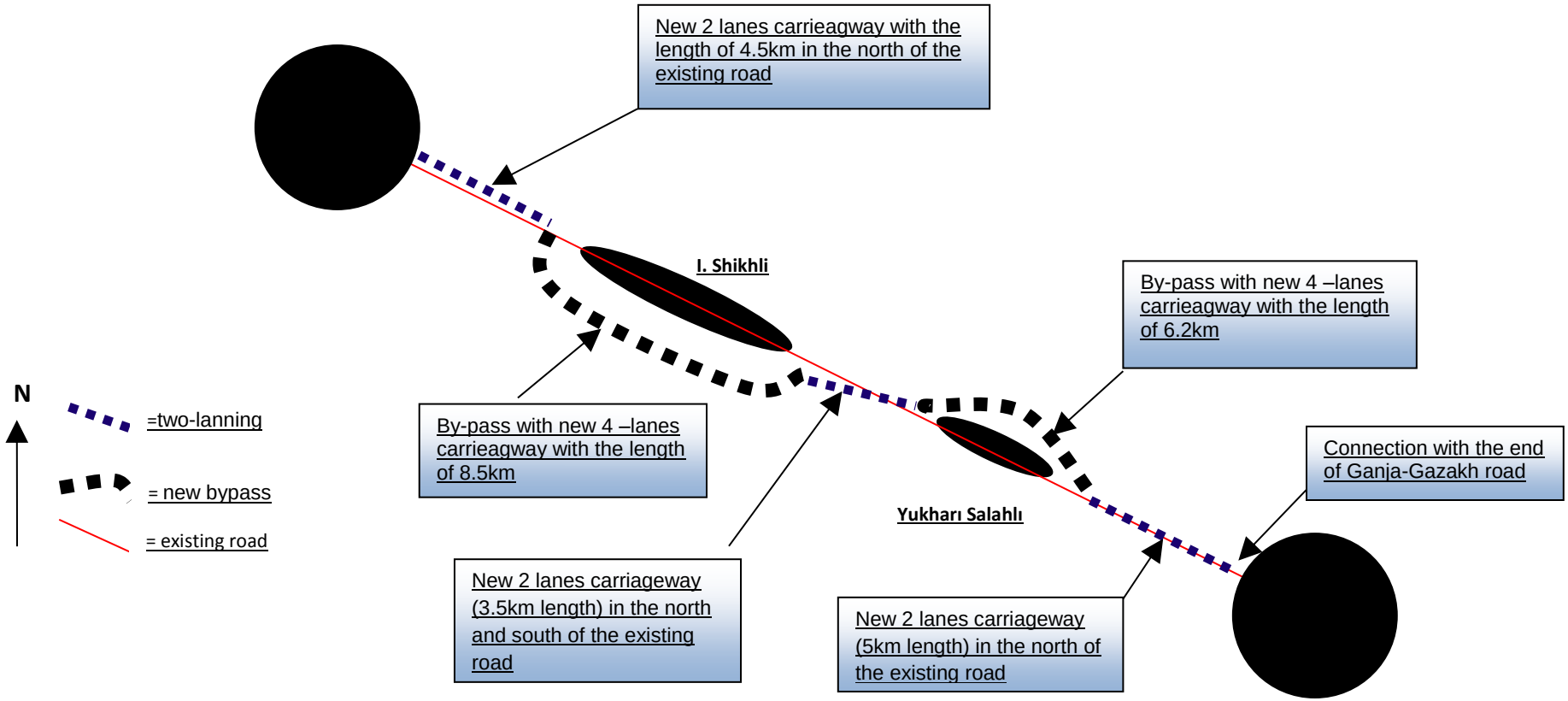
26. The infrastructure descriptions above are expected to be substantially correct, although certain details may change as development of the project design progresses from preliminary to detailed design.



Picture 2: Schematic of the Preferred Options for Dualization for Ganja-Gazakh section

Section No.	Dualization Option	Section Name	Description	Length of Parallel Widening (km)	Length of 4 Lane Bypass (km)	Width of New Road Section (m)
1	Parallel Widening	Ganja Bypass to Shamkir	Running on the south side of the existing road through open rangeland and scrub and agricultural land, passing three small settlements on the north side. Connects with four lane Ganja Bypass carriageway (under construction).	3.6	-	12.5
2	Bypass with four lane	Kurnelli bypass	Running through shruberry towards the south of Kurnelli village.		3.7	27.5
3	Parallel Widening	Kurnelli – Shemkir	Running on the south side of the existing road through mainly agricultural land	5.2		12.5
4	4 Lane Bypass	Shamkir Bypass	Running through agricultural land and wasteland on the north side of the existing development, to the north of the existing road	-	12.25	27.5
5	Parallel Widening	Shamkir to Asagi Ayublu	Running on the north or south side of the existing road mostly through agricultural land.	10.00	-	12.5
6	4 Lane Bypass	Asagi Ayublu Bypass	Running through agricultural land on the north side of the existing development to the north of the existing road and crossing the 500 metre wide flood plain of the Zagamcay river.	-	13.00	27.5
7	Parallel Widening	Asagi Ayublu to Tovus Bypass	Running on the north side of the existing road mostly through agricultural land.	6.10	-	12.5
8	Parallel Widening	Tovus Bypass	Running on the north side of the new Tovus Bypass mostly through agricultural land with a new 300 metre long river bridge alongside the recently completed bridge.	9.90	-	12.5
9	Parallel Widening	Tovus Bypass to Agstafa Bypass	Running on the south side of the existing road through agricultural land passing a small settlement on the north side.	4.80	-	12.5
10	Bypass with four lanes	Agstafa/Gazakh bypass	Running through agricultural land to the south of Agstafa and east of Vurgun, then to the north and west of Gazakh . The bypass crosses the Agstafacay river, passes Kosalar and then connects with the existing road (Georgian Border road rehabilitation project) around 8 kms north-west of Gazakh.	-	27.9	27.5
			Total Length (km)	**39.90**	**56.85**	

Table 1: Section Summary of the Preferred Options for Dualization of Ganja-Gazakh section



Picture 3: Schematic of the Preferred Options for Dualization for Gazakh-Georgian border

Section No.	Dualization Option	Section Name	Description	Length of Parallel Widening (km)	Length of 4 Lane Bypass (km)
1	Parallel Widening	Gazakh to Yukhari Salahli	Running parallel to the existing road through open rangeland and scrub and agricultural land. Connects with four lane Ganja - Gazakh highway (construction will start soon).	5 km	-
2	4 Lane Bypass	Yukhari Salahli bypass	Running through mainly the agricultural land on the north side of the existing road.	-	7
3	Parallel Widening	Yukhari Salahli to I Shikhli	Running on the north or south side of the existing road mostly through agricultural and scrubland, crossing the Injichai river .	2,5	-
4	4 Lane Bypass	I Shikihli Bypass	Running through mainly the open unused land, scrubland and through the agricultural lands on the southern side of the existing road.	-	8,5
5	Parallel Widening	I Shikhli to Georgian border	Running on the north side of the existing road mostly through agricultural land until the Georgian border.	4,6	-
			Total Length (km)	**12.1**	**15.5**

Table 2: Section Summary of the Preferred Options for Dualization, total of sections for Gazakh-Georgia border

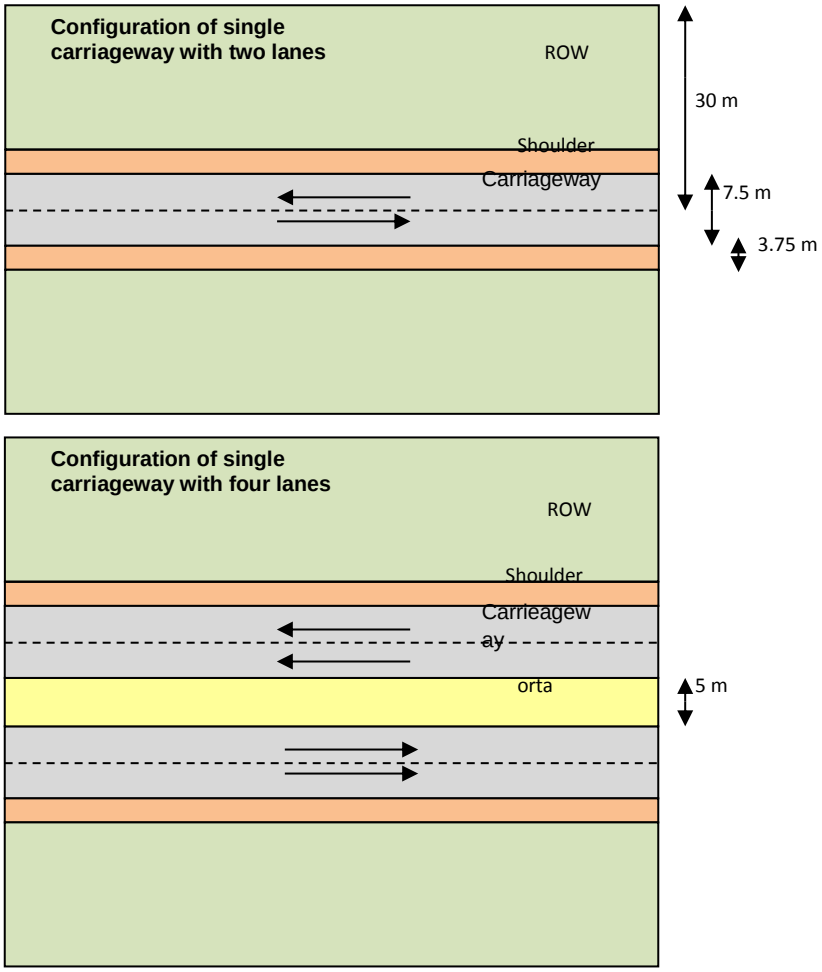
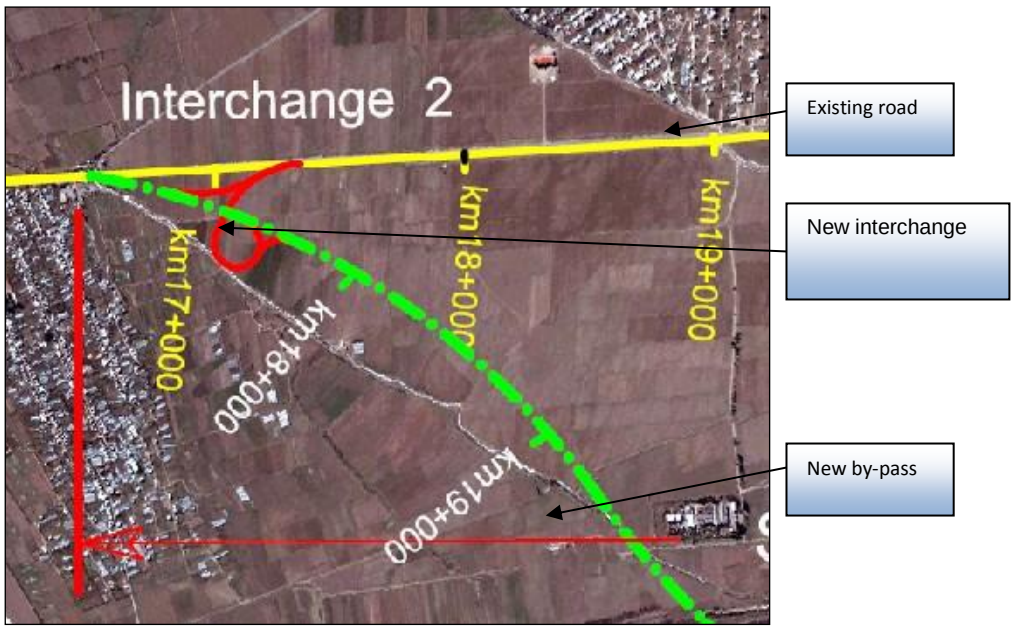


Figure 4: Schematic of Existing Single Carriageway (top) and Proposed Dual Carriageway (below)



Picture 5: Example Layout of Interchanges

27. The completed road will therefore comprise a *circa* 130+150 km four lane dual carriageway, of modern international standard, constructed with a median for safety,

and 79 interchanges. Motorists will be able to drive the length of the road between Ganja, Gazakh and Georgia quickly, smoothly, in safety and without posing a threat to oncoming vehicles or pedestrians. Figure 6 shows the overall alignment of the proposed upgrades[12].

ii. Construction

28. The proposed project will be constructed using standard road construction techniques and sequence and no novel or special techniques are expected to be employed. This section describes the probable construction method and sequence; the specifics will however be established at detailed design stage and cannot be fully anticipated.

29. It is expected that the eventual contractor will establish one or more yards along the road alignment. These would be used for office buildings, storage of materials and equipment (including plant) and mixing of concrete and asphalt. Some worker accommodation may also be located at these sites, although for the Ganja-Gazakh-Georgia road it is expected that most workers will find accommodation in local towns and villages.

30. The number and location of borrow pits (open pits from where aggregate is extracted) is somewhat dependent on the eventual contractor's planning, but all new borrow pits must be approved by MENR and must be located and operated in accordance with the various rules and regulations in place[13]. A number of pits already exist along the Ganja-Gazakh stretch of road (see Figure 6)

1. Paralle widening

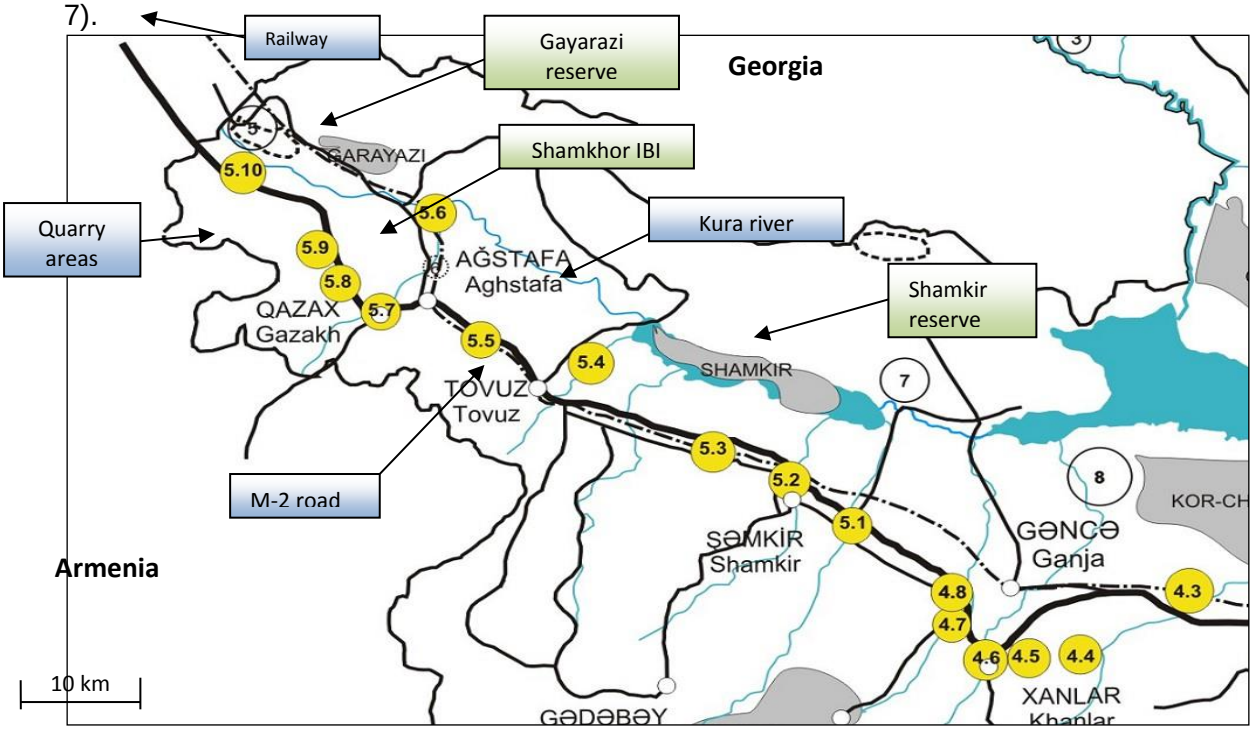
31. Construction will begin with the removal of topsoil and vegetation across a strip around 15 m wide alongside the existing road, using backhoe diggers and bulldozers. The topsoil will be stored on site for post-construction remediation or if not needed, will be removed for reuse or disposal.

32. Fill material, used to construct the road embankment, will then be brought to the site from borrow pits or other sources identified by the Contractor, using tipper trucks. These trucks will use the existing road for access. The fill will be placed along the alignment, positioned using graders and compacted using rollers and water sprinklers (see picture

[12] ADB (2003) requires that drawings and images from the feasibility study be included in the EIA. Overview alignment information is therefore included in Figure 6. Note that the route options have been altered following the Feasibility Study, and the latest route is shown in Fig 19.

[13] For more information on borrow pits and river bed extraction in Azerbaijan, see Niras (2008)

7).



Picture 6: Existing[14] borrow pits, reserves and bird habitats

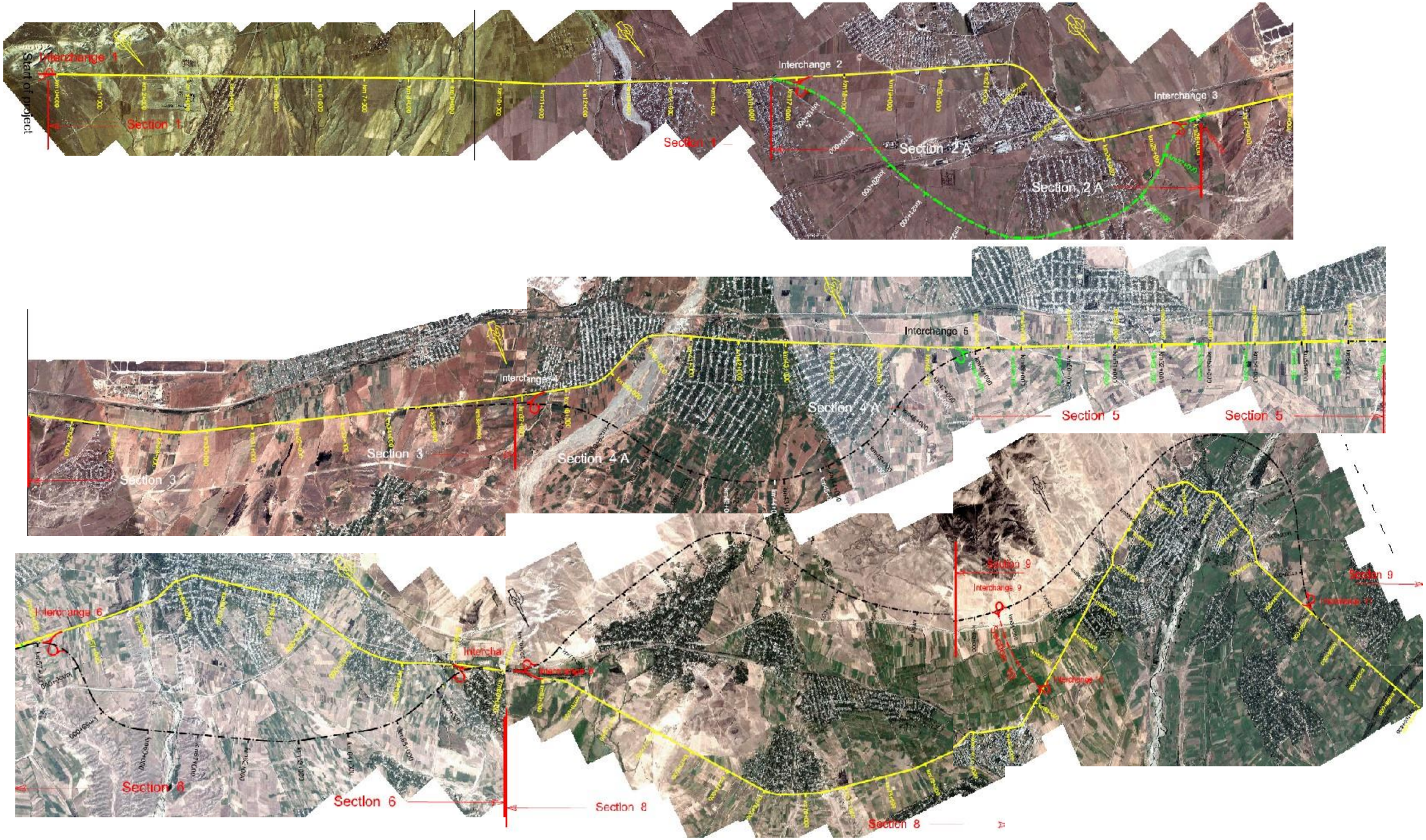
33. When the correct fill height has been achieved, the pavement (i.e. road surface) will be laid using road-laying machines in approximately 4 layers as follows[15]:

- Granular sub-base: c. 23 cm thick
- Asphalt base course: c. 15 cm thick
- Asphalt binder course: c. 8 cm thick
- Asphalt wearing course: c. 5 cm thick.

Picture 7: Road Construction along the M-2 Highway. Left shows Road-laying Machine; Right is a Roller

[14]Niras ilə uyğunlaşdırılmışdır (2008)

[15] Final layer numbers and thicknesses will depend on detailed design, contract specification and contractor methodology.



Picture 8: Satellite Imagery of Project Area Showing Existing and Proposed Route Alignments (from Feasibility Study)

34. The bitumen used for the asphalt will probably be produced in Azerbaijan as a product of oil refining and the aggregate for the asphalt mix will come from a site as yet unknown, as procurement of this material will be the Contractor's responsibility. The asphalt will be heated and mixed at the contractor's yard[16] prior to being transported on the existing road to the site for road-laying using tipper trucks.

35. Once the road pavement is completed, teams will install crash barriers where necessary, erect signage and will then paint the road markings. Road construction is a process that is plant-intensive, and involves perpetual movement of the working location, as teams pass along the alignment in sequence.

36. Due to the presence of the existing road alongside the new carriageway under construction, there will be no need for the construction of temporary roads on which to divert traffic; until the new carriageway is completed, traffic and construction vehicles will continue to use the existing road. This lack of requirement for temporary roads is beneficial to both road users and the environment, as even though the existing road was rehabilitated relatively recently, requiring temporary road diversions, some stretches alongside the existing road continue to show evidence of degradation.

2. Four lane Bypasses

37. The new sections of four lane bypass will be constructed in a very similar manner to the parallel widening of the existing road. The major differences will be that as the route will be passing through undisturbed land and not parallel to an existing road, access is somewhat restricted, and the work can only be carried out from either end of the bypass section[17]. The width of land to be cleared and the width of road to be constructed will be wider than on the sections to be dualized, and will follow roughly the widths detailed earlier in this report. As with the parallel widening sections, there is no need for temporary road construction to allow traffic to pass, as it will simply remain on the existing route until the works are finished and connections to the new bypasses are made.

1. Bridges, Flyovers and Interchanges

38. The construction of bridges, flyovers and interchanges will be carried out by dedicated teams simultaneously to the main road construction works. As with the road sections, the first step is to clear organic matter from the surface of the land. The foundations for the bridge piers will then be excavated by backhoe diggers[18]. Heavy-duty metal reinforcing rods will be placed into the voids, followed by a concrete and aggregate mix. The reinforcing rods will extend out of the foundations to create the structure of each pier (pillar), and these will then be encased in wooden shuttering, into which more concrete will be poured to form each pier. The pre-cast[19] Reinforced Cement Concrete (RCC) horizontal bridge sections will then be brought in from the manufacturing plant on large vehicles, placed into position by cranes and attached to the piers using heavy-duty bolts and concrete. The pre-cast concrete or steel safety barriers will also be positioned by crane at the edges of the bridge, after which the asphalt surface will be applied using road-laying machine and roller vehicles.

[16] Or yards, depending on eventual contract and contractors

[17] Unless suitable access roads lead to midpoints along the bypass alignments

[18] Where deeper footings are required, these are usually dug using a drilling machine or piling rig

[19] In some cases, particularly for smaller bridges, the bridge deck will be cast *in situ* rather than pre-cast off site

39. Cement for on-site casting of concrete will probably be sourced from the Garadagh Cement Company, located 40 km south of Baku. Aggregate and sand for the concrete mix will be sourced from borrow pits or other sources such as river beds. Concrete will be mixed at the Contractor's batching plant.

40. The overall construction, including dualization, bypasses and civil works such as bridges and culverts will be conducted by a team of between 300 to 500 workers, roughly divided as follows:

- 10% management and admin staff;
- 60% drivers and machine operators;
- 15% skilled workers; and
- 15% unskilled workers.

41. The numbers of trucks and other machinery such as graders will be entirely dependent on the Contractor's plan and cannot be estimated at the current project stage, however road construction is a plant intensive operation, so relatively large numbers will be required..

Iii Maintenance and operation

42. The new road sections, bridges and interchanges will have a design life of a minimum of 50 years, during which time they should require no major repair or refurbishment, beyond routine maintenance, to be carried out by ARS, and which will include:

- Monitoring of road pavement, bridges and interchanges, checking for stability and integrity and allowing remedial action if required;
- Small scale *ad hoc* repairs of surface damage caused by traffic use or accidents;
- Repairs and replacement of damaged safety barriers and signs;
- Periodic (5-7 yrs) assessment and maintenance work; and
- Unblocking / clearing of culverts and drainage ditches, etc.

43. If maintenance is not properly carried out within the required timeframes, the road, bridges and interchanges can be expected to deteriorate, and the life of the infrastructure may be reduced to 20 years or even less in extreme cases.

D. Traffic Analysis

44. To determine the likely future traffic levels and types on the project road, permitting an informed analysis of future demand, alternatives, road safety and assessment of potential environmental impacts, a future traffic forecast was carried out. The forecast was based on traffic surveys carried out in 2008[20]; the base data was weighted and factored according to GDP and population growth estimates, and the results provided a good insight into likely future traffic levels and characteristics along the project road. The average annual traffic growth rate for all vehicle types and all sections of the road was of the order of 10%.

45. In order to determine the influence of inclusion or emission of certain parts of project forecasting which includes the change correlation of route for the number of traffic to be passed

[20] The surveys included data gathering on vehicle numbers, type and origin/destination

through the towns or expected by-passed for different road sections and all altrenative configurtions. Projections were made for the provisional opening year and for 20 years after the opening year.

46. The forecasting, which included diversion ratios for expected vehicle numbers that would pass through towns or "divert" to a bypass, was carried out for all the different road sections and all the alternative configurations, so as to determine the effects of including or omitting certain parts of the project.

47. The results of the traffic analysis showed that:

- On current projections of a c. 10% growth, the traffic levels through Shamkir and Asagi Ayublu will soon be reaching unacceptable levels.

- The construction of the new bypasses will lead to a significant reduction in traffic levels in the urban areas of Shamkir, Asagi Ayublu and Agstafa. Traffic levels in these sections of road will be reduced by more than 50% and this will offer significant reductions in noise and air pollution. Traffic safety conditions for local residents will also improve.

- 2012 traffic levels in the section of road between Ganja and Gazakh are between 8,700 and 6,700 vehicles per day. In the section of road between Ganja and Gazakh, traffic levels drop to around 4,300 to 2,200 vehicles per day21.

- 2012 traffic on the 13.25 km long Gazakh Bypass, the final section of the project road is only 574 vehicles per day. This bypass traffic is restricted mostly to cars and articulated multi-axle trucks that will travel through to the international border to Georgia and Turkey.

48. A summary table of the traffic forecasting results is provided in Appendix 5[22].

[21] This figure is well below the normal threshold traffic limits for upgrading to 4 lanes, and Nippon Koei UK (2009a) does not recommend this bypass as presently viable. However as no decision has yet been made on the components to be included in the detailed design, this EIA study includes the Agstafa / Gazakh bypass.

[22] For further details, see Nippon Koei (2009a)

III. DESCRIPTION OF ENVIRONMENT

A. Summary of route

49. The existing road runs NW/SE along the intermontane Kura River valley[23] and passes through predominantly agricultural land. Areas that are not turned over to agriculture include urban and semi-urban areas, and two stretches of relatively sparsely vegetated grassland and rangeland. The routes of the proposed bypasses run through either agricultural land or scrubland with some small areas of degraded wasteland[24]. Table 3 provides a summary of the broad land use and land cover categories encountered, and Figure 9 shows typical environments in these categories. Table 3 provides a summary of the broad land use and land cover categories encountered, and Figure 9 shows typical environments in these categories.

Table 3: Summary of Major Land Use and Land Cover Categories along the Existing Road

Land-use Category	Broad Description	Total Length (km)	% of Total Road Length
Scrubland and bushes	Flat or gently undulating plains with sparse scrub vegetation (mainly wormwoods) and grasses, or bare open gravel flood plains. Punctuated with areas of human-influenced degradation.	27.4	21.05
Agricultural	Intensively farmed irrigated or semi-arid agricultural land that is turned over to growing wheat and other crops such as potatoes, alfalfa, sunflowers, apricots, grapes and tomatoes.	74.15	56.98
Semi-Urban	Agricultural land but with residential houses, shops, workshops, warehouses, and other small businesses along one side of the road, often within 20 metres of the road edge.	22	16.9
Urban	Built-up urban areas with a high density of residential, commercial and industrial activity on both sides of the alignment and in close proximity (often less than 10 metres) to the roadside	6.6	5.07
	Total	**130+150**	**100**

50. Reconnaissance surveys were undertaken along the existing road alignment and where possible along the route of the proposed bypasses. The summary of appropriate observations is provided at the end of this section, table 8.

[23] Also referred to as *the Kura Depression*

[24] For example to the North of Dallyar

Picture 9: The Four Major Land Use Categories Encountered Along the Existing and Proposed Road Alignments: Scrubland (top left); Agricultural (top right); Semi-Urban (bottom left); and Urban (bottom right)

B. Physical Resources

i. Climate

51. Azerbaijan has a widely varying climate due to the considerable differences in altitude and geomorphology throughout the country, and its situation on the northern extremity of the subtropics[25]. Further influence on the climate is provided by the Caspian Sea. Maximum temperatures can reach 44[26] degrees C and minimum temperatures can descend as low as minus 42[27] degrees C. Rainfall also varies widely, from 200 to 1,800 mm[28]. Despite these extremes, The Greater Caucasus range serves as natural barrier against cold air from the north, and the Lesser Caucasus holds back hot tropical air from the South. As a result of the moderating effect of the topography, most of the country can be classified as having a dry and warm subtropical climate.

[25] http://www.azerbaijan.az/_Geography/_Climate/_climate_e.html

[26] Recorded in Julfa

[27] Recorded in the Greater Caucasus

[28] http://www.azhydromet.com

52. As shown in Figure 10 the project area in the Kura valley lowlands shares a similar climate as Baku, where the sun shines for 2200 to 2400 hours a year. The average rainfall of the project area is slightly higher than that of Baku but still almost half the national average, at around 281 mm per annum.

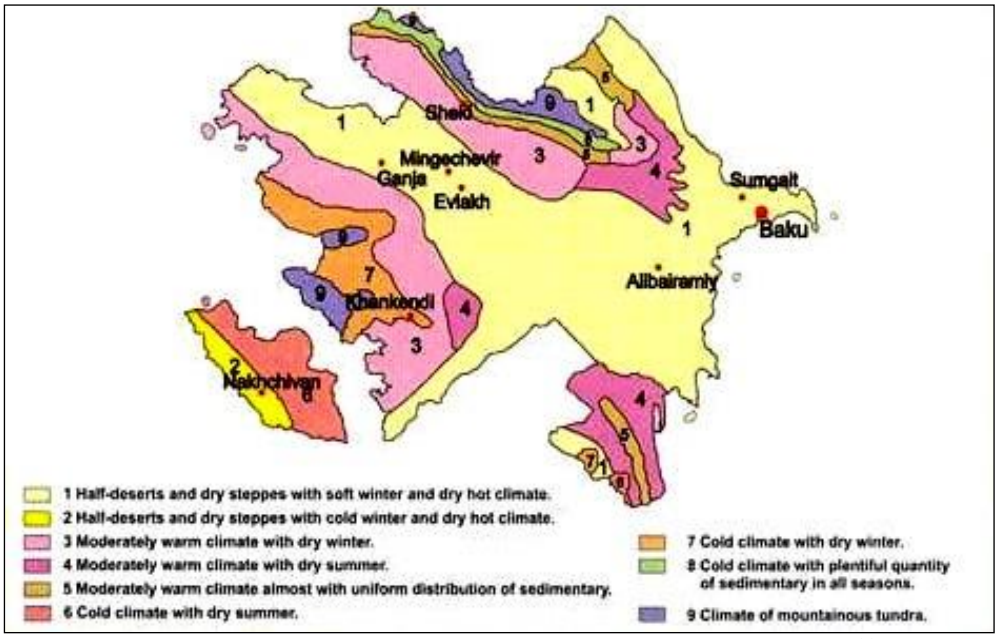


Figure 10: Climatic Zones of Azerbaijan [29]

i. Air quality

53. Air Quality across Azerbaijan is generally good, but in Baku and on the Apsheron peninsula, air quality is acknowledged as a serious problem[30]. The principal contributors to air pollution are industry and increasingly, motor vehicles[31] with over 60% of emissions originating from mobile sources[32]. According to data obtained (see Table 4a), daily air quality averages in Ganja are comparable to that of Baku, however it should be noted that only 4 (unusual) parameters are measured, and methods, accuracies and sample numbers are unknown. Visual assessment suggested that Ganja's air quality was considerably superior to Baku's. This is supported by Table 4b, which provides annual air quality data for some of the towns along the alignment, in addition to Baku. Table 4a appears to be far more representative of the real situation, with far higher levels of emissions in Baku than the Ganja-Gazakh region.

54. Due to high levels of agriculture and low levels of industry, air quality in the project area is generally very good. In the immediate environs of the road some deterioration of air quality is occasionally noticeable, in particular in the urban areas, but this remains insignificant in comparison to the Baku region, which has 40 times the total

[29] Based on http://azembassy.pl/index.php?section=24

[30] ADB (2005)

[31] UNECE (2004)

[32] The closure of many Soviet era industries and the cleanup of hydrocarbon industry facilities has helped to improve air quality, however this has been offset to some degree by a considerable increase in vehicle numbers and congestion. Many vehicles also lack catalytic converters.

emissions of the entire Ganja-Gazakh district. Ambient air quality standards in Azerbaijan are based on Soviet GOST standards[33] and are provided in Appendix 4.

Table 4 a: Comparison of Air Quality in Baku and Ganja[34]

	il	Average daily concentration of air pollutants, mg/m^3			
		Powder[35]	Sulfuric anhydride[36]	Carbon oxide[37]	Dust[38]
Average daily permissible limited concentration		***0,15***	**Average daily permissible limited concentration**		***0,15***
Baku	2003	0,2	0,036	2	0,06
	2004	0,2	0,025	2	0,06
	2005	0,15	0,021	2	0,05
	2006	0,2	0,02	2	0,04
	2007	0,2	0,015	2	0,05
Ganja	2003	0,3	0,032	-	0,03
	2004	-	0,032	-	0,04
	2005	-	0,033	-	0,03
	2006	-	0,036	-	0,03
	2007	0,2	0,034	-	0,03

Table 4 b: Air Pollutant Emissions from Stationary Sources for Baku and Ganja-Gazakh Regions in 2007 (in tonnes)

City	Total Emissions	Particulates	Gaseous and liquid matters	Sulfuric anhydride	Carbon oxide	Nitrogen tetroxide
Baku	***299429,7***	***14520,8***	***284908,9***	***2034,3***	***6936,4***	***4389,4***
Ganja-Gazakh	***6970,3***	***1993,8***	***4976,5***	***55,5***	***2839,1***	***872,7***
Agstafa	58,8	0,4	58,4	-	0,1	0,1
Dashkesen	53,2	23,6	29,6	3,1	24,4	2,1
Gedabey	3,1	1	2,1	0,7	0,7	0,3
Goranboy	18,7	1,4	17,3	0,2	1,9	0,2
Geygel	230,3	229	1,3	0,1	0,9	0,1
Gazakh	1869,1	853,4	1015,7	2,9	3,9	2,2
Shamkir	30,7	1,5	29,2	1,1	2,8	2
Tovuz	12,2	4,7	7,5	0,7	2,9	0,9
Ganja city	4694,2	878,8	3815,4	46,7	2801,5	864,8

[33] Pasillo (2007)

[34] Data provided by the National Monitoring Department, MENR

[35] Probably Particulates

[36] Probably SO_2 despite the name

[37] Probably carbon monoxide

[38] Probably NO_2 or NO_x

III Topography, Landscape and Land Use

55. Much like its climate, the topography of Azerbaijan is varied, ranging from the flat lands below sea level[39] near the Caspian Sea to the 4,466 m Bazardyuzi peak[40] in the Greater Caucasus[41]. Over half of the country's area consists of undulating land of some degree, with the remainder composed mainly of flat lowland plains. Figure11 shows the topography of the country.

The route of the East-West Highway follows the east-west line of the extensive lowlands in Azerbaijan which lie between the Greater Caucasus Mountains (maximum elevation 5,047 m) and the Lesser Caucasus mountains (maximum elevation of 3,740 m). The regional structure is dominated by compressional deformation of sedimentary rock, which led to the formation of napes verging towards the south-east. There was some volcanic activity during this long period of compressional tectonism. 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 sediments of Pliocene to Quaternary age, but are a source for seismic events e.g. the Western Caspian Fault which is situated in a depth of 3-3.5 km. The amount of dislocation along these faults is uncertain, and it is unclear whether some of the faults are still active. The whole 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 have an underlying geology typified by mainly loose, unconsolidated sand and alluvium. There is some occurrence of mountain outwash deposits and lacustrine sediments. All soils react vigorously with dilute hydrochloric acid, which classifies them as calcareous. The soils observed are predominantly clayey and dense; in many areas they are also saline. The main soil types of the study corridor are chestnut soils, meadow soils and sierozem soils (meadow gray soils).

Chestnut soils occur between altitudes of 300 to 500 m asl with average precipitations of 300-450 mm. This type of soil is plain dry steppe, which has loamy structure, low coefficient of erodibility and low bio-climate potential. Chestnut soils are mostly suitable for winter pastures and long-living plants such as vines. Meadow soils are generally typical for altitudes of about 100 m and average annual precipitation of 250 mm. This type of soil is thus lowland semi-dry arid steppe with a light loamy structure and a medium degree of salinity. It is not susceptible to erosion and has a low bio-climate potential. Meadow soils are mainly suitable for winter pastures and arable land (cotton). Sierozem soils (meadow gray soils) are typical for altitudes of up to 150 m and mainly dry climate with a maximum precipitation of 200 mm. Generally, this soil is semi-dry, dry steppe, light loamy type. Meadow gray soils have agricultural potential for winter pastures and arable land for cultivation of cereals and cotton. Most of the road is at an elevation of 200-400 m a.s.l.

[39] 18% of the country's land area is below sea level

[40] http://www.azerbaijan.az/_Geography/_Landscape/_landscape_e.html

[41] The Caucasus was formed largely as a result of tectonic plate collisions between the Arabian plate moving northward with respect to the Eurasian plate

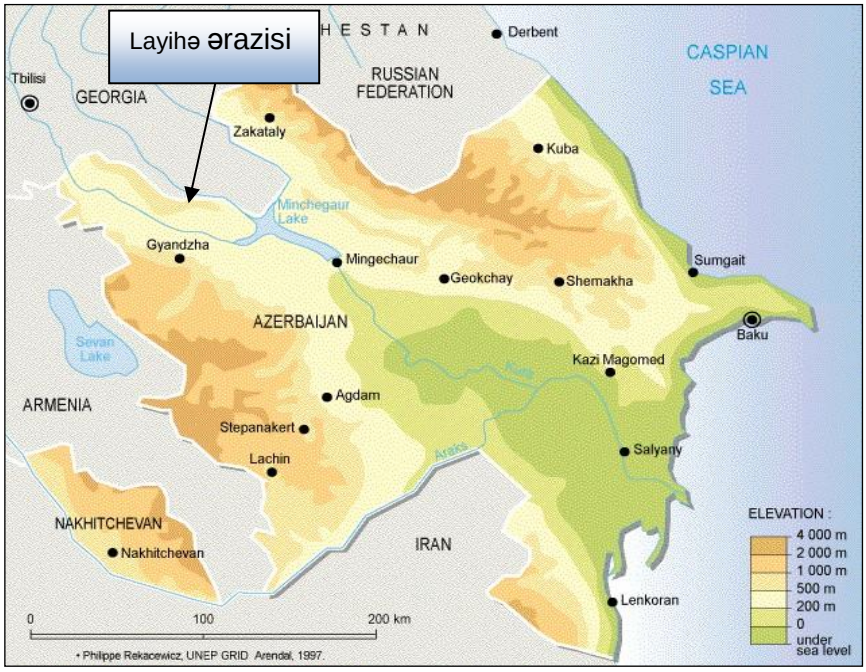


Figure 11: Topography of Azerbaijan[42]

56. The proposed Shamkir and Asagi Ayublu bypasses run through relatively flat agricultural land, showing only minor undulation. The Agstafa and Gazakh bypass alignment was originally planned to climb out of the valley and skirt the hills surrounding the town, but due to the alluvial runoff, crossing the small valleys extending towards the plain would have necessitated considerable amounts of cut and fill, so the revised alignment of the bypass remains in the flat agricultural valley along its entire length. Figure 12 shows the topography typical of the Gazakh area.

Figure 12: Topography and landscape along the foothills to the south of Gazakh near the planned RoW (right)

Plain towards the north of Gazakh

[42] UNEP (1997)

57. As has already been described, land use and landscape along the corridor is dominated by agriculture, in common with around 50% of the country[43]. Landscapes, whilst generally pleasant, have no special value, and are often spoiled by a variety of activities from quarrying and light industry to fly-tipping. Planted trees along the existing road break up the landscape and it is common practice in Azerbaijan for any new road to have trees planted alongside where possible. Table 8 at the end of the present chapter further describes the land use along the existing and proposed alignments.

IV Geology and Soils

58. All rivers of Azerbaijan drain into the Caspian Sea in the east of the country, through three main river basins-the Caspian basin, the Kura basin (in western and central Azerbaijan) and the Araz basin. The coastline of Azerbaijan is approximately 800 km. Occasionally droughts were experienced in the Kura basin. Approximate 15,000 km^2 of land are irrigated to allow agricultural use. The project area belongs hydrologically to the Kura river basin. The Kura river lies to the north of the project road. On the Gazakh-Georgian boarder section the road passes the Injachai river and two ravines. The Injachai river is a tributary of the Kura river and flows to the north.

59. The Kura intermontane valley developed over a long geological time span, but its recent geometry was shaped only during the Oligocene[44] period. The Kura River trough in which the project lies is divided into two sub-basins by transversal uplifts; The Middle and Lower Kura River sub-basins.[45] The flat plain of the project area lies on recent Quaternary sediments that are bordered by the lime sediments of the Lesser Caucasus foothills to the south, and the faulted Neogene Kura River valley to the North. Figure 13 shows the geological structure of the project area.

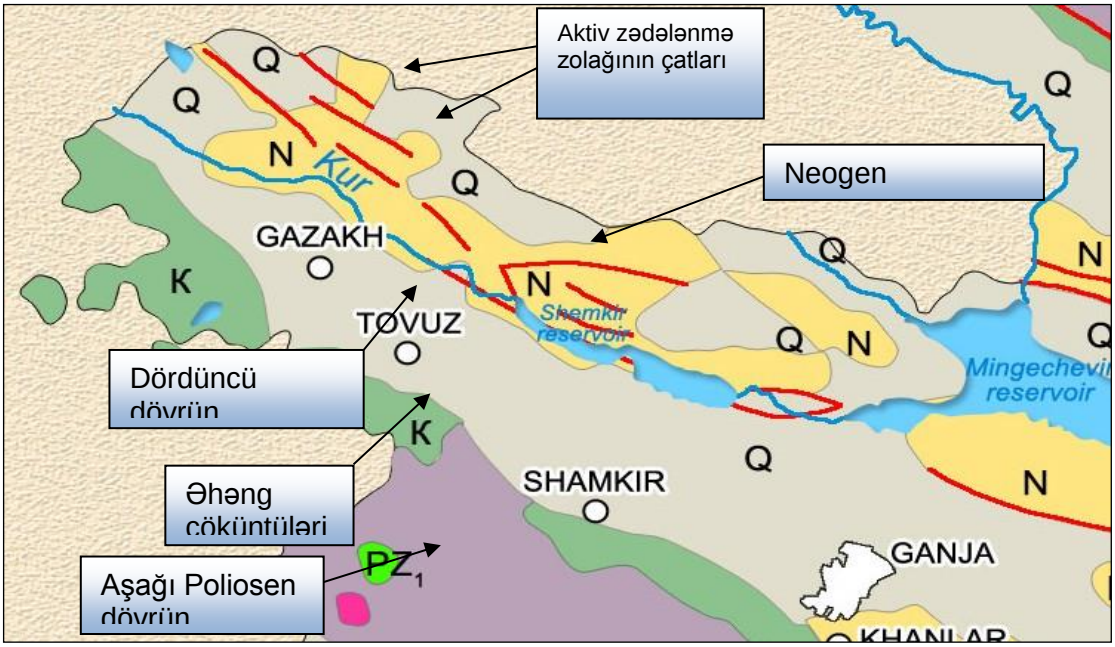


Figure 13: Geological Map of the Project Area

[43] http://www.cac-biodiversity.org/aze/aze_geography.htm

[44] About 33.9 million to 23 million years ago

[45] http://www.azerbaijan.az/_Geography/_Geostructure/_geostructure_e.html

60. Due to its position over the Arabian and Eurasian plates and within the central part of the Mediterranean mobile belt, Azerbaijan experiences a reasonable level of seismology. Most earthquakes occur in the south west of the country. It is not known exactly how susceptible the project area is, although it is understood that the area between the Greater and Lesser Caucasus has been struck by earthquakes in the distant past[46]. Landslides are fairly common in Azerbaijan, but due to the flat nature of the terrain in the project area, no major events have been reported in recent times[47].

61. As a result of the sedimentary nature of most of Azerbaijan's geology, the extraction industry is notable[48]. Hydrocarbon extraction is clearly the most important of these; however oil industry activity is restricted to the eastern part of the country and does not directly affect the project area. Less than 10 km to the south of the project alignment lie three open zeolite tuff quarries at Shamkir, Zajam and Tovuz.

62. Soils in the Kura valley generally have a high clay and sand content, with considerable levels of pebbles and gravel. This is due to the alluvial patterns that dominated the area and continue to have a presence. The soils of the plains are classified as *leptosols* (a shallow soil over hard rock, highly calcareous material or gravel) and *regosols* (weakly developed mineral soil in unconsolidated material). Regosols are common in eroding lands, in particular in arid and semi-arid areas and in mountain regions. Whilst the areas around the rivers and drainage ditches in the project area (see section 5 below) have alluvial wetland meadow soils, the predominant soil type along the project road is chestnut coloured soil. Figure 14 shows a regosol typical of the project area.

63. Soil erosion is recognised as a key environmental problem in Azerbaijan[49], and due to the regosols described above the project area exhibits considerable levels of erosion in localised areas, particularly along rivers and streams. The riparian erosion is aggravated by aggregate extraction at most locations. Figure 14 below shows erosion typical of the rivers in the project area.

[46] Although the only earthquakes in Ganja mentioned on the website of the Azerbaijan Geology Institute were in 427 and in 1235

[47] RSK/ERM (2002)

[48] In addition to oil, Azerbaijan has commercial deposits of iron, aluminium, chromium, tin, zinc, cobalt, copper and tungsten. Notable non metal deposits include gypsum and rock salt.

[49] ADB's country environmental analysis reports that more than 60% of the country's territory is exposed to some form of erosion, with erosion rates in hilly areas reaching an average of 250 m^3 per ha per yr

Figure 14: Alluvial regosol in the project area (left) and severe gulley erosion typical of the rivers along the road alignment (right)

V Surface and Groundwater

64. The project area belongs to the Kura River catchment. The Kura is Azerbaijan's main river and it accounts for around 90% of the country's surface water resources. On its way to the Caspian Sea the Kura feeds two major reservoirs (the Shamkur and the Mingechevir Reservoirs) which mainly serve for power generation and irrigation purposes. Water quality in the Kura River in the section upstream of Ganja is satisfactory, but the river becomes polluted downstream of Yevlakh due to the discharge of untreated waste water from the populated settlements and other discharges from industrial activities in its catchment. Bridges and culverts carry surface water under the road where tributaries and channels feed the Kura River. Six mid-sized rivers are traversed by the road along the project alignment[50]; the Shamkircay, Dxheircay, Zagamcay, Asrikcay, Tovuzcay and Agstafacay. The rivers, all of which are tributaries to the Kura, are perennial and are fed by rainwater, groundwater, and some meltwater[51]. They are braided with wide beds, and are associated with thick alluvial fan outwash deposits, which contain a high proportion of pebble and gravel material. As noted above, extensive extraction of these aggregates from river beds occurs at almost all locations, and the disturbance that this causes is easily visible from bridges and on satellite imagery.

65. In addition to drawing water from the local rivers and aquifers, agriculture in the project area is also supported by a large irrigation canal that runs roughly parallel to the project road, originating at a reservoir west of Gazakh and extending all the way to Dujarli.

66. Groundwater in the project area is confined to gravel-shingle and sandy formations of the Quaternary and the Upper Pliocene age[52]. They are widely used for water supply and irrigation. Groundwater depths in the project area are greatest (often in excess of 25 m) in the interfluves between the Shamkircay and Agstafacay Rivers, and shallowest (around 5 m) in the river valleys of the Tovuzcay and Agstafacay[53]. Fluctuations in groundwater levels in the project area are understood to be low.

67. The National Hydrometeorological Department has a hydrological station and water quality sampling station on the Agstafacay River, but no sampling or records have been made since 1995[54], and therefore no information on water quality is known. Due to the location of the six main rivers crossing the project highway, and considering brief visual assessment, it is expected that the waters are of reasonable quality, affected only by the illegal disposal of waste and the extraction of aggregates. The rivers are in general of a very high turbidity, with high sediment transport rates caused by erosion, lack of vegetation, flash floods and freeze-thaw processes further upstream.

VI Noise and Vibration

68. Noise and vibration levels were not recorded in the project area, but are clearly very low in general. There is little heavy industry and commerce along the project road, and most noise and vibration is likely to result from the trucks transporting goods along the road between Georgia and Baku. Perceived traffic noise from these transport vehicles, whilst relatively low, is increased during the night, when fewer other vehicles use the road. Noise

[50] in addition to numerous small streams

[51] Finnroad (2005) reports that the Tovuzcay is fed 8% by meltwater

[52] http://www.gia.az/contents/default.aspx?lg=2&idpt=2401&id=7656

[53] RSK/ERM (2002)

[54] See http://www.azhydromet.com/maps/points/agstavachaykazakh.html

and vibration perceptions are also increased in urban areas, where proximity and number of receptors are greatly increased.

69. In Azerbaijan, traffic noise is only measured in response to complaints, and tends to be more troublesome in summer, when windows are kept open[55].

C. Ecological Resources

70. Due to its complicated geological history, varied climate, and its position at the crossroads of Asia and Europe, Azerbaijan is relatively rich in terms of its ecological resources. A large proportion of endemism is reported, and the country is also host to a large number of relict species. In general, however, these resources have been partially depleted due to pollution and poor management under Soviet and post-Soviet rule. Improvements are underway and biodiversity is receiving increasing attention both nationally and internationally but progress is slow. Azerbaijan is signatory to a number of relevant international treaties, notably the Convention on Biodiversity.

71. The majority of the existing road and proposed bypasses run through land that was converted for agricultural use many years ago. There is practically no remaining natural habitat in the area, with the majority of flora being limited to crops, and artificially planted trees and shrubs, and the fauna comprising of domesticated animals. The areas of wormwood (Artemisia sp.) dominated scrubland that occur along the road at the Ganja end of the alignment, whilst generally somewhat disturbed by man, do belong to the WWF ecoregion known as Azerbaijan shrub desert and steppe56.

I Fisheries and Aquatic Ecology

72. In total there are 89 species of fish in Azerbaijan, of which eight are introduced[57]. High levels of aquatic pollution have severely affected fish stocks across the country in recent years. The various species of sturgeon, which spawn in the Kura River, have of course received most attention due to their high value, however stocks in general are in decline. In the project area, the perennial rivers that traverse the road are understood to hold some fish; including the Caspian roach (*Rutilus rutilus caspicus*) Barbel (*Barbus* sp.), Chub (*Leuciscus cephalus*) and Brown trout (*Salmo trutta fario*) but no recent data on prevalence were available. No formal fisheries are based in the area[58] and any fishing in the six main rivers of the project area is largely recreational. Little study has been devoted to the invertebrate aquatic ecology of the rivers of the project area; most attention is given to the Kura. According to the IUCN Red List, there are not known to be any endangered, or critically endangered fish or other aquatic species in the project area.

II Canlı təbiət

73. As already described, the majority of the non-urban land surrounding the existing road and proposed bypasses is turned over to intensive agriculture, leaving very few areas of unmanaged land. As a result of the extensive impact of the long-established area of agriculture, wildlife in the project area is predominantly restricted to species that are tolerant of permanently agricultural conditions, for example the common Fox (*Vulpes vulpes*), Striped field mouse (*Apodemus agrarius*), and the Social Vole *(Microtus socialis).*

[55] Finnroad (2005)

[56] (PA1305)

[57] ANAS (2004)

[58] Although small-scale commercial fishing is practised on the Kura

During the field investigations several Striped-neck Terrapins *(Mauremys caspica)* were observed in the road culverts and adjacent drainage and irrigation channels, which are also expected to be prime habitat for brown rats (*Rattus norvegicus*) and the Coypu (*Myocastor coypus*).

74. Due to the habitat restrictions mentioned above, presence of non-domesticated mammals in the project area is severely restricted, and is primarily represented by rodents and other small mammals such as Jerboa (Allactaga elater) and Hedgehogs (Erinaceus concolor).

75. Ten species of amphibians and 52 species of reptiles are recorded in Azerbaijan[59], and none are rare or endangered. Most of the reptile species are found in semi-desert areas and are unlikely to inhabit the majority of the project area. Approximately 20,000 species of invertebrates have been recorded in Azerbaijan, of which 90% are within the phylum Arthropoda.

76. Azerbaijan has a diverse avifauna with 363 species of birds recorded from 60 families. Around 40% of these species are native to Azerbaijan, with the remainder being migratory[60]. Whilst individual species were in general not noted[61], it appears that there are large numbers of birds in the project area, as agricultural zones are in general more "bird-friendly" than they are to other genera. A small Important Bird Area (IBA) exists in the Agstafacay valley around 5 km north of the existing road[62]. Agstafacay IBA is known to be home to at least one breeding pair of the Lesser Spotted Eagle (*Aquila pomarina*) and numerous Imperial Eagles[63] (*Aquila heliacal*). Kingfishers (*Alcedo atthis)* and European Rollers[64] (*Coracias garrulous)* are very common breeding birds at the site. A second IBA, Shamkir reservoir (National designation of "sanctuary"; IUCN Category IV), is located around 10 km north of the existing road. In addition to the species that inhabit Agstafacay, Shamkir is also home to the Black Francolin (*Francolinus francolinus*) and the White Tailed Eagle (*Haliaeetus albicilla*). The locations of Agstafacay and Shamkir IBAs are shown in Figure 15.

iii. Flora

77. The floral diversity of Azerbaijan is considerable, with over 4,500 higher plant species[65]. The flora exhibits a high degree of endemism (7 % of all species)[66] and relict genera of the tertiary period are common, and include the iron tree (*Parrotia persica*), the Lenkoran acacia (*Albizzia julibrissin*), the basket oak (*Quercus castaneifolia*), and the Caucasian persimmon (*Diospyrus lotus*). Oaks (*Quercus* sp.*)*, hornbeam (*Carpinus* sp.), beech (*Fagus* sp.), and maple (*Acer* sp.*)* forests cover the lower slopes of the mountain ranges, orange groves carpet the southern coastal lowlands and mulberry trees are extremely common in the lowlands. Despite the presence of many rare and interesting plant species, and the first national report to the Convention on Biodiversity reporting that 10% of plant

[59] ANAS (2004)

[60] Azerbaijan is a major route for birds migrating from Asia to Europe, and millions of birds pass through the country from Eastern Europe and western Siberia to South and West Africa each year. Approximately 1.5 million birds use the wetlands of Azerbaijan to rest and feed

[61] Although numerous species were seen, including the Little egret (*Egretta garzetta*) and the Black kite (*Milvus migrans*)

[62] IBAs are designated as such if they hold significant numbers of one or more globally threatened species, are one of a set of sites that together hold a suite of restricted-range species or biome-restricted species, or have exceptionally large numbers of migratory or congregatory species.

[63] IUCN Red List status: Vulnerable (VU)

[64] IUCN Red List status: Near Threatened (NT)

[65] http://www.azerbaijan.az/_Geography/_Planting/_planting_e.html

[66] ADB (2005)

species are considered to be threatened, the IUCN Red List does not list any as being Vulnerable, Endangered, or Critically Endangered.

78. The M-1 highway passes through predominantly agricultural land, where numerous types of vegetables, fruits and cereals are cultivated[67], in addition to animal fodder crops such as alfalfa. The first few kilometres of the road near Ganja, however, pass through an area of semi-arid steppe dominated by Wormwood[68] (*Artemisia fragrans*) with some Saltwort (*Salsola nodulosa* and *S. dendroides*), and perennial xerophytic (i.e. tolerant of dry environments) grasses such as *Bromus japonicas* and *Poa bulbosa*. Some riparian broadleaf trees were seen in proximity to the rivers[69], but these were few. Alongside and in the drainage ditches and irrigation channels are large stands of the reed species *Phragmites communis* and *Phragmites australis* as well as the Bulrush (or Reedmace) species *Typha latifolia* and *Typha angustata.* The semi arid and non-irrigated area at the foot of the hills south of Gazakh are partly used for growing wheat, with the remainder being semi-wild rangeland-type pasture. This area of pasture, mainly composed of grasses and forbs, showed signs of overgrazing and pasture degradation. In view of the above situation, it is clear that there are practically no areas of undisturbed land where wild plants can flourish along the project road. Alongside the road embankment, which has recently been disturbed due to the rehabilitation works, grasses (such as *Cynodon dactylon* and *Festuca myurus*) forbs, legumes, and various common flowering plants (such as Sorrel - *Rumex acetosa*) are generally well established.

Figure 15: Overgrazed rangeland near Gazakh (left) and typical habitat found between the road and a wheat field (right)

79. For most parts of the Gazakh-Georgian boarder road section the design road is being overlaid the existing road. On this reason tree losses are put to a minimum. However there will be need to cut number of trees. But exact figure will be defined after the final decision on project design. Species along the road are *Populus nigra, Pinus eldarica*, *Acacia* spec., *Morus* spec., *Cypressus* spec., and *Ulmus* spec. Tree losses are either due to smaller alignment shifting that are necessary at some places due to technical reasons or because of embankment fillings in the stem area of the respective trees. In the following the necessary tree cuts are listed based on site visits and based on the detailed design plans (scale 1:1000). In the case of those trees which are subject to embankment filling the decision whether the tree has to be cut or not shall be made by the construction supervision engineer

[67] At the times of the field investigations, crops included: tomatoes, wheat, alfalfa, potatoes, cherries, apricots, grapes, sunflowers, maize, peaches, onions, cabbages, chillies, green beans, peppers, and courgettes.

[68] Also known as Mugwort

[69] Where castor oil plant, *Ricinus communis* was also common

iv. Protected areas

80. The Caucasus is considered one of the world's 25 environmental hotspots and has been identified by the World Wildlife Fund (WWF) as one of the key global ecoregions, based on criteria such as species diversity, endemism and taxonomic uniqueness[70]. A number of protected areas of international importance are found in Azerbaijan, but according to the UNEP-WCMC World Database on Protected Areas, other than the IBAs identified in previous paragraphs, the immediate project area has no internationally protected areas71.

81. The domestic protected areas system follows a tiered structure in common with many countries, with different uses and protection levels applying to different categories. The categories are defined by the Law on Specially Protected Natural Areas and Objects (2000)72, and are defined as follows:

- *National Parks:* These are state-owned land or water bodies of special environmental, historical or other importance. They are used for educational, scientific, and cultural research[73]. National Parks provide favourable conditions for animals living within the park. They are restricted tourism zones but are open for observation of the natural processes.

- *Sanctuaries:* These are similar to National Parks but the land is not necessarily state-owned, and humans are permitted to continue to live inside, if their settlement was present at the time of categorisation

- *Reserves*: The state-run nature reserves aim to protect nature, wildlife and the environment. They allow scientists to conduct natural research. They are specifically designed for the protection of both common and rare species of flora and fauna. Azeri law strictly prohibits industrial development or meddling with animals or plants within the borders of the state parks.

- *State Game Reserves*: These reserves have the purpose of maintaining wildlife whilst also allowing sustainable hunting

82. Individual features of value, such as trees, caves or paleontological sites are protected by the "Nature Monuments" designation

83. In terms of nationally-protected reserves, Gayarazi Nature Sanctuary[74] is located at around 1 km north (separated with Kur river) of the project area[75] with Gayarazi State Nature Reserve reaching beyond that up to the Georgian border, but there are no national protected areas or nature monuments in the immediate project area

D. Economical development

84. Azerbaijan's Economic development since 1991 has been tumultuous, beginning with enormous depression following the departure of Soviet rule and industry that resulted in a

[70] ADB (2005)

[71] Confirmed to the study team by colleagues at UNEP-WCMC

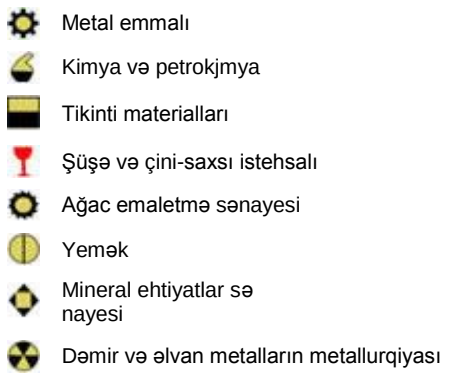
[72] UNECE (2004)

[73] http://www.azerbaijan.az/_Geography/_Ecology/_ecology_e.htm

[74] Equivalent to IUCN Category IV

[75] This reserve is known as Agstafchay MQE

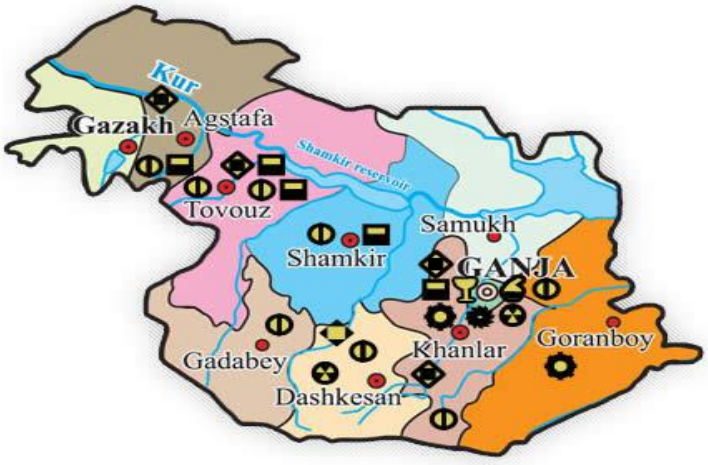
loss of almost 53% of the GDP between 1990 and 1994[76]. Since then, and predominantly due to the hydrocarbon industry [77], GDP has continued to rise. By 2001 the GDP had almost returned to pre-1991 levels, and was predicted by the IMF to grow to $53.3 billion in 2008 and to $68 billion in 2009, although these figures were not realised, with 2010 GDP estimates currently at $52.2 billion. There has been a recent decline in Azerbaijan's growth rate[78], but its oil-based economy continues to grow. Oil output in Azerbaijan is, however, projected to peak around 2015 unless new oil reserves can be found. Thus, non-oil sector development is crucial to the country, and good transport infrastructure contributes significantly to non-oil sector development.



v. Industry and trade

85. Agriculture employs roughly a third of the workforce, but due to the lucrative nature of the oil industry, the agricultural sector accounts for only around 14% of the GDP79.

The Ganja-Gazakh economic region is the second most important in the country after Baku, but it should be noted that Baku' prosperity is far ahead of the rest of the country, and even the second economic region lags far behind the capital city. The Ganja-Gazakh region contributes 12-13% of total industrial production due mainly to its extraction and processing industries. In addition to the extraction and processing of ores in Shamkir, Ganja and Dashkesen, the region has strong automobile and electronics manufacturing industries, some chemical production and a considerable economy in light industry and commerce[80]. Figure 16 shows the locations of some of the region's main industries.



[76] AİB (2006)

[77] Growth in finance, transport, trade, and construction have all occurred, but are clearly as a result of oil industry-based stimulae

[78] 9.3 % for 2009, 4.3 % for 2010, and a projected 1.8 % for 2011.

[79] ADB (2006)

[80] Including cotton and wool processing, carpet manufacture, furniture making, and manufacture and repair of agricultural machinery

Figure 16: Industry in the Project Area [81]

86. The project area's principal economic activity is overwhelmingly agriculture, with over 70% of the project area land devoted to growing a variety of crops as already described elsewhere in this report. The area is important for the food needs of Baku and the rest of the country; in particular for potatoes, of which the area produces around 80% of the national crop. Farm sizes vary but most families other than those in the urban parts of Gazakh and Ganja are involved in farming to some degree; almost all houses adjoin a smallholding. Economic growth from agriculture in the project area was 4.7% between 2000 and 2006, outstripping national growth by 0.6% percent.

vi. Transport

87. Transport in the Ganja-Gazakh-Georgia area is largely by road. The M-2 provides the main artery through the area. Local traffic along the M-1 accounts for roughly 60% of vehicles, with the remainder being composed of long distance and international traffic82. Around 15% of all traffic is large trucks. Local roads in small towns and villages generally have severely degraded asphalt surfaces or are not paved and are simple dirt tracks; these tracks are dusty in the summer and muddy in the winter, causing discomfort to residents.

88. The main railway line to Georgia runs parallel to the M-2 through almost all the project area. The railway line is predominantly used for freight purposes, though a small number of passenger services connect the project area towns to Baku in the east and Georgia in the west. Most non-car owners needing to travel long distance prefer to take the bus service along the M-2 rather than the slower train service. Car ownership levels in the area are not known but are thought to be relatively low

89. Road infrastructure and road system in Ganja-Gazakh-Georgia is one of the main factors of social development. The projects implemented improved the highways and thus contributed to increased economic activity and subsequently contribute to lowering poverty by reducing gap between rural and urban areas. Roads are tool of labor markets to provide access to economic activities and basic services. Upgrade and rehabilitation of roads in Gazakh is cornerstone of rural development and poverty reduction and thus ensured acceleration of economic growth by different ways

    - improved road transport operations, along with more efficient and sustainable development and maintenance of road safety network;
    - selected immediate priority bottlenecks are eliminated;
    - road sector planning, programming and policy formulation is transformed to and objective, sustainable process;
    - road safety is improved and traffic is better managed

90. One of the major highways (M2 – 503 km) of road system goes through connects Baku and Tbilisi. It is worthy to note that Azerbaijan and Georgia are strategic partners in the region and most of the economic activities happen between these two states. A contact point (Red Bridge) on the border serves daily and shares a huge amount of economic growth from both sides

[81] http://economy.az/en/10_regions/reg_02.php#

[82] Nippon Koei UK (2009a)

vii. İnfrastructure and Power Facilities

91. Most of Azerbaijan's power production is from heavy grade thermal power plants. The project area is expected to be powered predominantly by power from thermal plants, in particular the Ganja power station, however it is understood that a 380 MW Hydropower scheme is under operation at Shamkir. Connection levels to the electricity grid are relatively low, partly due to the poor service provided and partly due to an inability to pay the charges. Ganja has a town gas system but piped gas is not provided to any of the other towns along the project road.

92. Water supply in the project area is provided at a local level, using riverbank filtrate and small reservoirs[83].Connection levels to power and water are unconfirmed, but are reported to be lower than 50%. Many settlements have sunk private wells for water abstraction, with over 2000 wells reported in the Ganja-Gazakh region. Ganja and Gazakh are understood to have soviet-era drainage and wastewater treatment facilities [84] that are rapidly deteriorating. The remainder of the towns and villages do not have wastewater connections or septic tanks, and simply drain their effluent to soakaway or the nearest watercourse.

93. Waste management is poor in Azerbaijan, and no modern sanitary landfill facility exists nationwide. It is therefore expected that most household waste in the project area is dumped in small local dumpsites, and is then partially burned and buried. Collections are provided by the relevant municipality, and frequency appears to be good. Telecommunications are of little importance in the agricultural communities in the project area; roughly half the settlements have a communal phone or phones, with the remainder having no connection[85].

viii. Tourism

94. There is very little tourism occurring in the project area at present, and whilst the region overall has some tourism potential, the M-2 corridor offers little in the way of tourist attractions.

E. Social and cultural resources

v. Population and communitites

95. The estimated population in the project area is about 1 million people[86], of which 48% live in towns and 52% live in rural areas. Table 5 shows the population and population growth rates for the project area.

Table 5: Population and Growth Rates in the Project Area[87]

[83] Finnroad (2005)

[84] Only 16 out of the most important 75 towns have wastewater treatment facilities.

[85] Mobile phone ownership is not known but is expected to be relatively low.

[86] 11.8% of the country's total population (2007 data)

[87] The State Statistical Committee of the Republic of Azerbaijan

Region İl	POPULATION (x 1000)				
	2000	2005	2006	2007	2012
Azerbaijan Republic	**8,016.2**	**8,347.3**	**8,436.4**	**8,532.7**	**9235,1**
Urban population	4,086.4	4,298.3	4,356.6	4,397.6	4888,7
Rural population	3,929.8	4,049.0	4,079.8	4,135.1	4346,4
Ganja-Gazakh region - total	**1,091.5**	**1,124.0**	**1,133.4**	**1,143.1**	**1205,2**
Urban population	498.4	519.5	522.5	525.4	
Rural population	593.1	604.5	610.9	617.7	
Agstafa region	**74.4**	**76.7**	**77.3**	**77.9**	
Urban population	14.6	19.4	19.5	19.5	
Rural population	59.8	57.3	57.8	58.4	
Gedabey region	**87.0**	**90.1**	**90.8**	**91.4**	**92,9**
Urban population	8.5	8.6	8.5	8.5	
Rural population	78.5	81.5	82.3	82.9	
Gazakh region	**81.6**	**84.5**	**85.4**	**85.9**	
Urban population	18.9	19.4	19.5	19.5	
Rural population	62.7	65.1	65.9	66.4	
Shamkir region	**174.7**	**181.4**	**183.5**	**185.8**	
Urban population	58.6	62.7	63.3	63.9	
Rural population	116.1	118.7	120.2	121.9	
Tovuz region	**144.2**	**150.3**	**152.0**	**153.7**	
Urban population	25.0	25.6	25.8	25.9	
Rural population	119.2	124.7	126.2	127.8	
% of Azerbaijan Population	**12.0%**	**11.9%**	**11.9%**	**11.8%**	
% of Ganja-Gazakh economic region - total	88.5%	88.4%	88.4%	88.4%	

96. As has already been described, the project area is largely agriculture-based and is essentially rural. Other than in urban areas of Ganja and Gazakh, most communities are closely tied to the land and the agricultural way of life. All the towns and villages along the alignment of the existing road are settlements based on agriculture, and practically all houses have a large garden that acts as a smallholding to provide the household with food (see Figure 17 below).

Figure 17: Smallholdings Typical of the Project Area[88].

97. There is a huge difference between the national average salary and the average salary encountered in the project area. 2011 data shows that the national average monthly salary is 364.2 AZN whereas in the Ganja-Gazakh economic region it is only 233.7 AZN. Salaries appeared to be at an average of 195 AZN per month (until 2010; it increased to 220,6 AZN in 2011); under 60% of the national average.

Location	Year							
	2004	2005	2006	2007	2008	2009	2010	2011
Republic of Azerbaijan	**99.4**	**123.6**	**149.0**	**215.8**	**274.4**	**298.0**	**331.5**	**364.2**
Ganja-Gazakh region	***54.0***	***69.7***	***86.1***	***128.7***	***171.2***	***190.3***	***213.2***	***233.7***

Table 6: Average Monthly Wages in the Project Area

ii Health and Education

98. The Azerbaijan constitution pledges to provide all citizens with 11 years of free education starting from the age of 6, and enrolment rates currently exceed 90%. There are 1,653 preschool institutions in the country of which 280 are located in the Ganja-Gazakh area. 650 standard schools exist in the project area, of a national total of 4,538 institutions. Azerbaijan has nearly achieved universal primary education, with gender equity in enrolment rates, but cutbacks in social sector spending threaten to erode these gains[89]. The 1999 census showed that 97.5% of all people aged 15-24 had completed primary school, although household survey data on net enrolment rates show less than full enrolment[90].

99. In 2008, there were 748 hospitals and clinics in Azerbaijan, of which 121 were located in the Ganja-Gazakh region. By 2010 this number had risen to 756 hospitals nationwide; six of the eight new hospitals were in the Ganja-Gazakh ER (though strangely the total number of hospital beds in the region declined during the same period). Nationally, there are roughly 76 hospital beds available for every 10,000 people, and the project area has a slightly better average, at 83.2. These figures show a decline since 2008, when the national average was 80 beds per 10,000 people and 85.5 in the project area. Healthcare indicators for the project area are provided in Table 7.

[88] Photos taken in Asagi village

[89] ADB (2006)

[90] ADB (2006)

Description	No. of hospitals and clinics	No. of hospital beds	No. of hospital beds per 10,000 pop.
Azerbaijan	**756**	**67430**	**76.0**
Ganja – Gazakh region		***9810***	***83.2***
Agstafa	13	560	69.6
Gadabay	11	410	43.5
Gazakh	13	1225	139.1
Shamkir	23	1620	84.0
Tovuz	22	1330	83.6

Table 7: Indicators on the health measures of project area (2010)

iii Social Groups and Poverty

100. Due to their geographical location and history, Azeris typically exhibit a mixture of both Islamic and European cultures, the latter mostly Russian and Turkish, and struggle with deep divisions between the old and the new. About 90% of the population is ethnic Azeri, with 10% other ethnical groups[91]. Most Azeris speak Azeri, which is similar to Turkish, though many also speak Russian. English is spoken by an increasing number of people, particularly among younger generations.

101. Azerbaijan has made progress toward eliminating poverty, but the problem remains. Poverty incidence dropped from 46.7% in 2002 to 44.7% in 2003, and analysis of the 2004 household budget survey data suggests there were further declines in that year. The decline in poverty has been somewhat faster in urban areas than in rural, but there is still little disparity in urban and rural poverty rates (44.1% urban, 45.3% rural)[92]. The latest World Bank Report (2007) seems to show a considerable improvement; the poverty incidence was reported to be just 24% in 2005 with extreme poverty falling from 26.9% in 2002 to 9.2% in 2005. The main reason behind the sharp drop was reported to be that salaries have more than doubled since 2001.

102. As a result of the conflict with Armenia over the Nagorno-Karabakh territory (presently an autonomous region of Azerbaijan; an enclave totally separated from the main country by Armenia) in 1994, nearly 1 million people were displaced. Many of these people still rely on food aid, and many refugee families live in the project area, most in below average conditions. Due to the location of the project area, its towns have a relatively high number of refugees and Internally Displaced People (IDPs); Shamkir's population is reported to be composed of as much as 12% refugees and IDPs[93], and interviews conducting during the field surveys confirmed that these numbers are realistic, and that there is a particularly large concentration of IDPs in Kosalar, north of Gazakh.

iv Cultural heritage

103. Azerbaijan has a long history of human habitation, and is steeped in culture that has been enriched throughout centuries of changing rule and influence. Paleonthologic sites are in abundance in Azerbaijan, with 243 types of fossil flora and fauna collected to date[94].

[91] Such as Talysh, Tats, Kurds, and Avars (CIA world factbook)

[92] ADB (2006)

[93] RSK/ERM (2002)

[94] http://www.cac-biodiversity.org/aze/aze_natreserves.htm

The country's strategic location led to it becoming an ancient centre of civilization and it has a formidable cultural heritage created over thousands of years. There is much evidence of prehistoric habitation in the region, and archaeologists have found sites of all stages of human development in Azerbaijan, including Mesolithic, Neolithic, and bronze and iron ages[95]. Many of these sites are remains of settlements and caves, some including rock paintings[96]. Tribes in the region formed in the third millennium BC and included most notably the Skiphs and Sakkses. In more recent history Azerbaijan has been host to numerous empires, from the Kura-Araks to the Arabs, who brought Islam to what is now Azerbaijan in the Eighth Century, and the country is also rich in the cultural remains of these more recent periods, including numerous settlements, burial grounds, and forts.

104. The Ganja-Gazakh region, located on the historic "silk road" trade routes and having some of the richest agricultural land in the country, is home to a fairly high amount of cultural heritage and monuments. Shamkir was a medieval trading city of great importance, and Ganja was founded by the Arabs in the 9th Century. The area around Agstafa contains numerous settlement mounds (known as "tepe")[97] dating from the bronze age to mediaeval times. However in terms of the immediate project area along the existing road, there are no known historical monuments or sites, and due to the relatively intense human activity alongside the road corridor, most areas have been excavated or disturbed by construction of previous infrastructure or farming.

105. Cultural monuments and historical sites in Azerbaijan are preserved via the *Law on Protection and Utilisation of Historic and Cultural Sites* and are subject to state registration. Monuments are divided into three categories according to their significance, as follows

- Monuments of international importance, of which 64 are registered;
- Monuments of national importance, of which 3,692 are registered; and
- Monuments of regional importance, of which approximately 3,500 are registered.

106. Article 18 of the Law requires project proponents to notify authorities and the Academy of Sciences of their activity at feasibility stage, and to conduct archaeological surveys if necessary. Where any archaeology is uncovered, satisfactory excavation, recording and preservation must be conducted prior to commencement of project construction activities

[95] RSK/ERM (2002)

[96] Such as the Taglar cave in the Hadrut region

[97] RSK/ERM (2002)

Table 8: Summary of Route Reconnaissance Observations.

Location / Section	Observations			Preliminary Assessment
	Physical	Biological	Socio-cultural	
Km 0-2	• Gulley erosion is evident alongside streams that cross the area. • To the south a local road passes along the foot of the hills, diverging from the M-1.	• Flat area of semi arid scrubland dominated by wormwood (*Artemisia* sp.).	• No human presence observed.	• Dualization on either side of the highway would be feasible at all levels with minimal impact.
Km 2-4	• The area is degraded by many tracks and paths, some dumped waste and excavated pits.	• Similar wormwood desert environment but degraded due to human influence.	• This area has a number of old industrial buildings, and some that appear to be under construction. • Small monument to the north of the road.	• Dualization would have minimal impact in this disturbed area, but the south side of the highway is proposed as having the least impact.
Km 4			• The road bisects the very edge of a settlement with two smallholdings to the south of the highway.	• The settlements to the south appear to be outside the ROW. • Care would be required to minimise construction impacts in this area.
Km 4-9	• A number of streams in gulleys traverse the landscape and road N-S.	• Flat scrubland used as pasture with some marginal agriculture.	• Several businesses have their premises along this stretch (e.g. cafe, fruit seller).	• No major constraints in widening the road along this section are expected, though adequate attention should be given to access/resettlement as detailed design.
Km 9-12		• Flat agricultural land, predominantly turned over to wheat and hay production. Some grazing.	• No settlements along this stretch.	• Dualization on either side of the highway would be feasible at all levels with minimal impact.
Km 12-17	• Road crosses the Shamkir river at km 13.	• Small area of silvopasture either side of the road on the	• Petrol stations on either side of road at km 12 would be affected by one way traffic,	• Dualization should be on south side of alignment, but care is needed at design stage to minimise disruption

Location / Section	Observations			Preliminary Assessment
	Physical	Biological	Socio-cultural	
	• Old road bridge still in place. • Gravel extraction occurring in river bed.	edge of the river.	but should be outside ROW. • Beyond the river are the market garden settlements of Caparli, almost exclusively to north of road. • Greenhouses and produce depots on both sides of road. • Memorial immediately adjacent to river and road. The structure itself is outside ROW but walled land is inside.	to farms and business, as well as the memorial. • Adequate crossing required • RP should ensure adequate compensation for losses • Care will be needed to minimise disruption during construction.
Km 17-26 (existing)	• The area along and around the railway line is degraded due to industrial and commercial activities.	• Planted trees along the road	• The alignment passes between Shamkir to the south and Dallyar to the North. Busy settlements with clear needs to cross roads for access. • Houses line the road to the south in close proximity • Businesses on either side of the road as well as a sports centre • Roundabout between Shamkir and Dallyar is social gathering point with many taxies and shops • Dallyar is very close to the east side of the road, with a number of commercial buildings (mainly sawmills and	• Widening the road through this section, in conjunction with severing access, is not acceptable due to the considerable human impacts that would arise.

Location / Section	Observations			Preliminary Assessment
	Physical	Biological	Socio-cultural	
			furniture producers) to the west of the road	
Km 17-26 (bypass)	• At around km 25 the new alignment runs close to oil pipelines, thought to include the BTC pipeline.	• The bypass alignment passes mainly through agricultural land principally turned over to potatoes and alfalfa, with some fruit trees, at the time of recon.	• At around km 23 the area is somewhat degraded through various excavations (then aggravated by erosion) and dumping of municipal and commercial wastes.	• Care during detailed design is required when negotiating the gap between settlements at km 25. This gap is not ideal, but presents the best way to minimise impacts. The bypass route cannot pass elsewhere. A suitable crossing is needed at this point to allow access. • Pipeline ROWs and relevant standards/legislation need to be respected during detailed design
Km 26-36	• A large open quarry lies to the south of Zajam.	• The road passes through an established area of agriculture (mainly grape vines and wheat), and runs a km or so north of Zajam town and airfield. Bajrami is to the north. • Mature planted trees line much of the route along this stretch.	• A handful of buildings and houses are adjacent to the road, most on the north side. • At km 35, where the second bypass is planned to start, the area between the road and Bajrami is disturbed wasteland.	• Dualization of this stretch is a feasible proposition though the routing (i.e. which side the widening occurs) needs to be carefully established at detailed design. A provisional assessment suggests that the south side may be preferable; but a combination may be preferable if feasible.
Km 36-50 (existing)	• The entire flood plain of the Zagamcay River is highly eroded and degraded.	• Mature planted trees line much of the route along this stretch.	• From km 37 to 40 the road passes immediately to the north of the settlement of Duyali, with fields belonging to Duyali's smallholders to the north of the road. Many access tracks exist.	• Dualization of this section of road should be avoided at all costs due to the major human impacts that would arise from running the dual carriageway through the town. • A drawback is that a bypass will pioneer a new crossing point over

Location / Section	Observations			Preliminary Assessment
	Physical	Biological	Socio-cultural	
			• The Zagamcay flood plain is highly degraded due to human activity (principally dumping of municipal, construction and medical waste, and extraction of aggregates). • Beyond the Zagamcay between km 41 and 43 the road passes right through the smallholder settlement of Asagi. 20 or so properties lie adjacent to the road on either side, however many more rely on the access. A number of shops also exist on both sides of the road, and taxi also congregate in the area. • From km 43-45 the market gardens and houses of Asagi extend on the north side of the road only, with field crops to the south.	the Zagamcay rather than passing over the already degraded corridor between Duyali and Asagi.
Km 36-50 (bypass)	• Although less degraded than at the existing road bridge, the proposed crossing point of the Zagamcay River shows clear evidence of considerable aggregate extraction.	• The new bypass route passes exclusively through farmed land and through no virgin areas.	• A graveyard at km 42.5 is very close to the proposed alignment. • Interchange 5 is presently proposed at a location of mature high-value vines.	• The bypass route presents the minimum impact option but it passes through some prime agricultural areas. • Consider a noise barrier to protect residents at km 47. • Detailed design should ensure adequate distance from the

Location / Section	Observations			Preliminary Assessment
	Physical	Biological	Socio-cultural	
				graveyard. • Interchange 5 should be moved at detailed design if possible, so as to avoid the mature area of vines that it is currently proposed to be sited over. • South of Asagi the agriculture is rather more fertile than other areas, and compensation should reflect this.
Km 48-57		• A generally flat and regular landscape entirely farmed for grapes, potatoes, sunflowers and alfalfa.	• The town of Govlar, including some light industrial facilities, spills across the old road and pushes right up to the south side of the existing highway.	• Other than loss of mid-quality agricultural land, dualization should present only minor impacts if carried out on north side of the road.
Km 57-65	• This section of the route is the newly constructed 2 lane Tovuz Bypass. • Crossing of irrigation canal at km 58, and crossing of the Tovuzcay river at km 60.5	• The entire section passes through agricultural land of varying richness.	• No human settlements near to the alignment.	• Other than loss of agricultural land, the dualization of the new bypass should cause only minimal impact.
Km 65-100 (existing)	• Km 69-74: This section of road passes close to the arid hills to the south, then runs through undulating open grassland and wheat. • At km 77 is a highly eroded stream valley showing clear signs of gravel extraction.	• Mature planted trees line much of the route along this stretch. • Between km 77 and 80 the road passes through a large area of well established grapevines. • Between km 83 and 85 the road passes through wheat and alfalfa farming.	• Between km 74 and 77 the settlement of Qirli lies adjacent (south) of the existing road. Many connecting roads exist. To the north of the road the arid area is replaced with cultivated land. • Between km 80 and 83 the road passes on the south edge of Agstafa; a well	• Dualization through Gazakh is not a feasible option for numerous reasons. • Due to the complications of surrounding settlements and land use, the bypass should be extended to cover the entire Qirli – Agstafa - Gazakh area rather than having several smaller bypasses.

Location / Section	Observations			Preliminary Assessment
	Physical	Biological	Socio-cultural	
		• Between km 93 and 100 the road passes through fertile agricultural land of mainly alfalfa, wheat, and vegetable crops.	developed town that is less agricultural than previous settlements. Although most development is to the north of the road, numerous agricultural, commercial and residential properties exist on the south side of the highway. • Between km 85 and 91 the road passes through Gazakh, with residential properties and businesses on both sides of the road and in close proximity. • Between km 91 and 93 the road passes through an area of light industry and commerce, sited on both sides of the road. • Between km 93 and 94 lie a number of sports facilities and a large new hotel. • A large abandoned industrial facility lies a few hundred metres from the road at km 94.	
Km 70-100 (bypass) Black route (not	• The route passes along the foot of the arid hills that surround Gazakh. In places the changes in elevation are considerable.	• Between km 68 and 91 the route passes mainly though arid semi-degraded grassland used as extensive pasture or	• The community of Kokasger lies to the north of the alignment between km 72 and 76. This is a rural smallholding area, and	• The route proposed represents the best option environmentally, passing through the low-value land at the foothills and minimising disturbance

Location / Section	Observations			Preliminary Assessment
	Physical	Biological	Socio-cultural	
selected)	• Rail crossing at km 70 would require elevated bridge • Crossing of Agstafacay at km 92.5.	semi-arid wheat fields. • Between km 91 and 97 the proposed bypass passes through more fertile irrigated agricultural land.	inhabitants are accustomed to using the arid grasslands to the south for grazing their animals as well as dumping their waste. • At km 75 a large graveyard lies several hundred metres from the proposed alignment.	to agriculture and settlements. • The tree at km 75 should be avoided at detailed design, if this route is selected. • Access to the rangelands would need to be ensured for Kokasger residents.
Km 70-100 (bypass) Yellow route (selected)	• The route passes through mainly flat land. • Between km 79.5 and 80 the route crosses the gently undulating Hasansu river valley. • Crossing of Agstafacay at km 90. • Rail crossing at km 89.5 would require only a minor bridge as rail is in an embankment.	• Between km 70-75 the route passes through semi-arid wheat fields. • Between km 75 and 100 the route passes through more fertile irrigated agricultural land. • Most fields are used for pasture and field crops, but higher value fruit trees and vines are fairly common along this section. Most of these fields are small and can be avoided during detailed design.	• Between kms 76 & 77, and 78.5 & 79 the RoW passes within 200m of two clusters of houses. • At km 83 the RoW passes between two farmhouses within 200m, and at km 86 the RoW passes close to a farm. • Between km 93 & 94 the RoW passes within 200m to the north of Kosalar. • At km 98 the RoW passes very within 100m of a house. • Numerous minor roads are crossed along the entire section. • The villages of Kosalar and Husenbaili are quite large, but clearly poor, settlements, with poor dirt roads and restricted	• The route passes through relatively high value agricultural land, however none is particularly sensitive environmentally. Care should be taken to avoid fruit trees & vines if possible. • Several sections would require noise protection, but the number of potential sensitive receptors is far lower than at other locations. • Insufficient crossing points and underpasses could cause a severance problem. • Conversely, sufficient connections to the main road would be a considerable positive social impact, particularly at Kosalar & Husenbaili.

Location / Section	Observations			Preliminary Assessment
	Physical	Biological	Socio-cultural	
			access.	
Km 102-107+100	• Widening of existing road	• Mainly used as pasture area	• Running aside from residential and other structures	• Underpass is necessary in the existing road
Km 107+100 – 113+400	• Running close to Kura river 300mm	• Mainly in the direction of agriulture	• Left part approaches up to 50m to dwelling houses • Yollarla kəsişmir	• Existing irrigation and maintaining of crossing is important
Km 113+400 – 117+000	• Widening of existing road	• Planting areas used as field exist	• Distant from düelling point and approaching to two cafes observed	• Crossing is important in the existing roads.
Km 117+200	• By-pass	• Running partial through agriculture and mainly pasture	• Observed approaching to 1 dwelling house up to 20 meter	• Crossings are important
Km 125-130	• Widening of existing road	• Mainly is agriculture	• Cemetry in both side at km 126 • School in 40 meter of road (km 127)	• One big interchange for plant area, two crossing for village area

IV. Analysis of Alternatives

A. Alternatives to the Project

107. The present project forms a part of the Ministry of Transport's RNDP and is a component project of an overall strategic programme to improve the country's transport links and therefore boost economic development. Due to the basis of the project being a sectoral development strategy that is in line with ADB's Country Strategy and Country Environmental Analysis, examining alternatives to the project is not required[98] and this has therefore not been carried out.

108. Despite there being no requirement for an analysis of alternatives to the project, it should be pointed out that at present several other projects that either upgrade or widen the existing road, one of which includes a new bypass, are already underway along the M-2 road. To leave the Ganja-Gazakh section of road as it currently is would result in it being a weak-point along the main transport corridor, unable to cope with increasing traffic demands, and all logic points toward the need for the project, as described in the introductory chapter to this report.

B. Project alternatives

109. Having established the need for the project and accepted that it must go ahead, a number of alternative options within the parameters of the project design have been examined, so as to determine the most favourable design in terms of environmental and social issues, as well as engineering feasibility and economics. The principal issue with respect to alternatives for this project is that of the proposed bypasses. The following sections describe the various issues involved and the reasoning behind the final selection of project options.

I Dualization or New Road

110. To achieve the required dual carriageway, two basic options were open; parallel widening of the existing road and the pioneering of an entirely new dual 2 lane carriageway on a new alignment, away from the existing road

111. The parallel widening option requires that the top width of the road be increased by 12.5 metres to accommodate the new central median and the new second carriageway. This option was deemed preferable to the construction of a new road along the entire corridor due to the following reasons

- A new road would require excessive land acquisition along its c.130 km length;

[98] By ADB Environmental Assessment Guidelines

- A new road would create greater environmental and social impacts due to disturbance of a large amount of land rather than using the existing alignment that is already degraded by human presence and along which residents are accustomed to the presence of traffic;

- A new road would create greater environmental impacts due to the increased requirements for construction materials;

- A new road would to some extent negate the benefits of the recent rehabilitation works performed along the existing road;

- A new road would cost considerably more than the dualization of the existing carriageway. This might be justifiable when the aim is to reduce environmental or social impact, however is difficult to justify when this aim is not present

112. The decision to undertake parallel widening of the road rather than pioneer a new road corridor meant that bypasses needed to be considered as an option around the urban areas through which the present road passes, as dualization is only suitable in open rural and agricultural areas and in some semi-rural areas where: (a) there is only development on one side of the road that is set back a reasonable distance from the road; and (b) there is only a limited number of side accesses and junctions. Section 2 below presents an analysis of the bypass options examined.

Ii Sections to be Bypassed

1 Bypasses or No Bypasses

113. Generally, by –pass will be 70+996 km. In areas where there is continuous residential and commercial development close to one or both sides of the existing road, parallel widening would:

- Require excessive property demolition to accommodate widening of the main road and the provision of parallel service road(s) required to maintain 2 way local access;

- Worsen safety conditions for pedestrians wanting to cross the road due to the increased road width and increased traffic speeds. Even if pedestrian footbridges or underpasses were provided, frequent uncontrolled crossings of the main dual carriageway would still be likely to occur. Any worsening of road safety conditions would not be acceptable on a road that already has a poor safety record;

- Increase traffic noise through the urban areas;

- Deteriorate air quality conditions due to the future growth in traffic running through the built-up areas; and

- Detract from the character, urban landscape and social function of the urban environment.

114. Conversely, bypassing the urban centres along the project road would:

- Minimise the loss of properties to the alignment, and prevent any losses in urban centres;

- Improve road safety conditions through the urban areas in comparison to present levels;
- Decrease traffic noise through the urban areas in comparison to present levels, minimising future increases in line with forecast traffic growth[99];
- Improve air quality conditions through the urban areas in comparison to present levels, minimising future deterioration in line with forecast traffic growth[100]; and
- Improve the character and social function of the urban environment[101];

115. Two potential negative impacts associated with the selection of the bypass option were identified;

- Some loss of passing trade in urban areas due to reduced traffic flow; and
- Loss of farmland along the bypass alignments,

116. However these are deemed to be minor impacts in comparison to the alternatives outlined previously, and will in any case be offset by the considerable benefits that bypassing urban centres will bring.

117. The comparison clearly shows that widening the existing road through the urban centres is not acceptable and would bring considerable negative environmental and social impacts, whereas bypassing these centres would bring an overall positive environmental and social impact. The originally selected option of parallel widening was thus modified to allow for the construction of new 4 lane dual carriageway bypasses around the urban centres.

2 Bypass locations

118. Having established that bypasses were needed in certain areas, an assessment of which settlements should be bypassed was then undertaken, prior to the planning of bypass route options. The assessment was based on detailed site visits and review of satellite imagery, and focussed on:

- Available space alongside the existing road;
- Presence of houses and businesses on either side of the road;
- Presence of unacceptable corner radii;
- Severance issues[102]; and
- General character of the urban areas.

[99] See section VI.C.4 for more detail on projected traffic noise for different project options

[100] See section VI.C.1 for more detail on projected air quality for different project options

[101] A key element of this improvement would be due not only to the overall 50 to 65% traffic reduction, but to the almost total removal of large long-distance haulage vehicles, which currently cause considerable impact not only from their noise and emissions but due to their visual impact and intimidating nature, quite out of place in the urban environment.

[102] For example where a school or railway station was on the opposite side of the road to the main housing area

119. The assessment determined that bypasses should be planned for the urban centres of Shamkir / Dallyar, Asagi Ayublu, Agstafa [103] and Gazakh. Details of the individual assessments are provided below.

120. **Shamkir / Dallyar Bypass:** The existing road runs through a suburb located to the north of the main town centre. Travelling west towards Gazakh, the following developments are located alongside the existing road:

- A residential housing area that has extended northwards to within 20 metres of the edge of the left hand side of the road over a distance of 1.2 km. There are a total of nine separate accesses off the existing road that connect to local residential roads serving the area;
- Three large commercial buildings on the left hand side of the road and two further large commercial buildings and a petrol station on the right hand side of the road, spread over a distance of 2 km. The buildings are set back between 12 metres and 20 metres from both sides of the road and each of the commercial buildings has its own direct access off the existing road;
- A large roundabout that serves roads forming the main accesses to the residential, administrative and commercial areas of Shamkir to the south and the residential area of Dallyar Dzheir and the railway station to the north. This area is an important stopping point for the long distance buses. There are always many taxis and smaller local buses parked on the road shoulder at this location waiting to serve embarking and disembarking long distance bus passengers. The shoulders of the existing road have been surfaced in the vicinity of the roundabout to accommodate the taxis and buses that park on the road;
- 13 furniture workshops, industrial premises and storage areas on both sides of the road over a distance of 0.7 km that all have direct access onto the road. These premises are set back between 15 metres and 30 metres from both sides of the road and there is a 'pinch-point' where the total clear width on both sides of the road is around 30 metres wide.

121. If the parallel widening option was adopted through Shamkir, two lane parallel service roads would also have to be provided on both sides of the 4 lane highway over a distance of around 5 km. These service roads would be required to provide access, in both directions to the large number of individual business premises that have individual direct accesses to the existing road and the large number of other local access roads that have junctions with the existing road. This would require a clear strip, around 65 metres to 70 metres wide to accommodate the 4 lane highway and the two service roads on each side, with their shoulders, pedestrian footways, provision for on-street parking and embankment slopes to provide for differences in level between the main carriageway and the service roads. A large interchange would also be required to replace the existing roundabout. In order to accommodate the parallel widening option, more than 20 large commercial premises and workshops, as well as around 10 houses would need to be acquired. Due to the development on both sides of the road, much of the recently rehabilitated existing road in this area would need to be destroyed as the widening to accommodate the new 4 lane

[103] Following the preliminary appraisal of by passes and preliminary variant of EAA it was decided that it will be neseccary to conduct the additional by-pass with the length of 37 km in the vicinity of Konullu village. This deviation is slight in compare with the other three huge by-passes, because the road borders the south edge of village to avoid road breaking issues.

carriageway and the parallel service roads would mostly need to be carried out relative to the existing road centre line.

122. **Asagi Ayublu Bypass:** The existing road passes alongside the settlement of Duyali and then bisects Asagi Ayublu, where dense residential housing is located sometimes within 10 metres from one or both edges of the road edge over a total distance of 6.8 kilometres. Travelling west towards Gazakh, the following developments are present alongside the road:

- Dense residential development on the left hand side of the road over a distance of 3 km. The nearest houses to the road are generally set back between 7 and 30 metres from the edge of the road. This housing is arranged along a series of closely spaced parallel estate roads that each connect with the main Ganja – Gazakh road. In total there are 21 junctions connecting to these housing estate roads over the distance of 3 km. On the right hand side of this length of road, there are also nine commercial, agricultural and residential buildings that are set back at distances varying from 12 m to 40 m from the edge of the road.

- Dense residential development and roadside shops on both sides of the existing road over a distance of 2 km. The nearest houses to the road are generally set back between 6 metres and 15 metres from the road and there are 5 'pinch points' where the clear space in the road corridor is between 20 metres and 28 metres wide. Boundary walls to individual houses are often located at the foot of the embankment slope, less than 5 metres from the edge of the road. As with the previous area, the housing on both sides of the road is usually arranged along a series of closely spaced parallel estate roads that each connect to the main Ganja - Gazakh road. In total there are 17 of these local junctions on the north side of the road and 14 on the south side of the road, over this 2 km distance. Five of the junctions on the north of the road are directly opposite five of the junctions on the south side of the road.

- Residential development and a few roadside shops on the right hand side of the road over a distance of 1.8 km. These houses and shops are set back between 6 and 32 metres from the edge of the road. As before, the housing is generally arranged along a series of parallel estate roads that each connect with the main Ganja – Gazakh road. In total there are 10 junctions connecting to these housing estate roads over the distance of 1.8 km.

123. Adoption of the parallel widening dualization option through Asagi Ayublu would involve leaving the existing road to function as a two lane service road and then constructing a new 4 lane highway over a distance of around 8 km as well as a new 2 lane service road over a distance of around 5 km. The following land and property would also need to be acquired for this parallel widening option:

- 23 residential houses and 12 hectares of residential land;
- 4 blocks of apartments with ground floor shops;
- 15 medium sized commercial or agricultural buildings; and
- 18 hectares of agricultural land.

124. Resettlement and social impacts of this loss of housing and businesses would be significant. Even after this demolition of roadside housing, there would still be a heavy demand for pedestrians wanting to cross the 4 lane road and there would be dangerous uncontrolled road crossings. Around 540 houses would remain in a zone within 100 metres of the new 4 lane road and they would experience no relief from the increasing noise that would result from the growth of traffic.

125. **Gazakh / Agstafa Bypass:** The existing road passes alongside the settlements of Qirli and Agstafa before partly bisecting Gazakh[104] as it skirts the suburban area. Residential areas have developed along this stretch of road, with the northern and southern limits of the development being constrained by the existing Ganja – Gazakh road, the railway line running to Georgia, and an important open irrigation channel and the Kura River. These constraints on the northern and southern limits of development have led to outlying villages and the cities of Agstafa and Gazakh tending to merge together, with only short sections of clear land between them. Travelling west on the approach to the cities of Agstafa and Gazakh, the following developments are present alongside the road:

- A dense residential area on the south side of the road, with some houses located within 20 metres of the edge of the road over a distance of 2 km. There are a total of 14 junctions over this 2 km distance that either serve residential estate roads or individual houses. On the north side of this length of road, there is an industrial building and scattered houses, with the closest buildings between 16 metres and 23 metres from the edge of the road. Access to these buildings on the north side of the road is provided by 13 junctions that either serve minor side roads or individual properties.

- The Ganja – Gazakh road forms the southern boundary of the dense built-up area of Agstafa city, over a distance of 2.6 km. Over this length of road, the nearest houses on the north side of the road are located between 10 metres and 25 metres from the edge of the road. There are 16 small T-junctions on this side of the road that provide access to either minor side roads or groups of properties. On this side of the road, at the eastern approach to Agstafa, there is a large junction with a gyratory layout that connects to main roads leading into the town. On the south side of the road, there are some isolated houses, workshops and a large furniture factory and store, located at distances ranging from 12 metres to 40 metres away from the edge of the road.

- The Ganja – Gazakh road skirts around the southern edge of the Gazakh city and then turns and runs northwards, cutting through the heart of city and then emerging through an outer urban fringe area ending near the new hotel and sports complex, before continuing on towards the Georgian border. In total, this distance is 8.1 km. Over this distance, the road runs through the dense built up area for a length of 5.2 km. In the city centre there are houses and business premises within 3 metres of the edge of the road and there are frequent side accesses along the full 8.1 km.

126. Adoption of the parallel widening option through Gazakh would destroy the character of the centre of the city and it would split the city into two sections, which would be unacceptable. The alignment of the existing road also contains several corners that have radii that would be unacceptable as part of a dual carriageway, and to remedy this

[104] The existing road does not pass through the centre of Gazakh as it was at one time a bypass itself

situation would require widespread demolition of residential and business properties through Gazakh town.

127. **Yukhari Salahli:** The existing road runs through a suburb located to the south of the main town centre. Travelling west towards Georgian border, the following developments are located alongside the existing road

- A residential housing area that has extended northwards to within 20 metres of the edge of the left and right hand side of the road over a distance of 3.5 km. There are a total of 23 separate accesses off the existing road that connect to local residential roads serving the area;

- More than fifty residential houses and commercial buildings on the both hand side of the road spread over a distance of 4 km. The buildings are set back between 12 metres and 20 metres from both sides of the road and each of the commercial buildings has its own direct access off the existing road;

128. If the parallel widening option was adopted through Yukhari Salahli, two lane parallel service roads would also have to be provided on both sides of the 4 lane highway over a distance of around 8 km. These service roads would be required to provide access, in both directions to the large number of individual business premises that have individual direct accesses to the existing road and the large number of other local access roads that have junctions with the existing road. This would require a clear strip, around 65 metres to 70 metres wide to accommodate the 4 lane highway and the two service roads on each side, with their shoulders, pedestrian footways, provision for on-street parking and embankment slopes to provide for differences in level between the main carriageway and the service roads.

129. **I Shikhli Bypass:** The existing road passes alongside the village of I Shikhli where residential housing is located sometimes within 20 metres from one or both edges of the road edge over a total distance of 4.9 kilometres. Travelling west towards Georgian border, the following developments are present alongside the road:

    - Residential development on the both hand side of the road over a distance of 4 km. The nearest houses to the road are generally set back between 15 and 30 metres from the edge of the road. In total there are 35 junctions connecting to these housing estate roads over the distance of 4 km. On the both hand side of this length of road, there are also number of commercial, agricultural and residential buildings that are set back at distances varying from 15 m to 35 m from the edge of the road.

    - Dense residential development and roadside shops on both sides of the existing road over a distance of 2 km

130. Adoption of the parallel widening dualization option through I Shikhli would involve leaving the existing road to function as a two lane service road and then constructing a new 4 lane highway over a distance of around 9 km as well as a new 2 lane service road over a distance of around 5 km.

131. Resettlement and social impacts of loss of housing and businesses would be significant. Even after this demolition of roadside housing, there would still be a heavy demand for pedestrians wanting to cross the 4 lane road and there would be dangerous uncontrolled road crossings.

3 Bypass options

132. Following the determination of the urban areas to be bypassed, a full assessment of routing options was carried out, again via field survey and analysis of satellite imagery. Routes were only considered as viable alternatives where they ran clear of all existing residential and commercial development, minimised environmental impacts on adjacent development, and were at least 100 metres clear of existing residential property so as to minimise the noise, air quality and visual impacts of the new road. The parameters described above, in conjunction with topographical constraints meant that for one bypass (Shamkir / Dallyar) only one route option was possible.

133. **Shamkir / Dallyar Bypass:** The built-up area of Shamkir extends for around 6 km to the south of the road right up to the foothills of the mountains beyond. There is therefore no clear corridor for a bypass on the south side of the road. A bypass running to the north side of the existing road is therefore the only viable option. Figure 18 shows the proposed alignment of the Shamkir Bypass, which is the shortest route running through open agricultural land, avoiding all residential and commercial development

134. **Asagi Ayublu Bypass:** A bypass running to the south of the existing road would need to be around 22 km long to avoid all existing development and the airstrip. The shortest route for a bypass around Asagi Ayublu is on the north side of the existing road, and this would have an approximate length of 11.5 km, roughly half that of the southern option. Considering the impacts associated with the extra land and materials requirements of the southern option, it is not preferable from an environmental standpoint. The proposed northern alignment option is therefore proposed, and this is shown in Figure 18.

135. **Gazakh / Agstafa Bypasses:** There were originally three alternative route options for the Gazakh / Agstafa Bypass, and these were reviewed in 2009 during the first phase of the present EIA. The “black” route option (see Figure 19) was preferred from an environmental perspective, as, although longer than the alternatives, it passed through less valuable, non-irrigated agricultural land (wheat fields), and degraded rangeland pasture. It also skirted the foothills, and presented no danger of obstructing future expansion of the urban area. The black route was therefore provisionally proposed as the preferred alignment option. In 2010, as the project underwent preliminary design, it became evident from detailed route surveys that the black route, though technically feasible, would have considerably larger cost implications than first assumed, due to the nature of the terrain and the provisional location of the railway crossing. It was decided to review the route options once more, including new information, more detail and extra alignment configurations, and using a systematic scoring system taking into account cost, road safety, resettlement, and environment

a. Bypass options

136. Following the determination of the urban areas to be bypassed, a full assessment of routing options was carried out, again via field survey and analysis of satellite imagery. Routes were only considered as viable alternatives where they ran clear of all existing residential and commercial development, minimised environmental impacts on adjacent development, and were at least 100 metres clear of existing residential property so as to minimise the noise, air quality and visual impacts of the new road.

137. **Yukhari Salahli bypass:** The built-up area of Yukhari Salahli extends for around 1 km to the north of the road right up to the agricultural fields and around 500 m south of the road right up to the small foothills. The elevation change on the southern side is quite often and therefore economically this option would not be profitable. A bypass running to the north

side of the existing road is therefore the only viable option. Figure 20 shows the proposed alignment of the Yukhari Salahli, which is the best route option running through open agricultural land, avoiding all residential and commercial development

138. **I Shikhli bypass:** Two options for bypass have been analysed. Both options were on the south of the existing road. First option (shown with green colour on the map) is 11 km but running through the area with almost same elevation and there would not be need for much digging and filling works while the second option (shown with red colour on the map) is only 8.5 km but there is elevation difference along the alignment which will require much digging and filling options rather than the first option. Reason of the selection of second option was first of all the difference of 2.5 km distance and as well the other main reason was that the first alignment goes quite close to Armenian border. To avoid any risks during the construction and implementation periods second option was selected as it mentioned above. In both options type of land use was the same so there was not any economic reasons (in terms of land acquisition) discussed during the selection process. Figure 19 shows the proposed alignments of the I Shikhli

139. Eight possible route options were identified, based on different permutations of the three main routes identified during the feasibility study. The route options assessed are shown in Figure 19 below. The routes were scored according to the weighted system shown in Table 9:

Table 9: Scoring system used for bypass assessment

Parameter	Scoring	Weighting (%)
Cost	1 = highest cost; 5 = lowest cost	25
Road Safety	1 = serious deterioration; 2 = minor deterioration; 3 = no impact; 4 = minor improvement; 5 = significant improvement	20
Loss of houses/buildings	1 = high deterioration; 2 = significant deterioration; 3 = moderate deterioration; 4 = slight deterioration; 5 = no impact	20
Loss of agricultural land	1 = high deterioration; 2 = significant deterioration; 3 = moderate deterioration; 4 = slight deterioration; 5 = no impact	11
Noise/Air Quality	1 = high deterioration; 2 = significant deterioration; 3 = moderate deterioration; 4 = slight deterioration; 5 = no impact	8
Severance	1 = high deterioration; 2 = significant deterioration;	8

	3 = moderate deterioration; 4 = slight deterioration; 5 = no impact	
Visual Impact	1 = high deterioration; 2 = significant deterioration; 3 = moderate deterioration; 4 = slight deterioration; 5 = no impact	8

140. Environmental considerations were applied to the scoring based on the findings of the EIA field visits and desk review. The results of the assessment are provided in Table 10 below, and show that the originally preferred black route is no longer the optimum alignment. The preferred alignment according to the new holistic assessment is the "yellow route".

141. The yellow route is not the favourite option in terms of minimising environmental impacts, as it passes closer to existing settlements, potentially causing elevated noise and air quality impacts and in places possibly causing some severance. It will also constitute a greater visual impact from these settlements, and construction will consume higher value agricultural land

142. Despite the above, as shown in Table 10, the yellow route is by no means the worst option environmentally. In fact it has several features that are favourable from an environmental and social perspective, and offers some potential for providing benefits that the black route is unable to

- The yellow route is shorter overall, and also requires less distance of new alignment. It includes an extra 5 km of dualization, through an area of uninhabited low value agricultural land with no sensitive receptors and therefore negligible likely impacts
- The 1.7 km Gazakh link road will no longer be required, which totally removes the environmental impacts previously associated with this stretch of new road.
- The yellow route will require considerably less cut and fill than the black route.
- The location of the required railway crossing is such that large earthworks and bridges will not be required (unlike for the black route).
- The inhabitants of Kokasger will no longer face possible severance for access to their rangeland pasture area.
- The Molla Nagi Tepesi historical site near Kokasger will most likely be further from the road.
- The point at which the yellow route crosses the Agstafa River is very close to the existing railway crossing.
- The yellow route passes closer to the settlements in the valley such as Kosarsgarli and Vurgun, meaning that, providing there are sufficient access points, it will be more useful to the inhabitants of these settlements than on

the previous alignment. The settlement of Kosalar will also benefit from improved access to the transport corridor.

- The proximity of the yellow route to settlements, and the additional interchanges will mean that more traffic is likely to divert to the new road rather than stay on the M-2, providing additional relief from noise and air quality impacts in the built up areas, and further improving road safety

143. It should be noted that as shown in the economic appraisal (see Section VII) this final bypass is not convincingly feasible when examining economic internal rates of return; reducing that cost to ensure improved development is therefore of greater importance along this section of the road

iii Sections to Undergo Dualization

144. Roughly 50 km of the M-2 road between Ganja and Gazakh will be widened to a dual two lane carriageway, as described in Chapter III. These works leave little flexibility in terms of alternatives/options, other than the decision of which side of the present highway the new carriageway will be constructed. This was provisionally determined via field survey, giving preference to the roadside that had the most suitable terrain, the most available space, and the least number of houses, businesses, cultural items and planted trees that would require demolition or relocation. It is expected that the side of the road on which dualization takes place will be further refined at detailed design stage

Parameter	Baseline Option		Black Route		Yellow Route		Black-Red		Green-Yellow		Green-Red		Black-Yellow		Yellow-Black	
	Score	Weighted Score	Score	Weighted Score	Score	Weighted Score	Score	Weighted Score		Score	Weighted Score	Score	Weighted Score	Score	Weighted Score	Score
Cost:	5.0	1.25	1.0	0.25	4.4	1.10	3.5	0.88	4.5	1.13	4.8	1.20	3.3	0.83	3.1	0.78
Road Safety:	1	0.20	5	1.00	5	1.00	4	0.80	5	1.00	4	0.80	5	1.00	5	1.00
Loss of houses/buildings	1	0.20	5	1.00	5	1.00	4	0.80	4	0.80	3	0.60	4	0.80	5	1.00
Loss of agricultural land	2	0.22	4	0.44	1	0.11	3	0.33	1	0.11	2	0.22	3	0.33	2	0.22
Noise/Air Quality	1	0.08	5	0.40	4	0.32	3	0.24	4	0.32	3	0.24	4	0.32	4	0.32
Severance	1	0.08	5	0.40	3	0.24	3	0.24	2	0.16	2	0.16	3	0.24	4	0.32
Visual Impact	1	0.08	5	0.40	3	0.24	2	0.16	3	0.24	2	0.16	3	0.24	4	0.32
Total Ranking:	---	**2.11**	---	**3.89**	---	**4.01**	---	**3.45**	---	**3.76**	---	**3.38**	---	**3.76**	---	**<u>3.96</u>**

Table 10: Comparison of route alternatives for the Gazakh / Agstafa Bypass

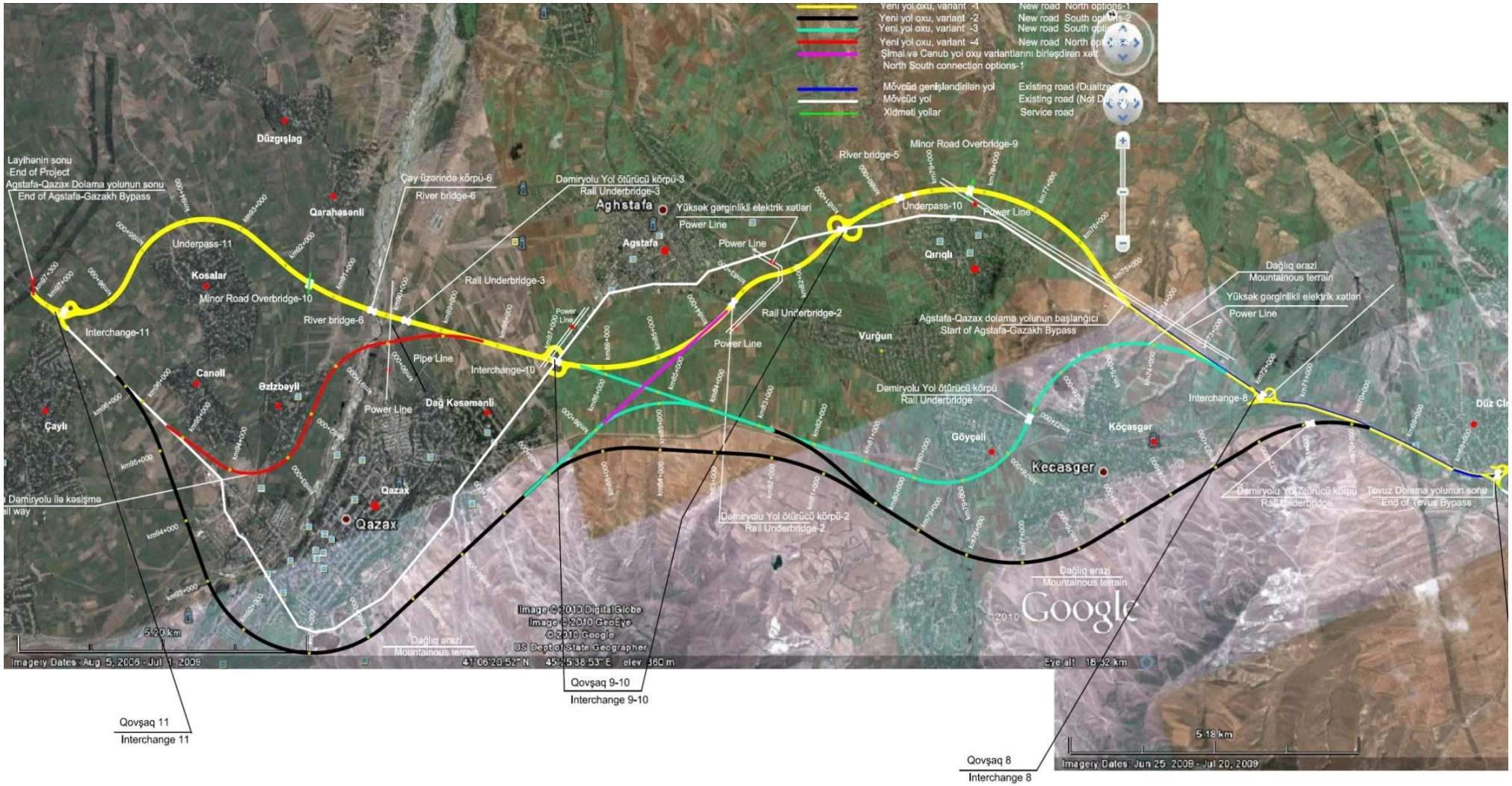


Figure 18: Route Options for the Agstafa / Gazakh Bypass

Picture 19: Road alternatives on Gazakh-Georgia border

ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES: LOCATION AND CONSTRUCTION

B. Introduction

145. This Chapter presents an assessment of the positive and negative environmental impacts[105] anticipated due to the location and routing of the project, and due to the construction process. Where negative impacts are predicted, design changes and / or mitigation measures are proposed where possible. The subsequent chapter examines the anticipated impacts associated with the operation and maintenance of the project.

Screening out areas of no significant impact

146. From the descriptions given in preceding sections it is clear that implementation of the project should not have major negative impacts during construction due to various factors, for example the acclimatisation of the local community to road works, and the relatively narrow strip of land that will be immediately affected. Furthermore, there are several aspects of the environment that are not expected to be affected by the construction process and these can be screened out of the assessment at this stage as required by ADB procedure. These aspects are shown in Table 11, with an explanation of the reasoning in each case.

Table 11: Fields in Which Construction is not Expected to Have Significant Impacts

Field	Rationale
Climate	Short-term production of dust and emissions is the only effect on atmosphere
Wildlife and rare or endangered species	There is minimal wildlife present in the project area, and those that are present are accustomed to disturbance from humans. No rare or endangered species are reported within the immediate project area.
Protected areas	The selected road alignment for dualization and bypasses does not cross or even approach any internationally or nationally protected areas.
Coastal resources	The project area is not located in a coastal area
Tourism	The project area is not a tourist destination

147. Yuxarıda qeyd edilən ekoloji faktorlar bu yolla seçildi və bundan sonra tikinti prosesinin təsirlərinin qiymətləndirilməsində bu məsələlərə toxunulmayacaqdır.

C Physical Resources

i. Air Quality

148. As described in Chapter III, the project will require a large amount of aggregates, most of which will come from borrow pits and river flood plains in or near the project area. Extracting and transporting such a large quantity of material could cause physical impacts, principally the creation of dust during excavation and transportation, which would affect people who live and work near the site and reduce the quality of adjacent land. Dust will also be generated from stockpiled materials on site, as well as exposed soils (for example when scrubland that is to be converted to road is scraped and cleared). Another potential source of dust is the batching plant at the Contractor's yard. It will be necessary to prevent

[105] As required by ADB Environmental Guidelines, impacts assessed include direct, indirect, cumulative, and residual impacts.

dust creation as much as is possible, so the Contractor should be required to follow best practical measures, in particular to:

- Site the Contractor's yard, especially batching plant and material stockpiles, away from existing settlements, paying attention to the prevailing wind direction;
- Plan the works schedule so that a minimum amount of materials are stockpiled on site;
- Damp down exposed soil, and any fill or other aggregates stockpiled at extraction or construction sites that are likely to cause dust, by spraying with water when necessary during dry weather[106]; and
- Use tarpaulins to cover loose material when transported by truck.

149. As the second carriageway or bypass will be constructed separately to the existing road, there will be no need to divert traffic or construct temporary roads, which are often a source of annoyance to motorists and local inhabitants due to noise and dust levels. The lack of need for temporary works will therefore totally avoid these negative impacts.

150. The Contractor will operate at least one asphalt mixing plant. This will generate both fugitive emissions[107] and an unpleasant odour. The Contractor should attempt to use an existing mixing plant where possible[108]. If installing a new mixing plant the Contractor should locate it away from existing settlements, paying attention to the prevailing wind direction. All asphalt mixing plants require the approval of the local executive and MENR, and in order to gain such approvals, the plant should be maintained and operated in compliance with the relevant pollution control guidelines of SNiP 111-4-80, and should have suitable emission filters fitted.

151. Road construction unavoidably requires a large number of diesel-powered plant and machinery. The exhausts from these machines create gaseous and particulate emissions that have a negative impact on air quality. The Contractor should therefore be required to use only modern machinery, and maintain it to a good standard so that it functions correctly and efficiently.

1. Topography, Geology, Soils and Landscape & Land Us

152. **Borrow pits**. Borrow extraction impacts for this project could be considerable if poorly managed, but good management and procedures will permit the mitigation of terrestrial impact to an acceptable level. Exposed borrow pits that have not been rehabilitated can have a visual impact, present a danger to humans, and can cause local erosion. Exposed pits, if near to areas of human habitation with poor provision of waste management, will also tend to be used as a dumping point for wastes, which can contaminate soils and groundwater. Extraction of fill from uncontrolled locations along river beds can also be detrimental to the aquatic environment, and can accelerate erosion. At the time of writing the present EIA, the project is at early preliminary design stage only, so no routing, geotechnical or topographical investigations have been undertaken, and it is therefore difficult to predict the total amounts of fill that will be provided via cut and fill and the

[106] To avoid competition with other local water demands the Contractor shall seek approval on the source of this water from the local competent authority.

[107] E.g. PM_{10}, NO_x and SO_x

[108] for example those currently used by contractors under adjacent road contracts, or the ARS mixing plant at Dallyar

amount that will be required as borrow. Furthermore, borrow locations are dependent on the Contractor's strategy for project implementation. Mitigation measures for avoiding the impacts described above are to a greater extent worked into the national system[109], whereby all borrow locations and operational procedures that the Contractor intends to use must be pre-approved in a three-stage process involving local stakeholders as well as MENR[110]. Operational measures that should be taken by the Contractor to reduce impacts of borrow pits include:

- Locating borrow pits away from human habitation;
- Removing and storing any topsoil prior to excavation, for use in the rehabilitation process; and
- Refilling borrow pits with spoil removed from other works, and restoring the borrow pit environs as much as is practicable, for example by revegetating the area and removing access tracks.

153. River flood plain extraction is not the preferable method of obtaining aggregates, but this practice is widespread in the area and the alluvial rivers of the project area deposit large amounts of material in their wide flood plains, so extraction of material is sustainable to some extent. Care must be taken, however, so as to minimize negative impacts of the extraction process. If riverside locations are used for borrow extraction, the Contractor should:

- Submit the location for approval using the same process as for borrow pit approval;
- Remove aggregate only from alluvial deposits adjacent to the river, not removing material from either river banks or river bed;
- Remove aggregate only during periods of low flow; and
- Use existing access roads as much as possible.

154. **Topsoil**. Earthworks will be required along the dualization and bypass sections and topsoil and any organic matter will need to be stripped. Heavy machinery moving around the construction corridor can create soil compaction, which may harm the soil's further potential as farmland and impair drainage. To minimise these potential adverse impacts related to site preparation the Contractor should:

- Strip topsoil and store it at an approved spoil area, or use it for borrow rehabilitation. Long-term stockpiles of topsoil should be provided with a suitable (e.g. grass) cover to prevent erosion or loss of fertility;
- Be sensitive to areas of high agricultural value, keeping disruption to a minimum, and adhering to the allocated working width; and
- Transport excess material to final disposal sites as extraction proceeds so as to reduce the risk of water or wind erosion.

155. **Cuttings.** The extent of cutting that will be required is unknown at present, although as the black route is no longer favourite for the Agstafa and Gazakh bypass, the major area of expected cutting, along the semi arid section bordering the foothills south of Gazakh will be avoided. At any other locations where significant cutting is required, aeolian and pluvial

[109] Numerous laws govern aggregate extraction – see pp. 122-123 in Niras (2008)

[110] See Niras (2008)

erosion of the banks could occur if not properly remediated. The Contractor should therefore ensure adequate compaction of cutting faces and slopes, and in arid areas where revegetation is likely to be slow, coir matting (or similar) should be used to cover cut faces so as to stabilize the soil and provide a medium for vegetation to hold to.

156. **Soil Contamination**. Fuel, lubricants and other materials, such as battery acid, could potentially cause contamination of soils, surfacewater and groundwater if allowed to spill or leak into the environment from vehicles or storage locations. A run-off control plan should be developed by the Contractor which focuses on managing potential problems at source, this will include as a minimum provisions for ensuring vehicles are well maintained, that all areas used for storage of fuel, bitumen and other liquids are bunded, and that vehicle washwater is not discharged to the environment prior to being passed through a gravity oil separator. Materials generated by vehicle maintenance such as oil and tyres should be disposed of properly and in accordance with MENR requirements.

157. Solid waste and sewage effluents from contractor yards or camps, if not properly managed, could contaminate soils and watercourses with *inter alia* heavy metals, salts and bacteria, causing negative secondary impacts (e.g. to fish and human health) as well as visual and odour-related impacts; the uncontrolled release of these substances into the environment is unacceptable. Serious negative impacts will be avoided by including the following requirements of the Contractor within the construction contract:

- Prepare and seek approval of a waste management plan covering collection, storage and disposal of solid and liquid wastes according to MENR requirements;
- Ensure the provision of sufficient portable latrines on site in areas where existing local latrines are not available; and
- Ensure that all on-site sewage is fed into a septic tank, which should be emptied as needed

158. **Landscape**. Landscape impacts related to construction other than the borrow pits are temporary, and in the case of the present project, these are relatively minor, and are related mainly to the temporary clearing of land, the presence of construction camps and yards, and the construction of bridges and interchanges. Screens and boarding could potentially be erected to mask the above; but this is not considered necessary due to the minor and temporary nature of the impact, and the relatively low value landscape environment in which the works will be carried out.

ii. Surface and Groundwater

159. Many of the potential construction-related negative impacts to surface and groundwater (e.g. contamination due to sewage effluent or inappropriate oil disposal) have already been covered above due to the causes being common to soil contamination. If the substances described are permitted to contaminate surface and groundwater, human health could suffer, as well as that of fish and other aquatic organisms. The Contractor should therefore follow the measures described above.

160. Extraction of water needed for the construction process from irrigation channels or aquifers has the potential to affect local water supply and irrigation as well as aquatic ecology. To mitigate against this possibility, water extraction locations and volumes should be approved by local authorities and utility providers, and adhered to by the Contractor.

161. Potential for contamination of surfacewater is greatest during construction of bridge crossings. During this process there is a danger of concrete spillage into rivers, spillage of fuels, and general disturbance of the river banks and river beds, causing contamination, erosion and high turbidity, which could have further secondary impacts, for example by affecting aquatic life (see section D.1 below). The risks of these potential impacts can, however, be easily managed:

- Ready-mixed concrete trucks should not be washed out into rivers following pouring, but into settling tanks at the Contractor's yard;
- Shuttering should be tightly constructed so that no concrete leaks occur during pours; and
- Disturbance to the flood plain should be kept to a minimum.

iii. Noise and Vibration

162. Road construction is by its nature a mobile process, and whilst some of the machinery involved can be noisy and cause a disturbance, the noise levels are not sustained and last only for short periods, whilst the construction teams pass through the locality. Where the construction passes very close to a settlement the noise and vibration levels can be of moderate concern, but of more concern is the noise and disturbance impact that can be created by both static and sustained noise sources, for example a generator set in a Contractor's yard, or sustained noise due to borrow excavations or rock crushing. The environment of the project[111] area means that the relative noise and vibration impacts of these activities are low. Furthermore, unlike much of the rehabilitation work that has been carried out along the existing road in recent times, there will be only a minimal requirement for the relatively noisy process of removing existing road surface. To further reduce the potential for disturbance a number of measures are proposed, as follows:

- Communities should be fully informed of the work programme by the Contractor well in advance of any works[112];
- Working hours should be restricted to between 06.00 and 21.00 hrs within a distance of 500 m of any settlements;
- Contractor yards and camps should be located away from settlements as much as is possible;
- Diesel generator sets and other static equipment should be well maintained, and where possible, should have enclosures to deaden noise;
- On site monitoring of noise levels should be carried out for static sites; and
- Full protective equipment should be provided to construction workers.

[111] i.e. the bypasses run through agricultural land with few sensitive receptors, as does most of the dualization; where the dualization runs through or close to settlements, there is usually a reasonable level of background noise due to commercial activities, road noise, etc. Furthermore, as the topography is generally flat, little in the way of blasting is expected to be required.

[112] Any changes to the original schedule should also be communicated to local communities.

C. Ecological Resources

i. Fisheries and Aquatic Ecology

163. As described above, the extraction of aggregates from river channels and the construction of bridge piers can agitate the river bed and banks causing an increase in turbidity which could be detrimental to fish. There is also a possibility of the construction process leading to direct disturbance of egg laying locations and the breeding cycle of anadromous[113] fish. These impacts are, however, expected to be relatively minor due to the Kura tributaries being naturally highly turbid as a result of the geomorphology of their upper reaches. Several measures to mitigate potential impacts on water quality have already been proposed, but to further safeguard fish in the rivers of the project area during the construction process, the Contractor should only carry out civil works for river crossings outside the major fish spawning periods. By happy coincidence the spawning seasons are likely to coincide with periods of high flow in the rivers, during which the Contractors would in any case avoid construction activities.

164. In addition to the potential effects to fish, poorly executed gravel extraction from unsuitable areas could impact upon aquatic ecology by disturbing or eroding riparian habitats such as reed-beds, nests and burrows. Impacts of this nature should be avoided by the Contractor due to the requirement to follow a strict procedure with regards to fill extraction; however monitoring is needed to ensure that shortcuts are not taken.

165. The project will require the construction of numerous culverts where drainage ditches cross the road alignment. These ditches are not known to hold any rare or endangered aquatic life, but care should be taken not to unnecessarily disturb aquatic habitats in these locations.

ii. Flora

166. There is little negative impact associated with the removal of a narrow strip of vegetation along the project road. Along most of the sections to be dualized the ROW is of low value ecologically, vegetated with commonly found grasses and perennial plants; more concern is given to the loss of ground cover rather than the loss of the plants themselves. In most areas these plants will re-establish alongside the new carriageway within 6 months to a year[114]. Along the majority of the new bypass ROWs the flora to be lost will consist principally of agricultural species. So as to minimise impact to both the landscape and to the landowners, detailed design activities will seek to minimise disruption to high-value, slow-growing crops such as fruit trees and grape vines, but in terms of construction-related measures to reduce impacts, the Contractor should enter into discussions with landowners to ensure that any crops have been harvested prior to the groundwork teams passing over the land. The landowners and workers should be adequately compensated for their loss of crops, however compensation and resettlement are covered in separate studies and are not the focus of the present report[115].

167. The 0.73 hectares of forest fund lands belonging to Shamkir FPRE and 137 trees of various diameters passing through the territory of Shamkir region (km 25+170 – 25+290), 0.2976 hectares of forest fund lands belonging to Tovuz FPRE and 239 trees of various diameters passing through the territory of Tovuz region (km 70+725 – 70+860), 1.6 hectares of forest fund lands belonging to Ghazakh FPRE and 59 trees of various diameters passing through the territory of Ghazakh region (km 97+812 – 97+971 və km

[113] Living in salt water but migrating up rivers to reproduce

[114] During field visits, road sections that had recently been rehabilitated already showed good levels of regrowth

[115] See Nippon Koei UK (2009b)

98+138 – 98+247) are under the road construction. Hence, totally 2,6276 hectares of forest fund lands and 435 trees of various diameters are under the Ganja-Ghazakh-Georgia highway construction. (The acts drawn up in FPREs of Shamkir, Tovuz and Gazakh are attached to the report; 3 copies).

168. As noted in Chapter IV, relatively extensive tree planting has taken place alongside much of the existing road, and some of these trees will inevitably need to be felled as part of the widening works. In reality far fewer trees than the numbers shown will be lost during construction, as the widening is only occurring along one side of the existing carriageway. A rough estimate of the likely number of trees to be lost during construction is therefore between 435 individual mature trees. The Forest Code of Azerbaijan allows tree felling that is required by road construction[116] activities but does not stipulate replanting requirements. The Nature Monuments code protects over 2000 historic or important trees but none of these are likely to be amongst those lining the road, but this should be checked by the Contractor prior to any felling. To mitigate the loss of existing roadside trees, the Contractor should undertake a full survey of roadsides to be dualized, noting numbers, age and species of the trees that need to be felled. A plan should then be prepared and submitted for approval containing details of the locations, species and numbers of trees to be replanted[117]. The plan should adhere to the latest legislation with respect to replanting, and should also include information on a follow-up care programme for the trees. To maintain the existing character of the road, and to improve the landscape value, a tree planting plan should also be prepared for the new bypasses.

D. Economic development

169. Economic related negative impacts resulting from the construction process are minimal and the construction of the project will have little effect on local or national trade or economy. Some minor local issues exist, but these are principally related to temporary disruptions at a very local level, which will not have any lasting effect on economic development.

i. Industry and trade

170. No major negative impacts on industry are expected to arise as a result of the project construction, indeed the need for materials, fuel, and other equipment will provide a boost to the relevant industries.

171. The construction activities may have an undesirable impact on local trade and businesses. The land requirements will force some roadside businesses to move or close. At other locations, whilst businesses may be clear of the ROW, their access roads or business frontage may be temporarily blocked or obscured, or part of their land may be lost. ADB policy on Involuntary Resettlement requires that no-one should be worse-off as a result of the project, so a Resettlement Plan (RP) has been prepared to examine these issues. This establishes that no more than 10 % of the total land of any owner or occupant should be acquired, and that if any business premises have to be removed, the owners or tenants should be provided with:

- Compensation equivalent to the amount of business income lost; and
- Compensation at replacement cost for any income-generating assets (e.g. shop premises) that have to be removed.

[116] Available at http://www.cawater-info.net/library/eng/az_for_cod.pdf

[117] İt is possible that rules on useç preservation and protection of trees and shrubs belonging to AR is kept

172. Certain roadside shops that are not purchased may still lose income because the presence of the construction site will deter customers, and access will be impeded by road closures, the presence of heavy vehicles and machinery, etc. These issues are also dealt with by the Resettlement Plan, and impacts will be mitigated by:

- Keeping disruption to the minimum in terms of frequency, duration and extent;
- Maintaining or providing alternative vehicle and pedestrian access to roadside businesses wherever possible; and
- Providing owners and tenants with financial compensation equivalent to the amount of business income lost.

173. The agricultural industry in the area has the potential to be adversely affected by the construction process, principally via the obstruction that may be caused by the works; in the project area farmers are accustomed to being able to access fields directly from the M-2 highway. The potential impacts can be greatly reduced via the consultation process and via the provision of suitable temporary crossing points, if required.

ii. Transportation

174. The nature of the project is such that there will be very little impact on the existing road traffic, as dualization works will occur on a parallel strip to the existing road and will generally not require diversions or temporary roads. There will be some minor delays due to turning trucks, the transport of large plant (e.g. road laying machines), and the presence of slow moving vehicles, but the current conditions of the M-2 road[118] mean that this will not be anything out of the ordinary. As already described, construction of the bypasses will also occur without major disruption to the normal traffic flow on the existing road. Where the most disruption is likely to occur is at the locations where interchanges will be built, however the impacts of this process are still minor and of short duration if properly managed. Normal traffic flow along the road should be maintained during most of the interchange construction process, with short temporary diversions to traffic required when the precast bridge beams are put in place, and again at the end of the construction process when the connection roads are made. These diversion roads should be of a reasonable quality, and standard best practices such as daily damping to prevent dust should be ensured.

iii. Infrastructure and Power Facilities

175. Excavations occurring during construction could damage existing infrastructure (such as water distribution pipes, electricity pylons, etc) located alongside the roads and at borrow locations. In order to avoid potential negative consequences such as disruption to power supply or contamination with sewage, official information on the locations and types of infrastructure networks should be sought by the Contractor, and a plan created for dealing with these. The project area has many private water extraction points, irrigation systems, and wastewater outlets, and a survey should therefore be carried out to ascertain the locations of any unofficial connections. Further mitigation measures to be ensured by the Contractor include:

- Provision of alternative power supply during disruptions due to the need to move pylons[119];

[118] Which has had road works, diversions, and disruptions along much of its length for sustained periods, and which is commonly used by slow moving agricultural vehicles, and large haulage vehicles.

[119] This should be provided by the local utilities company or the Contractor, depending on legislation and capabilities

- Provision of tankered potable water during disruptions to the water supply system; and

- Provision of suitable sanitary facilities in the event of disruptions.

176. The provisional route of the Shamkir / Dallyar Bypass runs close to the BTC pipeline; detailed design will ensure that the road is a satisfactory distance from the pipeline ROW, but construction workers should nevertheless be briefed as to its whereabouts and instructed to be particularly vigilant in this zone.

E. Social and cultural resources

i. Population and communities

177. Disruption to villages and other communities has largely been covered in section E above. The project works will have minor negative and positive impacts on daily life in nearby communities as:

- The towns will be bypassed and so works will be conducted away from urban centres;

- In semi-urban areas of dualization, which are classified as having development along one side of the road only, the works will be mainly carried out on the opposite side to that on which development exists; and

- The works will be transient, involving a relatively small workforce[120].

178. Certain measures to avoid disturbance to local inhabitants have already been set out in the present report. Further action that should be taken to minimise disturbance as far as possible includes:

- Consultation with the local community to inform them of the nature, duration and likely effects of the construction work, and to identify any local concerns so that these can be addressed; and

- Involving the community in planning the work programme so that any particularly noisy or otherwise invasive activities can be scheduled to avoid sensitive times.

179. The proposed project design options mean that land acquisition and resettlement impacts are minimised as much as possible but may not be fully avoided. According to the 2009 preparatory assessment[121], it is expected that the number of affected persons may be more than 200 and in accordance with ADB resettlement requirements, a full RP therefore needs to be prepared for the project. After finalization of the alignment, a detailed land acquisition plan will be prepared based on which a full census and inventory of lost assets and affected people (APs) will be carried out. A sample socio-economic survey of APs will also be carried out for generation of base data to be used for evaluation of project benefits following project completion.

180. Permanent land acquisition will be dealt with in the above plan, but the Contractor should also be mindful of the temporary acquisitions, taking care to minimise the duration that the land is required for, and ensuring that it is restored in an acceptable manner following completion of the work.

[120] Meaning that income boosts for local businesses due to the presence of the workforce and labour needs will be relatively meagre

[121] Nippon Koei UK (2009b)

ii. Health and Education

181. There is invariably a safety risk when substantial construction such as this is conducted, and precautions will thus be needed to ensure the safety of both workers and citizens. The Contractor will be required to produce and implement a site Health and Safety Plan, and this should include such measures as:

- Excluding the public from the site where possible;
- Ensuring that all workers are provided with and use appropriate Personal Protective Equipment (PPE);
- Provision of Health and Safety Training for all site personnel;
- Provision of first aid equipment;
- Documented procedures to be followed for all site activities; and
- Accident reports and records to be maintained.

182. Due to the relatively small numbers of workers expected on site, impacts on the local community are unlikely to be significant. Sexually transmitted Diseases (STDs) are a common risk among workers and local communities where a large project is implemented, however the small numbers of workers involved, and the conservative Muslim attitudes of the rural communities means that STDs are not considered to be a likely risk of the present project. Despite this, free condoms and advice should be provided by the Contractor.

183. The construction process will have no impacts on local education.

iii. Cultural heritage

184. The vast majority of the new carriageway and new bypasses will run through land that has already been disturbed on the surface, as well as subsurface due to ploughing. Questions regarding the presence of archaeological, cultural and historical sites will be posed during the stakeholder consultations, and this should identify any sites of interest that lie within the proposed RoW, permitting alterations to the route alignment, or excavation of the area prior to construction in areas where there is no leeway in the corridor[122]. Little or no ancient cultural heritage sites or items are therefore expected to be encountered during construction, but the Contractor should be prepared for such an eventuality by:

- Including state and local archaeological, cultural and historical authorities and interest groups in consultation forums as project stakeholders so that their expertise can be made available to the project;
- Developing a protocol for use by the Contractor in conducting any excavation work, to ensure that any chance finds are recognised and measures are taken to ensure they are protected and conserved. This should involve:
    - Stopping work immediately to allow investigation if any finds are suspected; and

[122] This scenario is highly unlikely

- Calling in the Academy of Sciences of Azerbaijan if a find is suspected, and taking any action they require to ensure its removal or protection *in situ*.

185. More recent sites of cultural value, such as monuments, graveyards, and mosques, should also form part of the Contractor's cultural heritage plan. Whilst the majority of these sites will be avoided via the detailed design process, it is expected that at one or two locations, there may be some encroachment. The specific action to be taken will to a greater extent depend on the opinions and preferences of local residents, and thus will be determined during the stakeholder consultations.

F. Location of project and impacts related to project

186. ADB Environmental Assessment Guidelines require that an EIA should evaluate impacts likely to arise due to the location, design, construction and operation of the project. Construction and operation are the two principal activities in which the project interacts physically with the environment, so they are the two activities during which the majority of environmental impacts are likely to occur. In assessing the effects of these processes therefore, all potential impacts of the project design are identified, and mitigation is devised for any negative impacts. This has been done in Sections B-F above and Chapters VI and VII below and no other major impacts are expected.

187. In many environmental assessments there are certain effects that, although they will occur during either the construction or operation stage, should be considered as impacts primarily of the location or design of the project, as they would not occur if an alternative location or design was chosen. For example, if a road was built in an area of great landscape beauty there would be severe visual impacts as a result of the location, as these would not occur if the road was routed around the outskirts of a neighbouring city.

188. The present project's only design-related possibilities for impacts come from the route of alternatives for the bypasses[123]; widening of the existing carriageway cannot be avoided or changed via design or location.

189. The three bypasses proposed under this project pass principally through agricultural land. The Shamkir / Dallyar Bypass cannot not be routed or redesigned due to constraints outlined in the examination of alternatives; its present and only realistic location fortunately passes through flat agricultural land and wasteland having no particular landscape value. Furthermore the BTC pipeline runs in relative proximity to the bypass, so the corridor is to a great extent already disturbed. As described the Asagi Ayublu Bypass, I Shikhli did have an alternative routing option, however due to the settlements and airstrip to the south of the road it would need to have been double the length of the selected option, still passing through similar agricultural land to the selected option, and furthermore it may have had to pass relatively far into the hills above. In selecting the northern option for the Asagi Ayublu Bypass, design-related impacts have been minimised. As discussed in the preceding chapter, the route selection for the Gazakh / Agstafa Bypass was an extensive process, and the yellow route was finally selected based on a compromise between all design considerations, including social and environmental issues. The selected yellow route does pass through higher value agricultural land than the black route, and has the potential to cause slightly greater environmental impacts via noise, air and visual pollution, however these minor increases in impact can all be mitigated fairly simply. The impacts just described are further balanced by the opportunities for positive social and environmental impacts that the yellow route offers – essentially improved connection to the transport corridor for the generally poor communities near to the provisional RoW, plus the likely diversion of increased levels of traffic to the bypasses when compared to the black route.

[123] Note that this refers only to the routing and not the presence of the bypasses as following the assessment of alternatives, their presence is a given and therefore not a design variable.

190. To achieve the above improvements and to minimise any impacts of the road passing closer to the settlements in the agricultural plain, it is important that mitigation measures are followed closely, and, critically, that sufficient access and crossing points are provided along the new Gazakh / Agstafa Bypass. The detailed design studies should also seek to avoid as much as possible the areas of mature fruit trees and vines found along the new Gazakh / Agstafa Bypass alignment. As well as provision of by-pass in Yukhari Salahli towards North and selection of by-pass variants from south part of I Shikhli village will be necessary because of prevention from negative affects.

191. The project involves straightforward construction and low-maintenance operation in an environment that is not especially sensitive; most of the predicted impacts are associated with the construction process, and are produced because that process involves quite extensive groundwork. However the routine nature of the impacts means that most can be easily mitigated. In the case of this project it is therefore not considered that there are any notable impacts that are a result of options related to its design or location

Vİ ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES: PRESENCE, OPERATION AND MAINTENANCE

A Introduction

192. According to the results of the scoping, a simple *ad hoc* assessment methodology was employed for impact assessment. The operation of the project should have an overwhelmingly positive environmental and social impact. The opening of new bypasses around the main population centres will result in a considerable reduction in traffic and will provide significant long term improvements in road safety conditions, severance effects, traffic noise and air quality. Other positive impacts include economic growth and reduced journey times. This chapter further details the expected positive impacts of the presence and operation of the project, as well as highlighting the potential negative impacts and providing suitable mitigation measures where necessary.

B Screening out areas of no significant impact

193. Because roads and bridges generally operate without the need for major repair and maintenance[124] there are several environmental sectors that should be unaffected once the new 4 lane dual carriageway is opened. These are identified in Table 12 below, with an explanation of the reasoning in each case. These factors are thus screened out of the impact assessment and will not be mentioned furthe

Table 12: Fields in Which Operation and Maintenance of the Road is not Expected to Have Significant Impacts

Field	Rationale
Climate	Minor changes to levels of emissions will not discernibly affect local climate.
Wildlife and rare or endangered species	There is minimal wildlife present in the project area, and those that are present are accustomed to disturbance from humans. No rare or endangered species are reported within the immediate project area.
Flora	Operation of the road will not involve any disturbance of natural flora or domesticated crop species.
Protected areas	The selected road alignment for dualization and bypasses does not cross or even approach any internationally or nationally protected areas.
Coastal resources	The project area is not located in a coastal area.
Infrastructure and power facilities	Operation of the road will not interfere with any local infrastructure; any clashes will have been dealt with during project construction.
Cultural Heritage	Any potential sites or items of cultural value will have been discovered during detailed design and construction, and allowances made.

C Physical Resources

i. Air quality

194. Due to the changes in locations of traffic flows, and vehicle numbers, type and speeds, changes to local air quality are inevitable. An assessment of the likely air quality impacts of the project operation has been carried out using a standard screening method adopted in

[124] As described in Chapter III

the United Kingdom [125] for the environmental assessment of road projects. This assessment has been carried out for 2012 (the originally planned opening year of the project) and for 2027 (the 15th year after opening), for the 'without project' and 'with project' scenarios for all the towns to be bypassed. Inputs to the model were based on projected traffic numbers, present and projected vehicle type mix, the results of the origin-destination surveys and standard emission factors[126].

195. Table 13 below shows the results of the assessment and compares the calculated emission levels with air quality criteria set in current European Union (EU) Directives.

Table 13: Conclusions of air quality assessment

	Year	Pollutant Concentrations						
		Carbon Monoxide CO	Benzene	1,3 butadiene	Nitrogen Oxides NO_x	Nitrogen Dioxide NO_2	Particulate Matter PM_{10}	
		Annual Mean mg/ m^3	Annual Mean µg/m^3	Annual Mean µg/m^3	Annual Mean µg/m^3	Annual Mean µg/m^3	Annual Mean µg/m^3	Days >50 µg/m^3
Max. EU Levels		**10**	**16.25**	**2.25**	**30**	**40**	**20**	**7**
Shamkir								
Existing Road, without project	2012	0.03	0.03	0.03	7.39	3.51	1.50	0
Existing Road, with project	2012	0.02	0.02	0.02	3.46	2.09	1.18	0
Existing Road, without project	2025	0.06	0.11	0.11	11.51	4.81	1.91	0
Existing Road, with project	2025	0.03	0.03	0.03	5.79	2.96	1.36	0
Bypass	2012	0.01	0.01	0.01	2.07	1.51	1.10	0
Bypass	2025	0.02	0.02	0.02	3.24	2.01	1.25	0
Asagi Ayublu								
Existing Road, without project	2012	0.03	0.04	0.04	8.23	3.79	1.59	0
Existing Road, with project	2012	0.02	0.02	0.02	3.48	2.10	1.19	0
Existing Road, without project	2025	0.07	0.13	0.13	14.07	5.56	2.16	0
Existing Road, with project	2025	0.04	0.04	0.05	8.48	3.87	1.62	0
Bypass	2012	0.01	0.01	0.01	1.96	1.47	1.09	0
Bypass	2025	0.02	0.02	0.02	3.24	2.01	1.25	0
Agstafa and Gazakh								
Existing Road, without project	2012	0.02	0.02	0.03	5.71	2.93	1.35	0
Existing Road, with project	2012	0.02	0.02	0.02	3.14	1.96	1.17	0
Existing Road, without project	2025	0.05	0.06	0.08	11.74	4.88	1.83	0
Existing Road, with project	2025	0.04	0.04	0.04	7.45	3.53	1.53	0
Bypass	2012	0.01	0.01	0.01	1.66	1.33	1.05	0
Bypass	2025	0.01	0.01	0.02	2.89	1.86	1.16	0

[125] The Highways Agency "Design Manual for Roads and Bridges (DMRB), Volume 11, Section 3, HA 207/72, May 2007, with accompanying spreadsheet.

[126] Average distance of sensitive receptors for the modelling were set at 10 metres for the existing urban roads, and 100 metres for the bypasses.

196. The results show that:

- Even without the project, air quality levels in the towns to be bypassed would still remain within acceptable levels beyond 2025;
- In all cases and across all parameters the presence of bypasses are greatly beneficial to the air quality of the towns they bypass, in some cases emissions are reduced by a factor of 3 in comparison to the no-project scenario;
- With the presence of the project bypasses, only minor deteriorations of air quality occur between 2012 and 2025 in the urban areas, whereas in the no-project scenarios the deterioration is much more significant;
- Air quality along the new bypasses, whilst clearly being less good than when it was open agricultural land, still remains good until 2025 and for all bypasses and all parameters, air quality in 2025 is still considerably better than the no-project scenario for 2012 in the urban areas; concentrations of pollutants at the nearest houses to the new bypasses were therefore vastly lower than the concentrations at the nearest houses to the existing road in any year, due to the fastest vehicle speeds and the increased distance to the road on the bypasses;

197. Overall, it can be concluded that the presence of the bypasses represents an overwhelmingly positive environmental impact in terms of air quality.

198. On sections of road to be dualized, modelling was not possible, but the increased traffic speeds that will result from the project will improve engine efficiencies, reducing overall emission levels in comparison to present levels. In terms of absolute emissions, the project will therefore contribute to an overall emissions reduction as well as the local improvements described above.

199. Note that although vehicles now outstrip industry as the principal source of air pollution in Azerbaijan[127], the presence of the new road *per se* is not considered likely to generate additional traffic as no alternatives routes exist to the border/Baku. As all elements of the project represent positive impacts[128], no mitigation measures are required.

200. Impacts on air quality resulting from maintenance operations are expected to be very minor, and should be mitigated according to similar lines as construction mitigations (see Section C.1).

ii. Topography, Geology, Soils and Landscape & Land Use

201. The presence, operation and maintenance of the widened road and bypasses will have no impacts on the geology and topography of the project area.

202. There is a minor risk that soils may become contaminated due to accidental spillage (e.g. an overturned fuel tanker). Ideally, a road surface drainage system, including API separators, would be installed along the project road, however a combination of the low risk involved, road construction standard employed by ARS, and the economic feasibility means that no drainage system will be installed. Furthermore, a major concern at present is ensuring basic and essential road maintenance and it is unrealistic to expect that additional infrastructure for run-off controls would be adequately maintained. ARS should,

[127] ADB (2005)

[128] As noted, the slight deterioration in air quality in the sparsely inhabited farmland areas is considered inconsequential

however, draft an Emergency Response Plan so as to allow effective mitigation in the event of an oil or chemical spillage, and relevant training should be provided to staff.

203. Clearly the presence of the road will have affected the land use in the immediate area, particularly in locations that were previously used as agricultural land. It is expected that along most of the new bypasses, adjoining land will remain under agricultural use for the foreseeable future, but there is some risk that commercial or residential development may arise alongside the new road sections. To a greater extent this is mitigated for in the road design, as unlike a single carriageway road, the four lane dual carriageway will not be so easy to connect to private driveways, and it is not possible to cross the road with a motor vehicle between designated interchanges. Despite the fact that anything other than minor developments are likely[129] along the new sections of road, regular checks for illegal connections should be made by ARS along the route.

204. Landscape impacts resulting from the presence and operation of the project will be a combination of positive and negative factors. There will be an improvement to the urban landscape in the towns being bypassed due to the reduced numbers of large trucks passing through the town centre. Views for vehicle passengers along the bypasses will also be improved in comparison to the urban landscapes. On the negative side, the rural landscapes through which the bypasses will run will be deteriorated from the standpoint of anyone walking through the fields, however it should be noted that these areas are not recreational and are exclusively used for farming. Another area where the landscape may be adversely affected is at the interchanges, where land alongside the road will be taken up with slip roads, and where the traffic is elevated over the bridges. If the tree planting plan outlined in the preceding section is successfully implemented, planting large-growing native trees at the periphery of the interchanges, masking the structures and giving a more pleasing appearance, these issues would not necessarily constitute negative visual impacts. Another measure that could assist with eliminating the possible visual impacts associated with the interchange bridges is to employ sympathetic architecture styling during the design phase[130].

iii. Surface and Groundwater

205. The major potential impact of road operation and maintenance on surface and groundwater is contamination due to accidental spillages. As has already been discussed above, protective infrastructure in the form of drains and traps will not be provided alongside the road, so an element of risk will remain, however it should be ensured that at detailed design phase sufficient thought is given to protection of the rivers and drainage/irrigation ditches by providing adequate barrier protection along bridges and crossing points.

iv. Noise and vibration

206. Due to the changing location of traffic flows, and vehicle numbers, type and speeds, changes to local noise levels under project operation are inevitable. An assessment of likely traffic noise levels has been made that compares noise levels in the 2008 base year with noise levels in 2012 (the originally planned opening year of the project) and in 2027 (the 15th year after opening) in the 'without project' and the 'with project' scenarios. This assessment was made using the standard calculation method adopted in the United Kingdom[131] which gives noise levels expressed in A weighted decibels (dB) as $L_{A10,18h}$ values, which is the average noise level exceeded for 10% of the time between an 18 hour period from 06.00 and 24.00 on a typical weekday. The resultant noise levels were then

[129] The most likely of which would be farmers making use of their land's newfound proximity to a road

[130] Perhaps including design options in the stakeholder consultations

[131] Department of Transport "Calculation of Road Traffic Noise" 1988 published by HMSO.

converted to LA_{eq} values which is the equivalent continuous sound level as used in European standards. In common with the air quality modelling, inputs to the noise model were based on projected traffic numbers, present and projected vehicle type mix, and the results of the origin-destination surveys. Table 14 shows the results of the traffic noise assessment.

Table 14: Results of the Noise Modelling Assessment

Location / year	Existing Road			Bypass
	Without Project	With Project	Change resulting from project	
	dB(A)	dB(A)	dB(A)	dB(A)
Shamkir				
$L_{A10\ 18h}$ values				
2008	67.6	-	-	-
2012	69.3	65.0	- 4.3	67.4
2027	74.1	69.6	- 4.5	72.0
L_{Aeq16h} values				
2008	63.0	-	-	-
2012	64.6	60.5	- 4.1	62.8
2027	69.2	64.9	- 4.3	67.2
Asagi Ayublu				
$L_{A10\ 18h}$ values				
2008	64.0	-	-	-
2012	68.5	62.9	- 5.6	67.0
2027	73.6	67.8	-5.8	71.5
L_{Aeq16h} values				
2008	59.5	-	-	-
2012	63.8	58.5	- 5.3	62.4
2027	68.7	63.2	- 5.5	66.7
Agstafa and Gazakh				
$L_{A10\ 18h}$ values				
2008	65.9	-	-	-
2012	67.6	64.3	- 3.3	65.0
2027	72.3	68.8	- 3.5	69.4
L_{Aeq16h} values				
2008	61.4	-	-	-
2012	63.0	59.8	- 3.1	60.5
2027	67.5	64.1	- 3.3	64.7

The results show that:

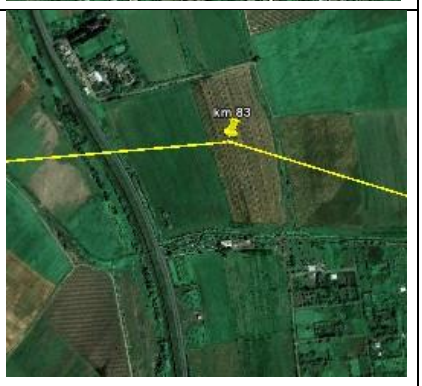
- Reductions in traffic noise along the existing road in the populated areas resulting from traffic diverting onto the new bypasses varies from 3.3 to 5.8 dB(A);
- With the presence of the project bypasses, noise increases due to rising traffic levels between 2012 and 2025 in the urban areas are slightly reduced in comparison to the no-project scenario;
- Noise levels along the bypasses upon road opening in 2012 are in all cases lower than the present (2008) levels in corresponding urban areas

207. It is evident that overall, the noise level reductions in urban areas provided by the operation of the project are significant and they will improve living conditions for those living near to the road. At Asagi Ayublu, the traffic noise reduction is in excess of 5 dB(A) and this is recognised as a major improvement.

208. Along the dualized sections of road, it is expected that there will be a slight increase in noise due to the increased traffic speeds, but this will not affect many people, and will be offset to some extent by improved road surface and the elimination of low speed engine revving and other disturbances associated with the current activities that occur along the semi-urban sections of road. In rural areas the noise will be slightly increased in comparison with the current levels, however there are almost no sensitive receptors along these stretches. The presence of any sensitive receptors along the proposed bypasses will be taken into account during detailed design, and once the final route is established, any areas where the road unavoidably passes human settlements will be known. At these locations, installation of noise barriers and tree planting are proposed as a measure to mitigate the noise impacts. Provisional locations along both sections for dualization and the bypasses at which noise protection may be required are shown in Table 15 below.

Table 15: Potential Locations for Noise Protection Requirement

Location	Description	Est. Length	Image
Caparli (km 14)	Existing road runs along the edge of the village. Increasing traffic speeds may require noise protection.	1100 m	
Settlement at km 16	Existing road runs along the edge of the village. Increasing traffic speeds and proximity to new interchange may require noise protection.	1000 m	
Northern edge of Dallyar (km 23 - 26)	Proposed bypass alignment passes between 200-500 m away from this residential area. The settlement to the north of the proposed bypass at km 26 may also require protection.	1700 m	
North western corner of Govlar (km 45-46)	Proposed bypass alignment passes at around 300 m from this residential area.	1300 m	

Location	Description	Est. Length	Image
Settlement at km 77	Very small cluster of houses some distance from the main settlement are within 100 m of the RoW of the proposed bypass. New houses under construction so this area is likely to develop.	500 m	
Settlement at km 79	Very small cluster of houses some distance from the main settlement are within 100 m of the RoW of the proposed bypass. New houses under construction so this area is likely to develop.	500 m	
Farms at km 83	The RoW of the proposed bypass passes through a field between two farmsteads, both within 200 m. Noise protection is advised on both sides of the road at this location.	500 m (250 m x2)	
Farm at km 86	A single farmstead is located within 200 m of the proposed RoW.	400 m	
NE corner of Kosalar	The alignment of the proposed bypass passes close to the NE corner of Kosalar, where noise protection may be needed.	500 m	

Location	Description	Est. Length	Image
NE corner of Gazaxbayli	The alignment of the proposed bypass passes close to the NE corner of Gazaxbayli, and within 150 m of one isolated house. Noise protection may be needed.	400 m	
North part of Yukhari Salahli village	This by-pass transvers in a distance of 70 m from the nearest house	600 m	
South part ofI Shihkli village	The esixting will be remained and widening will be done in the north part.	600 m	

209. The total provisional distance that may require noise protection is around 8,500 metres. Post-construction monitoring or receipt of complaints from residents as traffic levels grow may require some further retrospective installations, although in reality this is unlikely to occur. Noise barrier installation should be included within the construction contract, but for the purposes of budgeting, a provisional cost estimate for this mitigation measure is provided in Table 18.

210. Maintenance operations will be of a very routine nature, and will be carried out only infrequently and for short durations, therefore having an extremely low noise and vibration impact. Despite this, maintenance teams should only work between the hours 06.00 and 21.00 hrs within a distance of 500 m of any settlements, and they should be provided with adequate PPE.

D Ecological Resources

211. As noted impacts have to wildlife have been screened out due to the lack of any noteworthy species in the project area, and the fact that the land is turned over to fairly intensive agriculture in general. It is worth mentioning, however, that following the opening of the new 4 land road there may be some increase in road kill levels, particularly of domestic animals such as cats and dogs, due to animals not being accustomed to the increased road width combined with increased vehicle speed. No mitigation measures are provided as the problem concerns mainly domestic animals, and will most likely stabilise once local animals become accustomed to the presence of the new road.

i Fisheries and Aquatic Ecology

212. Normal operation of the road will have no direct impact on fisheries or aquatic ecology; but a minor secondary impact may arise from contamination of surface waters due to road runoff or accidental spillage. In addition to spillage, which is already discussed above, low levels of benzene, oils, heavy metals, VOCs and other contaminants will accumulate on the road pavement and be washed away during rain events. As mentioned, no measures will be in place to mitigate this runoff, however the natural conditions will allow for assimilation of this minor issue as, due to the relatively light traffic and frequency of rain events, any contaminant runoff will be highly diluted and no high impact runoff events are predicted.

E Economic Development

213. The principal aim of the project is to promote economic development at a national level via the encouragement of international trade, and the completed project is expected to contribute greatly to the overall road improvement strategy and thus to economic development as a whole. This will in turn have a beneficial impact across many aspects of life in the project area; as the national economy improves, trade, industry and commerce will improve, allowing for improvements to utilities and infrastructure, and a general improvement to living standards. This general sequence of events governs much of the impacts outlined in this section; the overall impact of the project is nothing but positive on local and national development.

I Industry and Trade

214. In addition to the promotion of international trade outlined above, the presence of the new road should be beneficial to local industry and trade. Improved journey times and fuel efficiency will reduce transport and employee costs, and the improved road surfaces and journey times should be beneficial to the quality of transported perishable goods such as fruit. Although as noted, the construction and operation of the project will have some negative impacts on agriculture, the presence of the completed road will also have some positive impacts, for example a reduction in travel time and travel-related spoiling for agricultural products.

215. The operation of the road will cause a negative impact, however, to some of the businesses that presently operate alongside the road in semi-urban areas. Due to the stopping and exit restrictions, most of these businesses will no longer be able to operate in theory, and the RP described in section V.1 will provide mitigation against these losses, ensuring that no businesses lose out due to the presence of the road. In practice many of these businesses are likely to continue to operate, either moving premises to the secondary road running to the south of the new road or by remaining where they are and using illegal road connections. Stalls selling fruit and other goods are also likely to be set up along the new highway, and due to the increased road speeds, these and the illegal connection roads represent a danger to both motorists and stallholders. ARS should endeavour to patrol the road at regular intervals so as to discourage the activities mentioned above. Petrol stations currently operating along the road will also lose some business due to the dualization, as the traffic directions will be separated. Again, allowances for these losses should be made in the RP. Dedicated rest areas that provide fuel, toilets, shops and restaurants are a potential positive outcome of the new road, but this is an issue to be developed at detailed design, and would need close cooperation with ARS regarding the financing for any such areas.

216. Businesses along the stretches to be bypassed may also experience some minor income losses as a result of the reduced traffic flow through the town. These losses will be felt more by certain businesses than others, and will in time be negated by the forecast traffic increases. Despite this, the RP should ensure that financial losses from urban businesses being bypassed are adequately compensated.

Ii Transportation

217. The direct positive impact on transportation in the project area is a key aim of the project. Regional and semi-local (i.e. between junctions) journey times will be reduced, and once all the upgrade projects are complete along the M-2 highway, the entire corridor from the Georgian border to Baku will have a greatly improved and safer transportation link. Another positive outcome is that those areas bypassed will have a safer and quieter road on which to make their local journeys.

218. A negative impact will however be felt by those living in close proximity to the present road in areas that will not be bypassed, and who presently use it for very short local journeys. Access to the carriageways will be restricted on the new road, crossing will not be possible and local traffic will be diverted to the secondary roads. This is mitigated for as much as possible in that most areas of any noteworthy inhabitation will be bypassed, and the local roads element of the project will seek to improve the minor roads around interchanges and elsewhere, but some people will inevitably remain affected. The RP should assist those worse affected, but in most cases the solution will simply be that the households will have to use a slightly longer route for access to the main road, using the official village roads. These issues should be covered during the consultation process so that residents are properly informed of the forthcoming changes, and can provide opinions on any proposed solutions.

219. The existing road has connections with a number of local roads running in a north/south direction and connection various villages and towns across the plain[132]. Whilst the settlements to the north of the existing road and proposed bypasses will not be directly affected by issues such as noise, safety or air quality, they may face an access or severance issue. It is therefore important that the social survey undertaken during detailed design takes note of all roads connecting with more distant settlements, and their requirements should be heard at consultations, and worked into the detailed design process; sufficient road, pedestrian and livestock crossing points should be provided.[133]

220. Most rural communities close to the planned bypasses, in particular the Agstafa / Gazakh bypass, are in general likely to be pleased for the improved transport connections that they will receive as a result of the new road. To ensure that this potential positive impact does not become a negative impact (severance), it is important that sufficient access points and underpasses are provided in these areas. Consultations during subsequent design should focus heavily on producing a design that is beneficial or at the very least, satisfactory to local residents.

Iii Tourism

221. The project area is not a touristic region, and this situation is unlikely to change with the advent of the upgraded and new road sections. It will however have two positive benefits with respect to tourism:

- Tourists, in particular Azeris from Baku going to Georgia, will have smoother and quicker journeys as a result of this and the other improvement projects along the M-2; and
- The positive effect on the economy of the road sector improvement strategy should gradually promote tourism at a national level within Azerbaijan.

[132] For example, there are several settlements to the North of Dallyar whose main connection to the M-1 is via Dallyar town.

[133] Bu ƏMT-in ilkin versiyasının hazırlanmasından sonra əlavə dolama yolların və yol ötürücülərin əhəmiyyətli sayı yola təkmilləşdirilmiş yanaşmanın verilməsi və parçalanma məsələlərinin azaldılması məqsədilə layihənin layihələndirilməsinə əlavə edilmişdir.İctimai məsləhətləşmə prosesindən (bax Fəsil IX) sonra əlavə müxtəif səviyyəli yol qovşaqları ilə dəqiqləşdirilmişdir.

F Social and Cultural Resources

I Population and Communities

222. The primary positive impact of the presence and operation of the project to communities will be the knock-on effects of the overall improvements to the national economy that are expected results of the RNDP. Local communities will also benefit from the positive impacts discussed under other dedicated headings (e.g. Health)..

223. Most major communities will not experience deleterious effects of the presence of the new road, as in areas where human activities focus on the road (e.g. the roundabout leading up to Shamkir, or the road crossing to reach the railway station at Dallyar) bypasses have been proposed. The communities in the areas that will be bypassed will experience a considerable improvement in their quality of life, including improved safety (see section F.2 below), improved air quality, reduced noise, and importantly, an improved general character and living environment of the area. The introduction of the bypasses will remove almost all of the heavy trucks from the existing road, as the bypasses will form the main route for long distance traffic. The existing road will then revert back to being a local distributor road carrying a mix of light vehicles, buses, with some light and medium sized truck traffic. Traffic conditions on the existing road will be typical of that expected on any city road or road passing through a populated area. The existing road will now become an essential local transport corridor and it would be an accepted feature, which would be in character with the local environment.

224. There will clearly be a difference in character along the sections of road to be dualized, but as these sections only skirt certain settlements rather than passing through them, the nature and character of the communities will remain unaffected.

225. The final new bypass alignment presents an opportunity to improve connections with settlements that are currently some distance from the M-2 road, down difficult unpaved roads. During the field visits and consultation meeting, it was clear that local inhabitants would welcome the road, providing it had sufficient junctions. As described in the previous section, the final bypass may well present a considerable positive impact on local communities, however this has the potential to swing to a negative impact if insufficient junctions and crossings are provided, and care should be taken during detailed design to address this issue.

226. The operation and maintenance of the road will have no impacts whatsoever on gender issues, family structure, religion, population, or other such areas.

Ii Health and Education

227. The existing Ganja – Gazakh-Georgia road has a poor road safety record. A major positive impact of the presence and operation of the dualized sections and bypasses is a significant improvement in road safety conditions which will greatly assist in reducing the number of accidents on this road. The project will significantly improve safety conditions in the following three ways:

- The introduction of the divided dual carriageway will eliminate the high speed head-on collisions between vehicles travelling in opposite directions. These accidents account for 31% of all accidents and the high speeds result in a high number high of fatalities and serious injuries;
- The traffic on the existing sections of the road running through the populated areas of Shamkir and Asagi Ayublu and the cities of Agstafa and Gazakh will reduce by between 50% and 65%. This is due to the long

distance and international traffic diverting onto the new bypasses. In all these areas there is a heavy demand for pedestrians needing to cross the main road over most of the length of these sections (see Figure 20). Despite introducing dedicated crossing facilities, pedestrians are still expected to make a large number of uncontrolled crossings. The significant reduction in traffic on the existing road will result in much safer conditions for pedestrians making these uncontrolled crossings.

- The introduction of interchanges at all major junctions will eliminate direct left turns across the opposite traffic stream and will therefore reduce the number of cars crossing the oncoming traffic. Presently 21% of accidents on the Ganja – Gazakh road are junction-related. The elimination of junction-related accidents will make a significant improvement in road safety conditions and should lead to a marked reduction in accidents.

228. There will probably a minor increase in same-direction accidents related to the increase in speed that the new road will afford, however these accidents are generally less dangerous than head-on or junction related accidents, and in any case this small increase will be dwarfed by the enormous reduction in overall traffic accidents as outlined above.

229. In the few semi-urban areas that are not bypassed by the project, and where a small number of people cross the existing road, there is the potential for an increase in pedestrian-related accidents due to the wider road width and the increased speeds. This potential issue can be mitigated by the inclusion of occasional underpasses or footbridges as well as fencing, at locations to be decided during consultations. If these separated crossings are used, then they will represent an improvement in safety conditions in comparison to the present situation.

230. At the intersections of the new bypasses, there is a slight danger of accidents in the period after road opening, due to those that frequently travel the road being accustomed to the old alignment. This can be mitigated by the Contractor ensuring that old sections of redundant road are removed so that they do not mislead drivers.

Figure 20: Pedestrians Crossing the Road at a Busy Location at Asagi[134]

[134] Note also the use of the area as a taxi rank and for commerce

Iii Social Groups and Poverty

231. The operation of the project will have no negative impact on local social groups and poverty. The cumulative positive effect on the economy of the road sector improvement strategy should gradually promote poverty reduction, though clearly this will take time, and the contribution of the present project is impossible to measure. Locally the new road may positively impact on poor settlements either through improved connection to the transport corridor, or through opportunities for trade.

G Impacts associated with decommissioning

232. Unlike many infrastructure projects, roads do not have a finite lifespan and do not rely on electronic or mechanical equipment for their functionality. Lifespans depend on maintenance levels as well as climatic and traffic conditions, however roads are rarely totally abandoned or become redundant in the same way that an old water treatment plant or power station might. Impacts with decommissioning the present project are therefore not considered relevant to the present scheme, which will simply be maintained and eventually replaced, most likely on the same alignment.

Vii Economic Assessment

233. ADB Environmental Guidelines require that the costs and benefits of environmental impacts and mitigation measures be included in the overall economic analysis of the project. The present project, whilst a transportation project, has sought to incorporate environmental and social considerations from the outset and to a large extent major elements of the project design are a direct result of the incorporation of environmental concerns into the design process. The Updated Feasibility Report 135 contains a full economic feasibility analysis for the project, including provisions for the major infrastructure that mitigates the environmental and social impacts of the present and forecast traffic levels along the road corridor. Options are assessed and values assigned to time and accident costs. Provisional resettlement costs are also included. A summary of the economic assessment is provided below.

234. In addition to the economic assessment below, which already includes a basic estimate for environmental mitigation measures, rough cost estimates for individual environmental mitigation actions are provided in the outline Environmental Management Plan (EMP) in Chapter XII. Most of the mitigation and monitoring costs will form part of the construction and supervision contracts, but where possible, these costs have been estimated. Certain costs, in particular those associated with post-construction monitoring, will fall to ARS. Where possible these have also been estimated to assist with ARS budget planning, however in many cases a provisional estimate was not possible at this stage in the project. The cost information provided in the EMP should inform the detailed design phase and should ensure that all mitigation measures will be adequately funded.

235. **Summary of economic assessment**. The economic costs of the project comprise (i) capital investment, including civil works, environmental mitigation, land acquisition and resettlement, as well as consulting services for construction supervision; and (ii) road maintenance. Costs related to taxes, duties and financing charges during implementation have been excluded. Financial costs (excluding VAT) were converted into economic costs by applying a conversion factor of 0.92. The investment costs (expressed at 2010 quarter 3 prices) range from USD 1.82 million per kilometre to USD 3.47 million per kilometre for the sections of the road where a new 2 lane carriageway will be constructed adjacent to the existing road. The high cost of USD 3.47 million per km was incurred in the Tovus Bypass section where extensive earthworks and a new 300 metre long bridge will need to

[135] Nippon Koei UK 2011

be constructed. In the new 4 lane bypass sections, investment costs vary from USD 3.80 million per kilometre to USD 4.90 million per kilometre, depending mostly on the number of bridges and grade-separated intersections.

236. Economic benefits have been calculated using the Highway Development & Management 4 (HDM-4) software package, and include savings in vehicle operating costs from the improved riding quality of the upgraded highway, savings in travel time costs and savings in accident costs resulting from the significant improvements in road safety. The bypass sections generally had lower EIRR values than the adjacent sections that would be dualized, as average investment costs per km were higher and traffic was less. The appraisal showed that upgrading the full length of the existing road from Ganja to Gazakh has a robust EIRR of 23%, which is above the minimum ADB loan funding threshold.

Viii Information Disclosure, Consultation and Participation

237. Preliminary consultation meetings took place on the 21st and 22nd February 2011 at the administrative headquarters of Shamkir, Tovus, Agstafa and Gazakh Rayons. A list of attendees is provided in Appendix 6.

238. At the meetings, the preliminary designs for the road project were presented, alongside the arguments for the preferred routes of the bypass sections, and a brief descriptive report, including a summary of the environmental and social assessment applied in the scoring of the bypass alignment options.

239. Comments were invited from local officials and members of the public. The overwhelming opinion towards the project was positive, though there were some concerns, as follows:

- Insufficient underpasses seem to be included for movement of livestock and machinery;
- Insufficient interchanges seem to be included for allowing access on and off the road; and
- Land acquisition problems were foreseen.

240. The number of underpasses and interchanges was appropriately increased considering the preliminary interests of interested parties.

- The number of interchanges was increases between 10- 22;
- The number of underpasses between 11-44;
- The number of fly-overs between10-12;
- River bridge -12

241. The preliminary draft of EIA was submitted as a series of public meeting held August 8-9.

242. The consultations were held in the administrative head quarters of Shamkir, Tovus, Agstafa and Gazakh. The meetings consist: the presentation of the last version of project, impacts on environment and mitigation measures and the purpose, detailed presentation covering conclusion and findings of the study of EIA.

243. The meeting was attended by local government organs, representatives of communication department and other public services and residents of village located around RoW as well as different members of local population. Some women participated as well, but their number was low. The pictures of meetings are presented in Picture 21.

244. During the consultations the opinion on project was extremely positive, because residents are informed about the benefits of project. No question is aroused regarding environmental issues or mitigation measures. But some issues on potential social impacts of project were raised. These questions mainly include: location, design of underpasses, interchanges and service roads. Other issues include relocation of the existing communication lines/occurrence of obstacles, land acquisition, compensation and employing of local residents during construction.

245. The majority of questions, comments and proposals was given by participations not understanding the design and construction of project. All efforts were directed to the explanation of road alignment, charecteristics and construction process. Provided expalantions were highly appreciated by residents whose first questions were remained without answers.

Picture 21: Consultations on preliminary EIA

246. The following issues are as follows:

- Deficiency of interchanges/bridges for travelling to Agstafa asked by residents of DuzGishlag and Garahesenli. (Presently they have to run all road in Gazakh to reach to Agstafa. Project engineers considered wrongly that these villages belongs to Gazakh region.
- Deficiency of effective infrastructure for protection of Su Hovzu Kehrizi (km8+300); and
- Deficiency of service road connecting with short distance interchange at km 64+400 in Khatinli village.

247. Social impact and relocation/compensation processes are at the beginning level, but EIA was raised during the opening meeting and majority of issues was discussed.

248. Minutes of meeting and list of participation are provided in Appendix 7.

249. Preliminary version of EIA and proposed road alignment maps will be provided by ARS and will be kept in headquarter, as well as in all the region to be affected by project.

Ix Grievance Redress Mechanism

A Introduction

250. A grievance redress mechanism will be implemented during the construction of the project. The mechanism will address any issues as they arise and will ensure the satisfaction of APs and maintain the project schedule[136].

An outline for the mechanism is provided below, and should be used as a starting point for development of the final grievance redress mechanism. The ADB's 2009 SPS provides guidance on the requirements of a grievance redress mechanism, and this should also be closely considered when the grievance redress mechanism is developed.

B. Outline Grievance Redress Mechanism

251. The 2009 SPS states that a grievance redress mechanism should:

- Be scaled to the risks and impacts of the project;
- Address affected people's concerns and complaints promptly; and
- Use an understandable and transparent process that is gender responsive, culturally appropriate, and readily accessible to all segments of the affected people.

252. It is proposed that the Implementing Agency, ARS, under the Ministry of Transport, hold overall responsibility for ensuring any grievances that may arise are dealt with fairly and effectively. To this end, ARS should nominate (and publicise) a person or persons to be responsible for receiving and dealing with grievances.

253. The responsible unit within ARS should create and maintain a live register of grievances, which should contain as a minimum the fields shown in the example in Figure 19 below. ARS should be supported by the supervision Engineer and the eventual Contractor to ensure satisfactory resolution of issues, and clauses to that end should be included in the relevant contracts.

254. The proposed grievance redress mechanism process is shown in Figure 20 below.

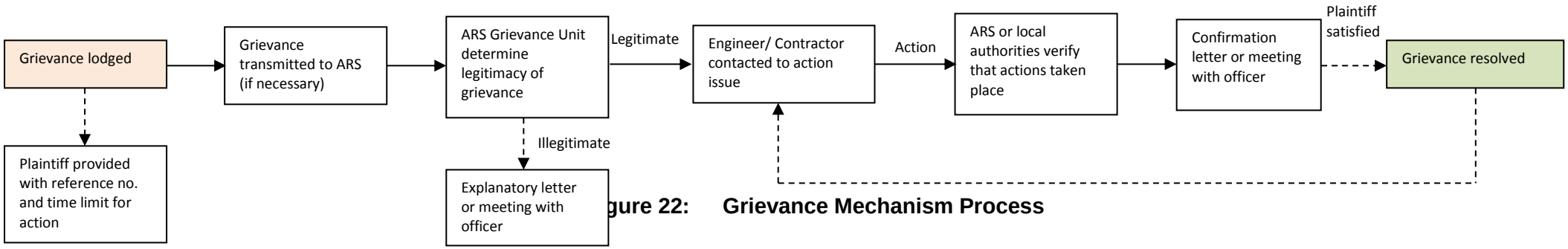
255. Dissemination of details on APs' rights, the grievance procedure, relevant contact details, etc. is a critical activity for establishing a successful redress system, and it is proposed that public meetings be held at the start of construction to disseminate the above information. Pamphlets should be distributed, and posters describing the process should be clearly displayed at locations where the local population gathers, such as schools and municipal offices. All pamphlets and posters should be provided in Azeri and Russian.

256. As has been described earlier in this document, communities in the project area are relatively conservative, and they continue to follow hierarchies based on the soviet model. At the Rayon level, executive powers should be informed of the mechanism. At the village level municipalities and responsible officers should be fully informed of the grievance redress procedures. At the wider project level, any relevant NGOs or community based organisations should also be informed of the mechanism and kept abreast of any key grievances.

[136] This approach is aligned with the ADB's 2009 SPS, which seeks to ensure increased focus on environmental and social safeguards during construction and operation of projects

Figure 19: Template for Grievance Register (showing example grievances)

Ref. No.	Date / Channel of Grievance Receipt	Name /contact details of plaintiff	Nature of Grievance	Category	Location	Status (Pending, Ongoing, Solved)	Action taken	Notes/Comments
1	06/05/2012 Via Engineer	Mrs A.	Noise is disturbing Mrs A and her animals	Noise	Km x	Solved	Contractor to provide sound insulation on generator at km x	Contractor was in breach of EMP. Letter sent to Contractor by Engineer.
2	12/06/2012 ARS	Mr. B	Contractor has left debris on Mr B's field and damaged fence	Property damage	Km y	Ongoing	Engineer notified	Engineer and Contractor due to visit incident site



gure 22: Grievance Mechanism Process

X Environmental Management Plan and Monitoring

A Introduction

257. The purpose of an EMP is to ensure that any potentially negative environmental impacts resulting from the construction and operation of the infrastructure are minimised, and that all aspects of the works comply with the relevant legislation and good practice. Detailed EMPs should be prepared by the Contractor and ultimately ARS as the project operators. EMP documents:

- Formally commit a company or entity to managing and minimising the environmental impacts of its activities;
- Explain in detail how each of the specified mitigation measures for which the entity is responsible will be provided;
- Describe other actions that the entity will take to reduce the environmental effects of its activities and sites (waste management, water conservation, training, etc);
- Explain how the successful completion of each activity will be monitored and confirmed;
- Provide contingency plans to deal with accidents and emergencies, to ensure human and environmental safety; and
- Describe the monitoring that will be conducted to ensure that the various activities are completed and provide the necessary environmental protection.

258. The EMP must be brought to the attention of each of the Contractor's employees working on the project, and they must be provided with a verbal explanation of the provisions of the EMP and an insight into the potential adverse impacts of their work.

B. Purpose of Outline EMP

259. This Outline EMP is intended to act as a guide to the Contractor for the preparation of their full EMP, which details the institutional arrangements, planned mitigation and monitoring measures, and the specific actions needed to implement the measures described. The Outline EMP consists of:

- The present introduction / overview;
- Summaries of the key impacts and mitigation measures identified during previous environmental studies;
- Details on the main environmental management and monitoring activities and other obligations expected to be included in the EMPs by the Contractors and Operators.

260. The eventual contract documents should require the Contractor to prepare a comprehensive EMP (based on this outline EMP), setting out in detail how he proposes to manage and minimise the environmental impacts of his activities throughout the construction period. The EMP should be reviewed and approved by the Supervision Consultant (SC) or ARS, prior to the start of construction work.

261. The contract should oblige the Contractor to comply with its EMPs on an ongoing basis, with failure to do so entitling ARS (or MENR) to impose penalties, should contraventions not be addressed in accordance with the procedures as specified in the contract.

C. Content of EMP

262. The Contractor's EMP should be closely based on the structure provided in Box 1 below

Box 1: Proposed Contents of EMP

1. **Introduction:** Background to the project, aims of the EMP, approach;
2. **Environmental Policy:** The EMP must start with a statement of Environmental Policy. This should be a simple statement of the Contractor's intent with respect to the environment and the management of environmental affairs.
3. **Management Responsibility and Contacts;**
4. **Project description:** The proposed project, construction methodology, and environmental context;
5. **Environmental Legislation, Permits and Guidelines;**
6. **Mitigation Measures;** Description of the approach to environmental mitigation;
7. **General Environmental Management Plan;** Description of plans and procedures in place to implement mitigation measures;
8. **Additional Management Plans;** Description of specific management plans for solid waste, health and safety, transport, training and emergency response;
9. **Environmental Monitoring Plan;** Description of planned monitoring, review and audit works;

D. Summary of environmental impacts and mitigation measures

263. Table 17 summarises the potential adverse impacts of the *Dualization of the Ganja-Gazakh Highway* project as identified and discussed in Chapters VI and VII, and the mitigation measures proposed to reduce these impacts to acceptable levels. The table also shows how the mitigation will be implemented, who will be responsible, and where and when the mitigation activities will take place. The final column assesses whether the proposed action will successfully mitigate the impact (shown as 0), whether a possible residual impact may remain (shown as -) and indicates that some of the measures will potentially provide an additional benefit (shown as +).

264. The principal section of the EMP following the description of mitigation measures will be the General Environmental Management Plan. Some of the mitigation measures form part of distinct plans that are to be prepared by the Contractor. These plans are designed to deal with one specific area of operation, and are prepared as stand-alone documents to allow for individual approval, and for distribution to the relevant staff. The plans contain details such as working procedures to be followed, designated locations and limits, and the assignment of responsibilities. The individual plans to be drawn up by the Contractor for this project will be confirmed during detailed design and the preparation of tender documents, but shall include *inter alia*:

- *General Environmental Management Plan:* Detailing the more general actions the Contractor proposes to take to manage and mitigate the environmental and social impacts of his day-to-day operations;
- *Borrow Management Plan*: Detailing locations of intended borrow pits or extraction sites, access roads, volumes to be removed, schedules, mitigation measures to be undertaken, remediation plans, etc. The plan is

to be approved by MENR and should be prepared in compliance with national requirements on borrow extraction;

- *Spoil Management Plan*: Detailing expected volumes and locations of spoil generation, planned locations and methods for storage and disposal, and mitigation methods and procedures to be followed;
- *Waste Management Plan*: Detailing expected volumes and locations of waste to be generated, planned storage and transport facilities and protocols, as well as disposal locations and methods;
- *Health and Safety Plan*: Detailing standard information such as working procedures, rules to be adhered to, protective equipment, hospital locations and contact details, and specific information such as mitigation measures to be taken, pedestrian safety planning, temporary works planning etc;
- *Emergency Response Plan:* Detailing procedures to be taken in the event of a working accident or external emergency.

265. The Contractor will also be required to submit various other lists, drawings and plans containing environment-related information[137].

E. Institutional arrangements for project implementation

266. The Executing Agency for the *Dualization of the Ganja-Gazakh-Georgia Highway* project is the Azeri Road Service (ARS) Open Joint Stock Company, under the Ministry of Transport. During project preparation and implementation, ARS will be responsible for, *inter alia*

- Obtaining necessary permits and clearances prior to commencement of the works;
- Reviewing the EIA, EMP, and SEIA, and submitting them to the ADB;
- Ensuring that the relevant environmental documents are disclosed to the public, if requested;
- Ensuring that the outline EMP is included in the tender documents for the construction contract, and that the Contractor and stakeholders have access to the EIA report;

267. Ensuring that an adequate revised EMP is prepared by the Contractor prior to commencement of works is the responsibility of the SC. During construction, the first level of responsibility for monitoring and reporting upon the Contractor's implementation of the EMP is also with the SC. The local Road Maintenance Unit[138] (RMU) will review reports and provide occasional on-site inspections, and it is not expected that any RMU personnel will be qualified or experienced in environmental monitoring activities. The Ecology and Safety Sector (ESS) of ARS are nominally responsible for ensuring implementation of the EMP, but it is not expected that they will have personnel on site.

268. Two-lane new carrieagway in the south part of the existing road with 6.50 length.

[137] Such as yard and camp layout, cultural heritage finds procedures, traffic management procedures, sewage storage and treatment arrangements, etc.

[138] Under ARS

Table 17: Environmental Impacts and Mitigation for the Dualization of the Ganja-Gazakh Highway

Potential Negative Impacts	Sig	Dur	Mitigation Activities and Method	Responsibility	Location	Timing	Residual [139]	Provisional Cost (AZN)
Design Related Impacts and Activities								
Multiple impacts resulting from Contractor negligence	M	P	Ensure bid documents and contracts contain relevant environmental management clauses, including payment-dependant terms.	Design Consultant / ARS	-	Detailed Design	0	Included in design contract
Existing infrastructure could be damaged by construction	H	T	Determine locations of water pipes, oil pipelines, electricity pylons, etc and design route to avoid these where possible	Design Consultant	-	Detailed Design	0	Included in design contract
Route could pass through high value /slow growing crops such as fruit trees or vines	M	P	Consult with farmers, and alter alignment if necessary	Design Consultant / ARS	Project area	Detailed Design	0	Included in design contract
			Provide adequate compensation if losses are unavoidable					As yet unknown
Excessive cut and fill	M	P	Good design should optimize cut and fill	Design Consultant	-	Detailed Design	0	None
Route could pass through cultural or historical sites	S	P	Consult with local inhabitants and specialists, and alter alignment if necessary	Design Consultant	Project area	Detailed Design	0	No additional
Road, bridges and interchanges may be a visual impact	M	P	Ensure sympathetic architecture	Design Consultant	-	Detailed Design	+	None
			Plant trees along road and around structures					None
Water and soil contamination due to accidents	M	T	Provide crash barriers on bridges	Design Consultant	-	Detailed Design	0	None
The new road may cause a loss of amenities for drivers	L	P	Consider designing rest and commerce areas alongside the dual carriageway	Design Consultant / ARS	-	Detailed Design	0	None
Road noise from new bypasses may affect	M	P	Consult with local inhabitants	Design	Project area	Detailed	0	1,275,000 but

Sig = Significance of Impact (L = Low Significance M = Moderately Significant; S = Significant; H = Highly Significant).

Dur = Duration of Impact (T = Temporary; P = Permanent)

[139] This column shows impacts remaining after mitigation: 0 = zero impact (impact successfully mitigated); + = positive impact (mitigation provides a benefit); - = residual impact possible

* Mitigation of these impacts will be provided through a separate Resettlement Plan

Potential Negative Impacts	Sig	Dur	Mitigation Activities and Method	Responsibility	Location	Timing	Residual [139]	Provisional Cost (AZN)
certain properties			Include noise barriers or trees as required	Consultant		Design		included in construction contract
Construction Related Impacts and Activities								
Excavation of material at borrow locations may cause airborne dust	M	T	Ensure daily damping of extraction site during dry conditions	Contractor	Site	Construction	0	Included in construction contract
Bitumen from old road sections could contaminate ground and surface water	M	T	Use old asphalt as fill for borrow pit restoration	Contractor	Site	Construction	+	Included in construction contract
Transporting materials could create dust	M	T	Use tarpaulins to cover truck contents	Contractor	Site / yard	Construction	0	Included in construction contract
			Ensure daily damping of access roads during dry conditions	Contractor	Site	Construction	0	
Aggregate crushing, concrete batching plant and asphalt mixing plant may produce dust, odours and noise	M	T	MENR approval needed for location	Contractor	-	Planning	0	Included in construction contract
			Yard to be sited away from settlements, taking account of wind direction					
			Use only modern vehicles/machinery	Contractor	Site / yard	Construction		
			Ensure regular maintenance of equipment	Contractor	Site / yard	Construction		
			Restrict operation hours to between 6am and 9pm	Supervision Consultant and Contractor	Site / yard	Construction		
On site aggregate storage may cause airborne dust	M	T	Plan works so as to minimize stockpiling	Contractor	-	Planning	0	Included in construction contract
			Cover any long term stockpiles	Contractor	Site	Construction		
Vehicles and machinery may cause excess emissions	L	T	Use only modern vehicles/machinery	Supervision Consultant and Contractor	Site / yard	Construction	0	Included in construction & supervision contracts
			Ensure regular equipment maintenance	Contractor	Site / yard	Construction		
Borrow pits may cause visual impact	L	P	Follow MENR borrow location approval procedure	Contractor	-	Planning	0	Included in construction & supervision contracts
			Ensure pits are located away from settlements					
			Place any spoil in excavated pits	Contractor	Site	Construction	+	
			Ensure topsoil removal, storage and replacement	Supervision	Site	Construction	0	

Potential Negative Impacts	Sig	Dur	Mitigation Activities and Method	Responsibility	Location	Timing	Residual [139]	Provisional Cost (AZN)
			Ensure adequate rehabilitation of vegetation	Consultant and Contractor				
Borrow pits could encourage fly tipping resulting in visual impact and soil and groundwater contamination	M	P	Ensure pits are located away from settlements	Supervision Consultant and Contractor	-	Planning	0	Included in construction & supervision contracts
			Place any spoil in excavated pits		Site	Construction	+	
Loss of planted trees along some sections of existing road	M	T	Ensure that new trees are planted along the new carriageway according to legislative requirements	Contractor	Site	Construction	+	4,375 but included in construction contract
Temporary or permanent land acquisition could cause harvest losses	M	T	Ensure works are planned so that farmers have harvested prior to the start of earthworks. If high value trees are on site, these should be transplanted if possible.	Contractor	Site	Planning and Construction	0	Included in construction contract
River plain aggregate extraction could contaminate water, cause erosion and harm riparian ecosystems	M	T	Follow MENR borrow location approval procedure	Contractor	-	Planning	0	Included in construction contract
			Ensure no extraction from river bed or banks		Site	Construction		
			Use only existing access roads					
			Extract only during periods of low flow					
Groundwork could cause unnecessary damage to surrounding land	L	T	Ensure workers keep to the specified working width	Supervision Consultant and Contractor	Site	Construction	0	Included in construction & supervision contracts
			Ensure stripped topsoil is stored and used for rehabilitating temporarily used land					
Water extraction could impact local supply or ecosystem	M	T	Water extraction locations and volumes should be approved by local authorities and utility providers	Contractor	-	Planning	0	Included in construction contract
Water supply shortages or poor quality water could affect worker health	M	T	Ensure that an acceptable & approved potable water source is identified during camp/yard planning. Treat if necessary	Contractor	Site / yard	Planning	0	Included in construction contract
Cuttings and embankments could cause	M	T	Compact cuttings and embankments sufficiently	Supervision	Site	Construction	0	Included in

Potential Negative Impacts	Sig	Dur	Mitigation Activities and Method	Responsibility	Location	Timing	Residual [139]	Provisional Cost (AZN)
erosion problems			Employ coir matting or similar in semi-arid areas	Consultant and Contractor				construction & supervision contracts
Fish spawning could be disturbed by bridge construction	M	T	Construct piers outside spawning season in periods of low flow	Contractor	Site	Construction	0	Included in construction contract
Ground disturbance could uncover archaeological and historical remains	S	P	Develop and apply protocol to protect chance finds (e.g. stop work if finds are suspected; Academy of Science to plan appropriate action)	Contractor	Site	Construction	+	Included in construction contract
Existing infrastructure interruptions could disrupt local inhabitants and businesses	L	T	Where possible provide backup power (e.g. generators), potable water in tankers, etc.	Contractor	Project area	Planning and Construction	0	Included in construction contract
			Ensure local authorities and inhabitants are warned of the disruption schedule					
Soil and water contamination /erosion could be caused by construction activities	M	T	Ensure regular equipment maintenance	Supervision Consultant and Contractor	Site / yard	Construction	0	Included in construction & supervision contracts
			Wash vehicles regularly in yard					
			Readymix trucks to be washed in yard and not river					
			Washwater to pass through separator prior to discharge					
			Fuel depot, bitumen plant and any other areas where chemicals are used to be bunded					
			Sufficient latrines to be provided on site					
			Sewage from contractor yard and/or camp to be treated to an acceptable level prior to discharge					
			Ensure civil works shuttering on bridges are tight to prevent leakage					
			Prepare Waste Management Plan and dispose of waste in accordance with legislation	Contractor	Site / yard	Planning and Construction	0	Included in construction contract
People living nearby may be disturbed by noise and dust	M	T	Inform community of work in advance; address concerns	Contractor	Project area and Site	Planning and Construction	0	Included in construction

Potential Negative Impacts	Sig	Dur	Mitigation Activities and Method	Responsibility	Location	Timing	Residual [139]	Provisional Cost (AZN)
			Plan work with community; avoid work at sensitive times					contract
			Avoid conducting noise-generating activities at night					
			Reduce dust by damping soil					
			Use modern vehicles/machinery & maintain as specified					
			Locate contractor yard or camp away from settlements					
			Enclose noisy machinery where possible					
			Ensure all machinery adheres to national noise standards					
Some inhabitants will lose land needed for the project	M	P	*Purchase land as described in Resettlement Plan	ARS	Project area	Planning	0	Unknown
			Avoid taking >10% of the total land of any occupant	Design Consultant /ARS	Project area	Planning	0	Unknown
Some business premises may need to be removed	M	P	*Compensate business owners/tenants for lost income	ARS	Project area	Planning	0	Unknown
			*Compensate owners for lost income-generating assets					
Businesses that remain may lose income if access is difficult for customers	M	T	*Compensate owners/tenants for lost business income	ARS	Project area	Planning	0	Unknown
			Keep road closure to minimum (frequency, duration)	Contractor	Site	Construction	0	Included in construction contract
			Maintain vehicle and pedestrian access when possible					
Road traffic will be disrupted by construction work	L	T	Plan work with local authorities and police	DS Consultant and Contractor	Site	Planning	0	Included in construction contract
			Keep road closures to a minimum	Contractor	Site	Planning and Construction	0	Included in construction contract
			Maintain safe passage of vehicles/pedestrians at all times					

Potential Negative Impacts	Sig	Dur	Mitigation Activities and Method	Responsibility	Location	Timing	Residual [139]	Provisional Cost (AZN)
			Provide effective diversions if needed					
			Conduct work that requires road closure at times when traffic volume is low if possible					
			Schedule truck deliveries for periods of low traffic					
			Ensure daily damping of temporary diversion roads during dry conditions					
Construction work could disrupt inhabitants	M	T	Inform community of work in advance and address their concerns	Contractor	Site	Construction	0	Included in construction contract
Influx of workers could cause STD problems	L	T	Provision of free condoms and advice	Contractor	Site	Construction	0	Included in construction contract
Workers and the public are at risk from accidents on site	M	T	Prepare and implement a site Health and Safety Plan that includes measures to:	Contractor	Site	Planning and Construction	0	Included in construction contract
			- Exclude the public from site					
			- Ensure that workers use Personal Protective Equipment					
			- Provide Health & Safety Training for all personnel					
			- Provide first aid equipment					
			- Follow documented procedures for all site activities					
			- Keep accident reports and records					
Operation and Maintenance Related Impacts and Activities								
The new interchanges and bridges will be more visible than the present infrastructure	M	P	Plant and maintain large-growing native trees at periphery	DS Consultant and Contractor	Site	Construction	0	5,500 but included in construction contract

Potential Negative Impacts	Sig	Dur	Mitigation Activities and Method	Responsibility	Location	Timing	Residual [139]	Provisional Cost (AZN)
The new bypasses may cause visual impact at certain locations	M	P	Plant and maintain native trees at more sensitive locations	Contractor and ARS	Site	Construction	0	4,000 but included in construction contract
Maintenance works may have minor impacts to air quality, noise, and soil and water contamination, principally due to machinery	L	T	Follow same procedures as per construction mitigation, primarily ensuring modern equipment that is well maintained	ARS	Site	Operation	0	General maintenance budget
Water and soil contamination is possible due to accidental spillage or general road runoff	M	T	Prepare and implement an Emergency Response Plan, including training of staff	ARS	Site	Operation	-	Unknown
The existence of the new bypasses may encourage illegal development, and market-style stalls	M	P	Conduct regular patrols along highway to prevent these arising	ARS	Site	Operation	0	General maintenance budget
New road layout may temporarily confuse people, possibly causing accidents	M	T	Remove old unused sections of road pavement	Contractor	Site	Construction	0	Included in construction contract
Failure to maintain road environs could cause flooding and erosion	M	T	Ensure maintenance work such as clearing of drainage ditches is carried out regularly.	ARS	Project area	Operation	0	General maintenance budget
Some businesses in towns to be bypassed may experience a loss of income as a result of the bypasses opening	M	T	*Loss of earnings should be compensated for	ARS	Project area	Planning	0	Unknown
Worker safety at risk when conducting road repairs	M	T	Coordinate with police - provide warning signs/diversions	ARS	Site	Operation	0	General maintenance budget

F. Environmental Monitoring Plan

271. Table 17 shows that most mitigation activities during design are the responsibility of the design consultant; most mitigation activities during construction are the responsibility of the eventual Contractor, and most mitigation activities during operation are the responsibility of ARS[140]. Responsibilities for the relevant measures will be finalised and assigned to the Contractor via the contracts through which they are appointed, so they will be legally required to take the necessary action. There are also some actions that need to be taken by ARS in their role as project proponent.

269. A program of monitoring will need to be conducted to ensure that all parties take the specified action to provide the required mitigation, to assess whether the action has adequately protected the environment, and to determine whether any additional measures may be necessary. This will be conducted on a part time basis by the Environmental Monitoring Specialist (EMS) from the Supervision Consultant. The EMS will be responsible for most monitoring activities, reporting the results and conclusions to ARS and the Contractor, and will recommend remedial action if measures are not being provided or are not protecting the environment effectively. The EMS may be assisted by specialists in particular technical fields, and junior or medium-level engineers who can make many of the routine observations on site.

272. As noted above, following the opening of the road there are a number of monitoring tasks that will need to be performed by ARS. These would ideally be performed by an staff member with environmental qualifications and/or experience, and this has been budgeted for in the cost estimate provided in Table 19.

273. Because no dedicated systems are to be installed to protect soils and water from contamination due to accidental spillage, there is a need to prepare an environmental emergency plan to militate against unpredicted environmental impacts. It would, however, seem somewhat ineffective to only prepare such a plan for a short section of one road, and it is recommended that a national-level environmental emergency plan be prepared. The plan should be a collaboration between *inter alia* ARS, Fire and Health services, the police, MENR and the Ministry for Emergency Situations.

270. Table 17 shows that most of the mitigation measures are fairly standard methods of minimising disturbance from road construction (maintaining access, planning work to avoid sensitive times, finding uses for waste material, etc), and experienced contractors should be familiar with most of the requirements. Monitoring of such measures normally involves making observations in the course of site visits, although some require more formal checking of records and other aspects. There will also be some surveys of residents, as most of the measures are aimed at preventing impacts on people and the human environment.

274. Table 18 below contains the proposed Environmental Monitoring Plan for this project, which specifies the various monitoring activities to be conducted during all phases. Some of the measures shown in Table 17 have been consolidated to avoid repetition, and there has been some re-ordering to present together those measures that relate to the same activity or site. The Environmental Monitoring Plan describes: (i) mitigation measures, (ii) location, (iii) measurement method, (iv) frequency of monitoring and (v) responsibility (for both mitigation and monitoring). It does not generally show specific parameters to be measured because as indicated above, most measures will be checked by simple observation, by checking of records, or by interviews with residents or workers.

[140] Or the O&M Contractors employed to conduct maintenance or repair work

Table 18: Environmental Monitoring Plan

Mitigation Activities	Location	Responsible for Mitigation	Monitoring Method	Frequency	Responsible for Monitoring	Provisional Cost (AZN)
Construction Activities						
Damping of borrow pits extraction areas, stockpiles, access tracks and diversions in dry weather	Site	Contractor	Site observations	Weekly	EMS	Included in supervision contract
Use old asphalt and other spoil as fill for borrow pits	Site	DS Consultant and Contractor	Site observations	As needed	EMS	Included in supervision contract
Use tarpaulins to cover materials when carried on trucks	Site / Yard	Contractor	Observations on/off site	Weekly	EMS	Included in supervision contract
Preparation of borrow extraction plans	-	Contractor	Receipt of MENR approvals	Prior to works	EMS	Included in supervision contract
Ensure adequate rehabilitation of borrow pits	Site	Contractor	Site observations	As needed	EMS	Included in supervision contract
Prevent borrow pits becoming fly tipped	Site	Contractor	Site observations	Monthly	EMS	Included in supervision contract
Good location of yard and camps	Yard	Contractor	Contractor plans / design reports	Prior to works	ARS/EMS	Mainly Included in supervision contract
Use modern vehicles and machinery and maintain as specified	Site / Yard	Contractor	Site observations (& spot checks); Contractor records	Monthly	EMS	Included in supervision contract
Restrict hours of operation to between 0600 & 2100	Site / Yard	DS Consultant and Contractor	Site observations; Resident surveys; Contractor records	Weekly	EMS	Included in supervision contract
Cover long term stockpiles	Site / Yard	Contractor	Site observations	Monthly	EMS	Included in supervision contract
Avoid works on un-harvested land	Site	Contractor	Landowner surveys; Site observations	Prior to works	EMS	Included in supervision contract
Avoid aggregate extraction from river beds and banks	Site	Contractor	Site observations (& spot checks)	Weekly	EMS	Included in supervision contract
Avoid aggregate extraction from river plains during high flow	Site	Contractor	Site observations (& spot checks)	Monthly	EMS	Included in supervision contract
Ensure workers and plant keep to specified working width	Site	DS Consultant and Contractor	Site observations	Weekly	EMS	Included in supervision contract

Mitigation Activities	Location	Responsible for Mitigation	Monitoring Method	Frequency	Responsible for Monitoring	Provisional Cost (AZN)
Ensure stripped topsoil is used for rehabilitating disturbed land	Site	DS Consultant and Contractor	Site observations	As needed	EMS	Included in supervision contract
Ensure acceptable water extraction locations	Site	Contractor	Contractor records; Contractor plans / design reports; Site observations	Prior to works & Monthly	ARS/EMS	Included in supervision contract
Ensure water potability	Site / Yard	Contractor	Sampling (e.g. Suspended Solids, TPH, coliforms, pH)	Monthly	EMS/lab	2,650 but included in supervision contract
Ensure adequate compaction on slopes	Site	DS Consultant and Contractor	Site observations	As needed	EMS	Included in supervision contract
Ensure use of coir matting or alternative in steep/dry areas	Site	DS Consultant and Contractor	Site observations	As needed	EMS	Included in supervision contract
No vehicle washing in rivers or anywhere other than yard	Site	Contractor	Site observations	Weekly	EMS	Included in supervision contract
Vehicle washwater to receive adequate treatment	Yard	Contractor	Site observations	Weekly	EMS	Included in supervision contract
Ensure appropriate bunding of yard equipment and facilities	Yard	Contractor	Site observations	Prior to works / Monthly	EMS	Included in supervision contract
Sufficient latrines	Site / Yard	Contractor	Contractor design reports; Site observations	Weekly	EMS	Included in supervision contract
Ensure tight shuttering on bridge and culvert works	Site	DS Consultant and Contractor	Site observations	As needed	EMS	Included in supervision contract
Ensure construction of bridge piers outside spawning season	Site	DS Consultant and Contractor	Contractor records; Site observations	As needed	EMS	Included in supervision contract
Preparation and implementation of Waste Management Plan	Site / Yard	Contractor	Contractor records; Site observations	Prior to works / Weekly	EMS	Included in supervision contract
Enclose machinery where possible	Yard	Contractor	Site observations	Monthly	EMS	Included in supervision contract
Ensure trees around interchanges are planted	Site	DS Consultant / Contractor	Site observations; Contractor records	As needed	EMS	Included in supervision contract
Ensure trees along dualized sections are planted	Site	DS Consultant / Contractor	Site observations; Contractor records	As needed	EMS	Included in supervision contract

Mitigation Activities	Location	Responsible for Mitigation	Monitoring Method	Frequency	Responsible for Monitoring	Provisional Cost (AZN)
Ensure trees along new bypasses are planted	Site	DS Consultant / Contractor	Site observations; Contractor records	As needed	EMS	Included in supervision contract
Ensure correct noise barrier installation	Site	DS Consultant / Contractor	Site observations; Contractor records	As needed	EMS	Included in supervision contract
*Purchase land as described in Resettlement Plan	Site	ARS	Landowner surveys; ARS records	As needed	IMA[141]	Included in supervision contract
Avoid taking >10% of the total land of any occupant	Site	DS Consultant and Contractor	Landowner survey; DS Consultant records	As needed	IMA	Included in supervision contract
*Compensate business owners/tenants for lost income	Site	ARS	Owner/tenant surveys; ARS records	As needed	IMA	Included in supervision contract
*Compensate owners for lost income-generating assets	Site	ARS	Owner surveys; ARS records	As needed	IMA	Included in supervision contract
Keep road closure to a minimum frequency and duration	Site	Contractor	Site observations; Contractor records	Monthly	EMS	Included in supervision contract
Maintain vehicle and pedestrian access when possible	Site	Contractor	Site observations; shopkeeper survey	Weekly	EMS	Included in supervision contract
Plan work with local authorities and police	Site	DS Consultant / Contractor	DS Consultant and Contractor records	Prior to works / Monthly	EMS	Included in supervision contract
Inform community of work in advance and address their concerns	Site	Contractor	Contractor records; resident surveys	Prior to works / Monthly	EMS	Included in supervision contract
Maintain safe passage of vehicles and pedestrians at all times	Site	Contractor	Site observations; Contractor records	Weekly	EMS	Included in supervision contract
Provide effective diversions if needed	Site	Contractor	Site observations; Contractor records	Weekly	EMS	Included in supervision contract
Conduct work requiring road closure at times of low traffic	Site	Contractor	Site observations; Contractor records	Weekly	EMS	Included in supervision contract
Schedule truck deliveries for periods of low traffic	Site	Contractor	Site observations; Contractor records	Weekly	EMS	Included in supervision contract

[141] Resettlement issues (asterisked) will be monitored by an Independent Monitoring Agency established under the Resettlement Plan

Mitigation Activities	Location	Responsible for Mitigation	Monitoring Method	Frequency	Responsible for Monitoring	Provisional Cost (AZN)
Include historical authorities as stakeholders	Site	ARS	ARS records; meeting records	As needed	EMS	Included in supervision contract
Develop and apply archaeological protocol to protect chance finds	Site	DS Consultant / Contractor	DS Consultant and Contractor records; site observations	Weekly	EMS	Included in supervision contract
Prepare and implement a site H&S Plan (safety of workers/public)	Site	Contractor	Site observations; Contractor records	Monthly	EMS	Included in supervision contract
Exclude public from the site	Site	Contractor	Site observations; Contractor records	Monthly	EMS	Included in supervision contract
Ensure that workers wear Personal Protective Equipment	Site	Contractor	Site observations (& spot checks); Contractor records	Monthly	EMS	Included in supervision contract
Provide Health and Safety training for all personnel	Site	Contractor	Contractor records; worker interviews	Monthly	EMS	Included in supervision contract
Follow documented procedures for all site activities	Site	Contractor	Site observations (& spot checks); Contractor records	Monthly	EMS	Included in supervision contract
Provide first aid equipment	Site / Yard	Contractor	Site observations (& spot checks); Contractor records	Monthly	EMS	Included in supervision contract
Keep accident reports and records	Site	Contractor	Contractor records	Monthly	EMS	Included in supervision contract
Operation and Maintenance Activities						
Coordinate repairs/maintenance with police – provide warning signs/diversions	Site	ARS	Site observations	As needed	ARS	General maintenance budget
Ensure establishment of vegetation on slopes	Site	Contractor	Site observations	Monthly	ARS	General maintenance budget
Noise monitoring at settlements near new bypasses	Site	Contractor/ARS	Noise monitoring	6 monthly	ARS	4,600 + time
Ensure adequate camp / yard closure/restoration	Site / Yard	Contractor	Site observations; soil sampling (Heavy Metals, PAH, TPH, pH, Sulphate, BTEX and PCBs)	Once post closure	EMS	Soil sampling 3,050 but included in supervision contract
Ensure maintenance work such as clearing of drainage ditches is carried out regularly	Site	ARS	Site observations	As needed	ARS	General maintenance budget

G. Environmental management and monitoring costs

277. Most of the mitigation measures outlined simply require the Contractor to adopt good site and construction practice, which should already be part of their normal procedures. The majority of the remaining specific mitigation measures, such as tree planting, will form part of the construction contracts for the civil works and these will be priced for by the Contractor. Costs of acquiring land and compensating businesses for loss of income during the construction period cannot be calculated until further studies are carried out; estimates will be provided in the final Resettlement Plan.

278. Many actions in the Environmental Management Plan, particularly with respect to monitoring, are to be conducted by the Supervision Consultant, and will be included for in the supervision contract. The remaining actions, principally those to be undertaken during the operational phase, will fall to ARS, and as these are not budgeted for elsewhere, rough costs are shown in Table 19 below.

Table 19: Summary of Environmental Management and Monitoring Costs (AZN)

Item	Phase	Unit	Quantity	Unit Cost	Total Cost
*National Environmental Monitoring Specialist	Construction	Month	24	2,450	58,800
National Environmental Monitoring Specialist	Post-Construction	Month	6	2,450	14,700
Local transport and subsistence	Post-Construction	Month	6	2,300	13,800
*Trees – replacements for felled	Construction	Tree	1,750[142]	2.5	4,375
*Trees – at interchanges	Construction	Tree	2,200[143]	2.5	5,500
*Trees – along bypasses	Construction	Tree	1,600[144]	2.5	4,000
*Noise barriers	Construction	Metre	8,500	150	1,275,000
Noise monitoring equipment	Post-Construction	Item	1	4,600	4,600
Digital Camera	Post-Construction	Item	1	250	250
*Water sampling equipment	Construction	LS	1	100	100
*Water sample analysis	Construction	Suite	2	1,300	2,600
*Soil sample equipment	Post-Construction	LS	1	100	100
*Soil sample analysis	Post-Construction	Suite	1	3,000	3,000
				TOTAL AZN	**1,386,825**

**Items marked with an asterisk will be included in the construction or supervision contracts; other items should be budgeted for by ARS for post-construction monitoring*

[142] This is based on a median estimate of 5 for 1 replanting ratio for 350 trees felled

[143] This is based on an estimate of 200 trees per interchange

[144] This is based on an average no. of trees per km of existing road multiplied by kms of new bypass

Xi Conclusions

279. The environmental impacts of the *Dualization of the Ganja-Gazakh-Georgia Highway* project have been assessed according to ADB guidelines, and the process and results are described in this document. The level of study applied to different fields was commensurate with expected impacts, and potential positive and negative impacts were identified in relation to design, location, construction and operation of the improved infrastructure. The project will have considerable positive impacts, most of which are permanent. Many of the negative impacts are short term and localised, and associated with the construction process. Mitigation measures have been developed to reduce all negative impacts to acceptable levels.

280. The design concept of the project is to promote economic growth whilst seeking to improve on the environmental and social impacts resulting from the forecast increase in traffic levels along the existing M-2 road corridor. Due to the holistic nature of the project design, and the early incorporation of environmental considerations, adverse environmental impacts have been minimised from the outset. This meant that there were limited opportunities to provide further environmental enhancements at the EIA stage, beyond the tree planting schemes and noise barriers outlined in Chapters VI and VII.

281. Environmental and social impacts due to the project are overwhelmingly beneficial and include:

- The provision of a more efficient and effective transport route which, as part of the SPPRED and RNDP, should in turn improve the national economy;
- Providing access to the transport corridor to communities that were previously relatively distant from the M-2 road, particularly in the Agstafa / Gazakh area;
- Considerable improvements to the safety level of the existing road to be dualized;
- Further safety improvements through urban areas resulting from the new bypasses;
- Improvements to the character of towns along the route and quality of life of their citizens, principally due to reductions in noise levels and improvement in air quality.

282. Most of potentially negative impacts arise during the construction phase. These potential impacts are temporary and localised, and most are easily managed by following good construction practice. Whilst the provisional EMP in Chapter XI provides mitigation measures for the potential negative impacts associated with the construction and operation of the project, it should be noted that these are relatively minor, mainly due to the following reasons:

- The project area is dominated by agricultural land and degraded scrubland with little to no ecological significance;
- There are no protected areas or sensitive or rare natural habitats for flora or fauna in the project area;

- There are very few sensitive receptors to noise and air pollution along the routes of the proposed bypasses;
- There are no known objects of cultural, recreational or historical interest in the immediate project area;
- Construction methods for the project are routine with well established mitigation procedures, and temporary works disturbances will be minimal due to the presence of existing roads;
- Maintenance methods for the project are routine, short in duration, and generally relatively unobtrusive to local populations, with no significant effect on the environment.

271. Issues related to poverty and involuntary resettlement were examined by a parallel process of assessment and resettlement planning and will be compensated by measures mentioned in this report but set out in detail in the separate Resettlement Plan.

283. There are two straightforward but essential recommendations that need to be followed to ensure that the environmental impacts of the project are successfully mitigated. ARS and its consultants should ensure that:

- All mitigation and compensation measures proposed in this EIA report and in the Resettlement Plan are implemented in full; and
- The Environmental Management and Monitoring Plans proposed in Section VIII of this report are implemented in full.

284. The preliminary version of EIA was disclosed to public and two rounds of public consultations with full disclose as well as open forum on the process, conclusions and findings of EIA were conducted. Despite that no comment, proposal and complaint regarding the environmental issues is made several important points were about social issues. Following two parts of consultation infrastructure project was widespread covered for considering the wishes and interests of interested parties.

285. The general conclusion of EIA shows environmental and social benefits as a result of road improvement and construction of new parts. There will be no adverse environmental impacts and mitigation and compensation measures will be considered.

272. **APPENDICES**

Appendix 1: References

ADB (2005): *Azerbaijan – Country Environmental Analysis*. Asian Development Bank, Manila, Philippines. Available at www.adb.org/Documents/...Environmental-Analysis/.../prelims.pdf

ADB (2006): *Country Strategy and Program Update – Azerbaijan*. Asian Development Bank, Manila, Philippines. Available at http://www.adb.org/Documents/CSPs/AZE/2005/CSP-AZE-2005.pdf

ADB (2007): Proposed Multitranche Financing Facility – Republic of Azerbaijan: Road Network Development Program. Report and Recommendation of the President to the Board of Directors. Asian Development Bank, Manila, Philippines.

ADB (2009): *Safeguard Policy Statement*. Asian Development Bank, Manila, Philippines. Available at http://www.adb.org/Documents/Policies/Safeguards/Safeguard-Policy-Statement-June2009.pdf

ADB Operations Manual (OM) 20: Environmental Considerations in ADB Operations

Azerbaijan National Academy of Sciences (ANAS) (2004): Country Study on Biodiversity of the Republic of Azerbaijan: First National Report to the CBD. Baku, 2004.

Nippon Koei UK (2009a): Road Network Development Program. Project III. Dualization of the Ganja-Gazakh Highway. *Report on Options for Dualization* (April 2009).

Nippon Koei UK (2009b): Road Network Development Program. Project III. Dualization of the Ganja-Gazakh Highway. *Poverty and Social Analysis Report*.

Nippon Koei UK (2010): Road Network Development Program. Project III. Dualization of the Ganja-Gazakh Highway. *Report on Options for Dualization* (October 2010).

Nippon Koei UK (2010): Road Network Development Program. Project III. Dualization of the Ganja-Gazakh Highway. *Updated Feasibility Study Report* (October 2010).

Niras A/S (2008): *Study on Prospective Construction Materials Sources and Better Regulation of River Extraction*- IBRD Loan 7356AZ. Prepared for the Azerbaijan Ministry of Transport – Azer Road Service OJC.

Passillo Consulting Engineers (2007): Environmental Impact Assessment Report (EIA) for the Masalli-Astara Motorway (Project 1) Under the Road Network Investment Program. June 2007.

RSK/ERM (2002): *BTC ESIA Azerbaijan*, Draft for Disclosure, May 2002.

UNECE (2004): Committee on Environmental Policy: *Environmental Performance Reviews Azerbaijan*.

http://web.ceu.hu/envsci/aleg/research/IAPA02.pdf

http://faolex.fao.org/docs/texts/aze32661E.doc

http://www.traceca-org.org/

http://www.azhydromet.com

http://azembassy.pl/index.php?section=24

http://www.cac-biodiversity.org/aze/aze_geography.htm

http://www.cac-biodiversity.org/aze/aze_natreserves.htm

http://www.azerbaijan.az/_Geography.htm

http://www.gia.az/contents/default.aspx?lg=2&idpt=2401&id=7656

http://www.azhydromet.com/maps/points/agstavachaykazakh.html

http://economy.az/en/10_regions/reg_02.php#

http://www.gfaids.az

http://azerbaijan.tourism.az/tr05.html

Appendix 2: Provisional Estimates for Earthworks, Aggregates and Land Requirements

1) Land			
Road section	**Un-utilised land (m^2)**	**Agricultural land (m^2)**	
1	0	494,760	
2	0	669,000	
3	0	318,000	
4	30,000	670,200	
5	0	251,400	
6	0	0	
7	0	118,500	
8	972,000	822,000	
Total land requirement m^2	***1,002,000***	***3,343,860***	**4,345,860**

2) Earthworks			
Element	**m^3 per km or interchange**	**km /interchange no**	**Total m^3**
Topsoil excavation - dualization	5,000	48	240,200
Topsoil excavation - bypasses	9,000	53	474,480
Topsoil excavation - interchanges	7,047	11	77,519
		Total topsoil removal	**792,199**
Fill from borrow - dualization	29,725	48	1,427,989
Fill from borrow - bypasses	59,325	53	3,127,614
Fill from borrow - interchanges	113,535	11	1,248,888
		Total fill from borrow requirement (m^3)	**5,804,491**

3) Aggregate			
Element	**m^3 per km**	**km**	**Total m^3**
Granular sub-base - dual	3780.05	48.04	181,594
Granular sub-base - bypass	6870.1	52.72	362,192
Granular sub-base - interchanges	5261.72325	11	57,879
		Total natural screened gravel requirement (m^3)	**601,644**
Asphalt base course - dual	1738.8	48.04	83,532
Asphalt base course - bypass	2898	52.72	152,783
Asphalt base course - interchanges	2922.4128	11	32,147
Asphalt binder course - dual	754.4	48.04	36,241
Asphalt binder course - bypass	1508.8	52.72	79,544
Asphalt binder course - interchanges	1900.4672	11	20,905
Regulating asphalt - dual	405	48.04	19,456
Regulating asphalt- bypass	NA	NA	
Regulating asphalt- interchanges	NA	NA	
Asphalt wearing course - dual	925	48.04	44,437
Asphalt wearing course- bypass	925	52.72	48,766
Asphalt wearing course - interchanges	1160.9	11	12769.9
		Total crushed gravel (for asphalt) requirement (m^3)	**530,581**

Appendix 3: List of Relevant Guidelines and Azeri Legislation[145]

Law on Protection of Historical and Cultural Sites, 1998 (amendment 2005)

Law on Transport, June 11, 1999

Law on Automobile Roads, 10 March 2000

Law on Road Traffic, July 3, 1998

EIA Handbook for Azerbaijan (United Nations Development Program), 1996

Law on Sanitary and Epidemiological Safety, 1993.

Soviet Technical Norms and Rules (SNIP),1985 2.05.02-85 Building Code & Regulations for Automobile Roads Chapter 3: Environmental Protection

Law on Amelioration and Irrigation, 1996

Law on Protection of Flora, 1996

Law on Chemicals and Pesticides, 1996

Land Code, 1996

Water Code, 1997

Forestry Code, 1997

Law on Public Health, 1997

Law on Radiation Safety of Population, 1997

Law on Underground Resources, 1998

Law on Industrial and Municipal Waste, 1998

Law on Fisheries, 1998

Law on Environmental Protection, 1999

Law on Access to Public Information, Public Participation in Decision Making and Access to Justice in Environmental Matters, 1999

Law on Environmental Safety, 1999

Law on Water Supply and Wastewater, 1999

Law on Fauna, 1999

Law on Environmental Safety, 1999

Law on Land Fertility, 1999

Law on Specially Protected Territories and Objects, 2000

Law on Water Supply and Wastewater, 2000

Law on Protection of Air, 2001

Law on Mandatory Environmental Insurance, 2002

Law on Access to Environmental Information, 2002

Law on Environmental Education, 2002

[145] ADB (2005) and Pasillo (2007)

Decree 176, on Payments for the Use of Natural Resources and Environmental Contamination, 1992

Appendix 4: Relevant Environmental Standards

1. Ambient Air Quality Standard[146]

Pollutant	Maximum allowable concentration (in mg/m^3)	
	For a given moment (maximum)	For 24 hours
Particulates[147]	0.1500	0.0300
Sulphur dioxide	0.3000	0.2000
Carbon monoxide	3.0000	2.0000
Nitrogen dioxide	0.0800	0.0700
Nitric oxide	0.4000	0.2400
Formaldehyde	0.0200	0.0050
Lead and its compounds (except tetraethyl lead)	0.0010	0.0002

1. Road Noise Level Standard[148]

Maximum allowable noise levels, dB(A)		Description
23 pm to 7 am	7 am to 23 pm	
45	60	Residential Areas
55	65	Industrial Areas
35	50	Public Areas of Leisure and Tourism
30	40	Sanitary Areas and Resorts
45	50	Agricultural Areas
up to 30	up to 35	Protected Areas

[146] UNECE 2004

[147] No particulate size provided

[148] Recommendations on Environment Protection in Road and Bridge Design, Moscow, 1995

Appendix 5: Summary of Traffic Analysis[149]

Traffic Diversion (VPD) to the New Bypasses in 2012 (Project Opening Year)

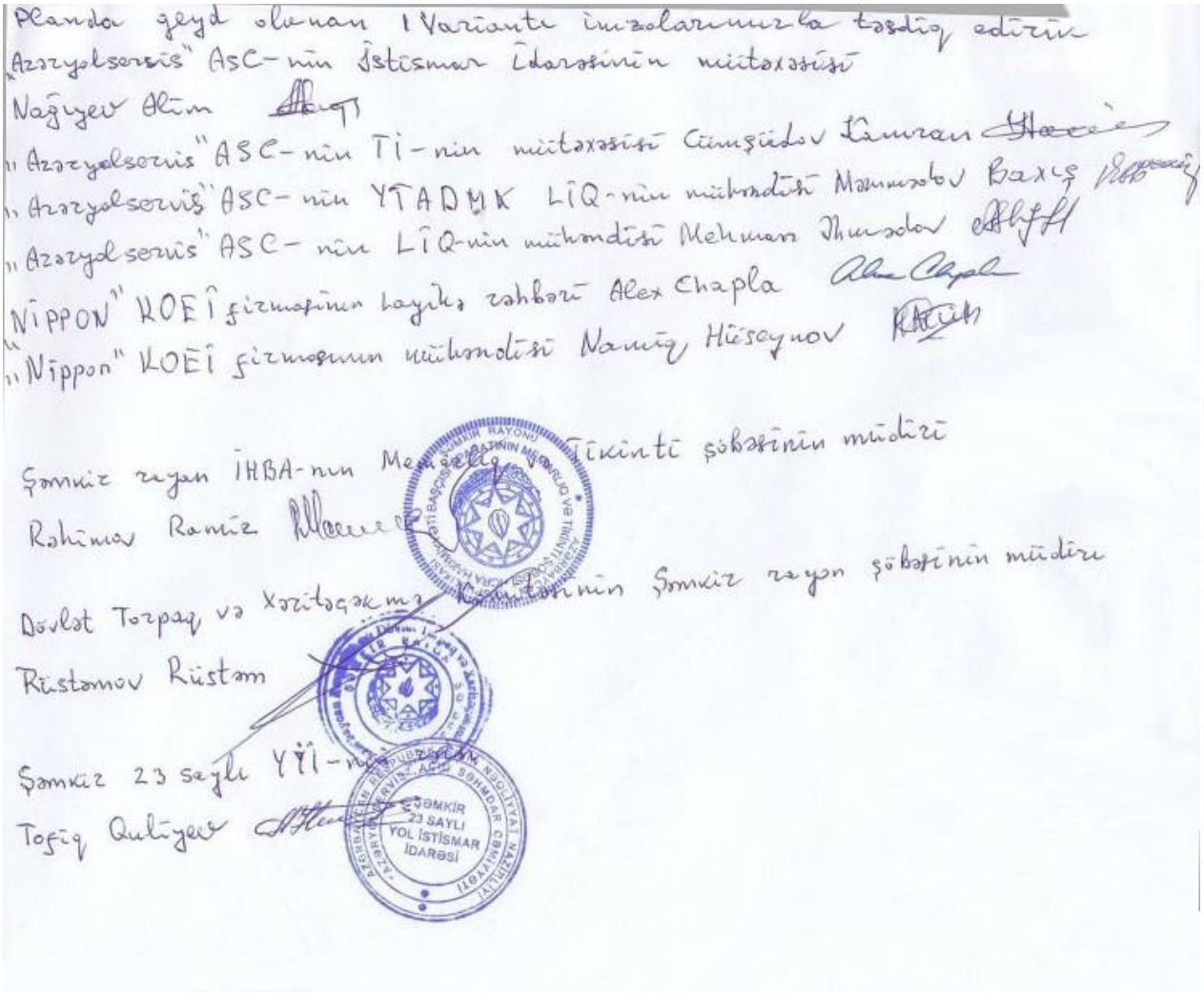
Road Section No.	Location	Car	Pick-Up	Mini Bus	Large Bus	2 Axle Truck	3 Axle Truck	4 Axle Truck	Artic. Truck	Total
	Without Project Scenario									
2	Existing road through Shamkir	5,838	174	601	156	252	273	48	403	7,744
	Project Scenario									
2	Existing road through Shamkir	2,685	33	210	36	113	120	10	12	3,220
2A	Shamkir Bypass	3,152	141	391	120	138	153	38	391	4,524
	Without Project Scenario									
4	Existing road thro' Asagi Ayublu	5,514	241	539	115	144	261	41	372	7,228
	Project Scenario									
4	Existing road thro' Asagi Ayublu	2,206	29	173	25	62	110	8	11	2,624
4A	Asagi Ayublu Bypass	3,308	212	367	90	82	152	32	361	4,605
	Without Project Scenario									
8 & 9	Existing Road thro' Agstafa and Gazakh	2,957	154	418	125	144	206	11	401	4,417
	Project Scenario									
8	Existing Road into Agstafa	1,686	28	176	34	92	130	3	20	2,168
9	Existing Road into Gazakh	1,124	97	226	85	49	68	2	24	1,675
8A	Agstafa Bypass	1,272	127	242	91	52	76	8	381	2,249
9A	Gazakh Bypass	148	29	17	6	3	8	6	357	574
10A	Gazakh Link Road	1,124	97	226	85	49	68	2	24	1,675

[149] Note that the analysis shown was carried out prior to the development of the final route alternatives for the Agstafa / Gazakh sections (no longer including "Gazakh Link Road")

Traffic Diversion (VPD) to the New Bypasses in 2031 (Project Opening + 20 years)

Road Section No.	Location	Car	Pick-Up	Mini Bus	Large Bus	2 Axle Truck	3 Axle Truck	4 Axle Truck	Artic. Truck	Total
	Project Scenario									
2	Existing road through Shamkir	12,317	154	897	153	349	406	42	53	14,372
2A	Shamkir Bypass	14,459	657	1,665	511	427	517	160	1,721	20,118
	Project Scenario									
4	Existing road thro' Asagi Ayublu	10,117	135	735	108	191	371	34	49	11,741
4A	Asagi Ayublu Bypass	15,176	990	1,562	384	253	513	138	1,589	20,604
	Project Scenario									
8	Existing Road into Agstafa	7,732	130	748	143	285	440	14	88	9,580
9	Existing Road into Gazakh	5,236	461	977	367	154	234	10	106	7,545
8A	Agstafa Bypass	5,925	600	1,049	394	163	263	34	1,676	10,105
9A	Gazakh Bypass	689	139	72	27	9	28	24	1571	2,559
10A	Gazakh Link Road	1, 5236	461	977	367	154	234	10	106	7,545

Appendix 6: Attendees of Preliminary Consultation Meetings



Ağstafa Rayon İHBA-nın Memarlıq və Tikinti şöbəsinin müdiri
cənab Sənan Mustafayev İmza:

Ağstafa 26 saylı Yİİ-nin rəisi Səməndər Əliyev
İmza:

Dövlət Torpaq və Xəritəçəkmə Komitəsi Ağstafa rayon şöbəsinin müdiri
Rəhbər İsgəndərov İmza:

Qazax Rayon İHBA-nın Memarlıq və Tikinti şöbəsinin müdiri
M. Həsənov İmza:

Dövlət və Torpaq və Xəritəçəkmə Komitəsinin Qazax rayon şöbəsinin müdiri
S. Həbiyev İmzə:

Qazax 27 saylı Yİİ-nin rəisi
Hadıyev Həsən
İmza:

Tovuz r/n İHBA-nın memarlıq və tikinti şöbəsinin müdiri
Rəşid Həsənov

Dövlət Torpaq və Xəritəçəkmə Komitəsinin Tovuz r/n şöbəsinin müdiri
Malik Abbasov

Tovuz 25 saylı Yİİ-nin rəisi Elman Məmmədov

Əlavə 7: ƏMTQ-inilkin məsləhətləşmə görüşlərin protokolu və iştirakçıların siyahısı

1. Məsləhətçi görüşlərinin protokolu

08.08.2012. Vaxt: 11:00 – Qazax rayonu

İclası rayon icra başçısının müavini açıq elan etdi. Gələn qonaqları salamladıqdan sonra sözü İlahə İlyasovaya verdi. İlahə xanım görüşün əsas mahiyyəti ilə bağlı məlumat verdikdən sonra Şahin İsayev layihə haqqında görüş iştirakçılara qısa məlumat verdi. Daha sonra o, layihənin ətraf mühitə təsirinin qiymətləndirilməsi ilə bağlı müfəssəl təqdimat elədi.

Təqdimat başa çatdıqdan sonra iştirakçıları maraqlandıran sualları vermələri və şərhlərini bildirmələri üçün onlara şərait yaradıldı. Belə ki, verilən suallar və şərhlər aşağıda qeyd olunmuşdur:

1. Layihənin son qəbul edilmiş halından öncə neçə alternativ varianta baxılmışdır?

   Suala Namiq hüseynov ətraflı Picturedə cavab verərək iştirakçıları layihənin müxtəlif varinatları və yekun variantın seçilməsi səbəbləri ilə məlumatlandırdı.

2. Yolun mühafizə zolağının eni nə qədərdir?

   Namiq Hüseynov: 60 m

3. Komunikasiya xətlərinin vəziyyəti necə olacaq?

   Namiq Hüseynov: Layihənin müfəssəl variantı bütün komunikasiya idarələrinə göndəriləcəkdir. Bakıdan ayırılmış nümayəndə və yerli nümayəndələrlə birlikdə əraziyə baxış keçiriləcək və onların verdiyi texniki tapşırıq əsasında lazımi tədbirlər görüləcəkdir.

4. Xidmət orqanlarının rəyləri tikinti vaxtı nəzərə alınacaqmı?

   Namiq Hüseynov: Yuxarıda verilən cavab bu sualı ətarflı Picturedə əhatə edir.

5. Yeraltı keçidlər əksər hallarda kifayət qədər qoyulur. Buna zəhmət olmasa diqqət yetirilsin!

   Namiq Hüseynov: Layihə daxilində 44 yeraltı keçid nəzərdə tutulmuşdur. Yerlərdə mümükün olan sayda keçidlərin qoyulmasına çalışmışdır. Hər bir halda təklif və fikirlərinizi bildirin və mümkün olarasa bütün təkliflər nəzərə alınacaqdır.

6. Pay torpaqlarının alq-satqı nəticəsində bölünməsi zamanı kiçik ölçüdə qalan istifadəyə yararsız torpaqlar alınacamı?

   Şahin İsayev: Asiya İnkaşf Bankının tələblərinə uyğun olaraq layihə çərçivəsində alqı-satqı nəticəsində alınmış bölünmüş pay torpaqlarının bir hissəsi müəyyən ölçüdən kiçik olarsa həmin torpaqlar da sifarişçi tərəfindən alınacaqdır. Hər bir halda bu suala torpqların qiymətləndirilməsi ilə məşğul olan digər qrupun nümayəndələri növbəti görüşlərdə daha ətraflı cavab verəcəklər.

7. Satın alınmış torpaqlardan əlavə tikinti zamanı istifadə olunan torpaqların aqibəti necə olacaq? Yəni bunun müqabilində hər hansı bir ödəniş olacaqmı?

   Şahin İsayev: istiafə olunan hər bir əlavə ərazi əhali ilə tam olaraq razılaşdırılacaq və müvfiq olaraq istifadə müddətində kompensasiyalar ödənəcəkdir.

8. Yerli yol istismar idarəsinin işçiləri tikintidə niyə iştirak etmir?

   Şahin İsayev: Tikinti şirkətininöhdəçiliklərindən biri də yerl əhalinin müəyyən hissəsinin işə cəlb olunmasıdır. Bu baxımdan mümkün olduğu qədər yerli əhali işə cəlb olunacaqdır.

9. Mövcud yolda Çaylı kəndinin ərazisində heç bir nişan, dayanacaq qoyulmamışdı. Xahiş edirik belə məsələləri diqqətdən kənar qoymayın!

   Namiq Hüseynov: Bütün bu məsələlər tam olaraq nəzərə alınmışdır.

08.08.2012. Vaxt: 15:00 – Ağstafa rayonu.

İclası rayon icra başçısının müavini açıq elan etdi. Gələn qonaqları salamladıqdan sonra sözü İlahə İlyasovaya verdi. İlahə xanım görüşün əsas mahiyyəti ilə bağlı məlumat verdikdən sonra Şahin İsayev layihə haqqında görüş iştirakçılara qısa məlumat verdi. Daha sonra o, layihənin ətraf mühitə təsirinin qiymətləndirilməsi ilə bağlı müfəssəl təqdimat elədi.

Təqdimat başa çatdıqdan sonra iştirakçıları maraqlandıran sualları vermələri və şərhlərini bildirmələri üçün onlara şərait yaradıldı. Belə ki, verilən suallar və şərhlər aşağıda qeyd olunmuşdur:

1. Satınalmalar necə aparılacaqdır?

   İlahə İlyasova: Satınalma məsələləri ilə digər qrup məşğuldur və bu suallara növbəti görüşlərdə ətraflı cavab veriləcəkdir, lakin əmin olunuz ki, bütünü məsələlər araşdırılcaqdır.

   Şahin İsayev əlavə etdi ki, hazırda Şəmkir rayonunun ərazisində layihəyə düşən torpaqların mülkiyyəti müəyyən olunub və yerlərdə dəqiqləşdirmə işləri aparılır. Digər rayonlarda isə hələ ki yalnız xəritə üzərində mülkiyyətlər müəyyən edilib. Yerlərdə bir başa dəqiqləşdirmə və inventarizasiya işlərinə başlanılmayıb. Yəqin ki ilin axırına qədər bu məsələlər tamamlanacaqdır.

2. Yen yol mövcud yoldan nə qədər aralı keçəcək?

   Namiq Hüseynov: Yolun təxminən yarısı mövcud yola paralelkeçəcək, digər yarısında isə dolama yollar mövcud yoldan müxtəlif məsafələrdə keçəcəkdir (sonra isə yol oxunu göstərən xəritələr təqdim edilmişdir).

3. Qaz borularının vəziyyəti necə olacaq?

   Namiq Hüseynov: Layihənin müfəssəl variantı bütün komunikasiya idarələrinə göndəriləcəkdir. Bakıdan ayırılmış nümayəndə və yerli nümayəndələrlə birlikdə əraziyə baxış keçiriləcək və onların verdiyi texniki tapşırıq əsasında lazımi tədbirlər görüləcəkdir.

4. Gedib kəndlərdə yerli əhali ilə görüşlər keçirmək lazımdır. Onların fikirlri, ehtiyacları öyrənilməlidir.

   Namiq Hüseynov: Əraziyə şəxsən mənim tərəfimdən dəfələrlə piyada gəzilərək baxış keçirilmişdir. Bütün ehtiyac duyula biləcək yerlərəd keçidlər və qovşaqlar nəzərdə tutulub. Lakin nəzərə almaq lazımdır ki, yol sürətli yoldur və burada hər 100 m-dən bir qovşaq qoymaq və ya tez-tez keçidlər qoymaq mümkün deyil. Çalışılmışdır ki, hər km-ə bir keçid qoyulsun. Hər bir halda yerlədə görüşlər zamanı əlavə keçidlərin qoyulmasının zəruriyyəti vurğulanarsa bu məsələyə bir daha qayıdıb yenidən baxmaq olar.
   Bir məsələni də bildirmək istıyirəm: Bir neçə il öncə rayonun aidiyyatı şəxsləri ilə yol oxu müəyyən edilib və razılaşdırılıb. Bundan sonra qanunla heç bir tikiliyə icazə verilməçəlidir. Lakin layihə boyunca yeni tikililər müçahidə olunur. Bu da əvvəlcədən nəzərə alınmadığı üçün çətinlik törədir. Xahiş edirəm bu məsələlərə bir qədər diqqətli yanaşılsın.

5. Körpünü keçdikdə sonra qovşaq var yoxsa yox?

   Namiq Hüseynov: Bu bir qədər çətindir. Amma çalışarıq oraya bir qovşağın qoyulmasını layihəyə daxil edək.

6. Rayonu su ilə təmin edən kəhrizlərin aqibəti necə olacaq?

   Namiq Hüseynov: Bu çox vacib məslədir. Çalışılacaq ki kəhrizlərə heç bir xətər yetirilməsin.

09.08.2012. Vaxt: 11:00 – Tovuz rayonu.

İclası rayon icra başçısının müavini açıq elan etdi. Gələn qonaqları salamladıqdan sonra sözü İlahə İlyasovaya verdi. İlahə xanım görüşün əsas mahiyyəti ilə bağlı məlumat verdikdən sonra Şahin İsayev layihə haqqında görüş iştirakçılara qısa məlumat verdi. Daha sonra o, layihənin ətraf mühitə təsirinin qiymətləndirilməsi ilə bağlı müfəssəl təqdimat elədi.

Təqdimat başa çatdıqdan sonra iştirakçıları maraqlandıran sualları vermələri və şərhlərini bildirmələri üçün onlara şərait yaradıldı. Belə ki, verilən suallar və şərhlər aşağıda qeyd olunmuşdur:

1. N.Bağırov bildirdi ki: Əsas məsələlər su keçidləri, yeraltı keçidlər, qovşaqlar və bu kimi digər məsələlərdir.Bu gün ki iclasdan sonra bütün kəndlərin nümayəndələri öz kəndlərinin ərazisində nə qədər keçidə, qovşağa, su borusuna və s. Ehtiyac olduğu barədə yazılı Picturedə icra hakimiyyətinə məktub hazırlasın. Biz də bu məktubu layihə mühəndisinə və aidiyyatı quruma təqdim edərik.

2. Zəyəmçay Tovuz rayonunun bir çox kəndlərini içməli su ilə təmin edir. Xahiş edirik ki, tikinti zamanı bu çaydan heç bir tikinti materialı çıxarılmasın.

3. Bəzi kəndləri yola çıxışı nəzərə alınmayıb. Bunu diqqətə alın.

   Namiq Hüseynov: Yol sürətli yoldur. Bu səbəbdən də hər kəndin ərazisindən ola çıxış qoymaq mümkün deyil. Xüsusilə də, yaxın kəndlərdə buna imkan yoxudr. Eləcə də, layihənin texniki cəhətdən bəzi məhdudiyyətləri vardır. Buraya qovşaqlar arası məsafələr, giriş cıxışlar arası məsafələr və s. Aiddir. Mən bu normalardan kənara çıxa bilmərəm. Lakin sizin təklifinizi nəzərə alaraq çalışaram ki, Xatınlı kəndi ərazisində bir qovşaq salaq.

4. Layihə müəyyən bir hissədə yaşlı palıd ağaclarının üzərindən keçir. Onların aqibəti necə olacaq? Əvvəlcədən hansı ağacların kəsiləcəyi barədə məlumat veriləcəkmi?

   İlahə İlyasova: Təbii ki, bu barədə əvvəlcədən bütün aidiyyatı qurumlara məlumat veriləcəkdir.

5. Layihənin xəritəsini əldə etmək olar? Keçidlərin, qovşaqların yerini bilmək üçün maraqlı olardı.

   Namiq Hüseynov: Layihənin müfəssəl variantı rayonar daxil olmaqla bütün zəruri təşkilatlarıa göndəriləcəkdir.

09.08.2012. Vaxt: 15:00 – Şəmkir rayonu.

İclası rayon icra başçısının müavini açıq elan etdi. Gələn qonaqları salamladıqdan sonra sözü İlahə İlyasovaya verdi. İlahə xanım görüşün əsas mahiyyəti ilə bağlı məlumat verdikdən sonra Şahin İsayev layihə haqqında görüş iştirakçılara qısa məlumat verdi. Daha sonra o, layihənin ətraf mühitə təsirinin qiymətləndirilməsi ilə bağlı müfəssəl təqdimat elədi.

Təqdimat başa çatdıqdan sonra iştirakçıları maraqlandıran sualları vermələri və şərhlərini bildirmələri üçün onlara şərait yaradıldı. Belə ki, verilən suallar və şərhlər aşağıda qeyd olunmuşdur:

1. Yeraltı keçidlər nəzərə alınıbmı?

   Namiq Hüseynov: Çalışılıb ki, yeraltı keçidlər tam nəzərə alınsın. Hətta son bir neçə ay ərzində onların sayının 29-dan 38-ə çıxarılması məsələsi razılaşdırılmışdır.

2. İcra başçısının müavini bildirdi ki, görüşün əsas məqsədi layihə ilə tanışlıq idi. Təbii ki, layihə müddətində hər hansı bir problem yaşanarsa rayon rəhbərliyi əhaliyə köməklik göstərərək lazımi qurumlarla əlaqə saxlayacaq və problemlərin həllini təmin edəcəkdir. Hər bir halda Şəmkir rayonurəhbərliyi və əhalisi layihəni tam olaraq dəstəkləyir və qonaqlara təşəkkürünü bildirir.

V. ***List of participations from consultation meetings***

Meeting(1) - Gazakh

Gəncə-Qazax yolunun genişləndirilməsi

İctimaiyyətlə görüş

Avqust 2012

Rayonun adı:

	Adı ve soyadı	İşyeri	Tutduğuvezife	Meşğuliyyəti	Əlaqənömrəsi	İmza
1	Nəbiyev Sarıxan Namaz	AZRDT vəKK-nın Qazax Zaş.	müdir		050-472-31-01	[illegible]
2	İmamverdiyev Vasif	Qazax Elektrik Şəbəkəsi	rəis		0502506828	[illegible]
3	Əyvazov Mehman	Çaylı ərazi İN. nümayəndəsi	müavin		050 4131974	[illegible]
4	Şəfiyev Rauf	Hüseynbəyli K/Numayəndə	Nümayəndə		050 625 81 88	[illegible]
5	Məmmədov Nazim	Hüsaggal Cəndi kəndi	kənd ağsaqqal		050 403 31-29	[illegible]
6	Məlsayev Musa	Bələdiyyə müavin	Kənd ağsaqqalı			[illegible]
7	Həsənov Valeh	Hüseynbəyli kənd İN-müavin	müavin		050-461-14-99	[illegible]
8	Hüseynov Elmar	Cəndi bələdiyyə. Sədri	Sədr		055-642-54-30	[illegible]
9	Yusifov Asif	Daş Salahlı Kənd İ.N-si	nümayəndə		050-324-55-98	[illegible]
10	Əzizov Mikayıl	Daş Salahlı kənd ağsaqqalı	ağsaq. Ş sədri		0179-28-7-84	[illegible]
11	Yusifov Akif	Daş Salahlı kənd Bələdiyyə	müavin		0279-28-5-51	[illegible]
12	Əmirəhmədov Vaqif	[illegible] kənd İN-si	nümayəndə		050-478-08-29	[illegible]
13	Məmmədov Elçin	[illegible] kənd icra nümayəndə	müavin		055-763-64-66	[illegible]
14	Süleymanov Saleh	[illegible] bələdiyyəsi	sədr		050-585-35-16	[illegible]
15	İsalov Ramiz	Kosalar kənd İ/N-si	nümayəndə		050 270-21-6	[illegible]
16	İsmayılov Məmməd Mustafa	Daş Salahlı Kid-nin müavini	müavin		050 3626634	[illegible]
17	Hadıyev Həsən Tanrıverdi	Qazax 17 saylı [illegible] rəisi	Rəis		050 3476850	[illegible]
18	[illegible]	[illegible]	nümayəndə		050 339 3940	[illegible]
19	Pənahov Əliş Məhəmməd	Qazax Meşə İdarəsi rəis	Rəis		050 356 740	[illegible]
20	Göyüşov Abbas Cahandar	Qazax Suvarma Sistemləri İd.	Rəis		055-575-86-01	[illegible]
21	Qədirov Mahir Mustafa	Qazax RİS	Rəis		055-222-21-16	[illegible]
22	Heydərov Akif Həsənbəy oğ.	Qazax [illegible]	Baş mexanik		055-549-49-98	[illegible]
23	Nizaməliyev Vidadi İsmayıl	Orta Salahlı kənd İN-si	sədr		050-270-21-64	[illegible]
24	Əliyeva Südabə Məhəmməd	Orta Salahlı-Qazaxbəyli bələdiyyə	sədri		050-270-21-80	[illegible]
25	Hacıyev Həsən Mehrali	Orta Salahlı kənd İN-si	müavin		055-353-16-33	[illegible]

Meeting - Gazakh

Gəncə-Qazax yolunun genişləndirilməsi

İctimaiyyətlə görüş

Avqust 2012

Rayonun adı:

	Adı və soyadı	İşyeri	Tutduğuvezifə	Məşğuliyyəti	Əlaqenömrəsi	İmza
1	Alimov Sahil Camisat	Orta Salahlı-Qazaxbəyli bələdiyyəsi	üzvü		070-921-80-69	
2	Qocayev Qasımfar Bəhmən	Çaylı kənd icra nüm.			050-270-21-62	
3	Vəliyev Səmərəm Şakir	Çaylı kənd sakini			2930-305	
4	Qolayev Abdulla	Qazax Su Kanal idarəsi			050 342 8011	
5	Məmmədov Elşad	Kosalar bələdiyyəsi			0518412916	
6	Əliyev Nazir	Bələdiyyə üzvü			0554329095	
7	Əliyev Xudaği	Kosalarkənd lazer	Kürmənqurudulması müəllimi		050 3688456	
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						

Gəncə-Qazax yolunun genişləndirilməsi

İctimaiyyətlə görüş

Avqust 2012

Rayonun adı: Ağstafa

	Adı və soyadı	İşyeri	Tutduğuvəzifə	Məşğuliyyəti	Əlaqənömrəsi	İmza
1	Bayramov Fazil	Dağ Kəsəmən kənd icra nümayən.	icra nümayəndəsi	—	050-334-58-20	
2	Məmmədov İftixar	Dağkəsəmən məktəb təs müdiri	təsərrüfat müdiri	—	055-586-38-06	
3	Yusifov İlham	Xilxina məktəbdə təs müd	məktəb direktor	—	050685-08-79	
4	İsmayılov Saleh	Xilxina bələdiyyə sədri	Bələdiyyə sədri	—	050366-61-76	
5	Əliyev Məsim	Həsənsu bələdiyyə sədri	Bələd. sədri	—	070-305-62-23	
6	Məmmədov Nəsrəddin	Qırılı bələdiyyəsinin sədri	Bələdiyyə sədri	—	050-318-96-04	
7	Qurbanov Elxan Xəlil.	Qırılı icra nümayəndəliyi	icra nümayəndəsi	—	050-383-24-67	
8	Tağıyev Zakir	Eynallı icra nümayəndəliyi	icra nüm müavini	—	050-727-83-29	
9	Məmmədiyev Tagı	Köçəsgər kənd məktəbin direktor	direktor		050-4259519	
10	Paşayev Mövsüm Həsən	Eynallı kənd t. orta mək direk	direktor	—	050-524-15-44	
11	Əliyev Adil Əli oğ	Yuxarı Qələdiyyəsinin sədri	Bələdiyyə sədri	—	050-325-94-64	
12	Fətəliyev Rəşid Zeynalabdi	Həsənsu kənd icra nüm.	nümayəndə	—	070-678-46-48	
13	Bayramov Əziz İlyas o	Dağ Kəsəmən bələdiyyəsi	Bələdiyyə sədri	—	070-6972163	
14	Ədayeva Sevgi Bayram q.	Qaraxasanlı bələdiyyəsi	sədri	—	055-742-18-79	
15	Babayev Məhəmməd	Qaraxasanlı icra nümayəndəsi	icra nümayəndəsi	—	050-265-88-93	
16	İsmayılov Ramiz	Qıraq icra nümayəndəsi [illegible]	[illegible]	—	050-391-95-01	
17	Novruzov Səlim Qafar	Xilxina icra nümayəndə	icra nümayəndə	—	050-397-29-28	
18	Əsgərov Elgün İsfəndi oğlu	Yuxarı icra nümayəndə	icra nümayəndəsi	—	050 657-35-25	
19	Hüseynov Nurəddin Hüseyn	Qaraxasanlı kənd orta məkt.	direktor	—	0506403088	
20	İsmayılov Tahir Rafiq.	Yuxarı orta məktəb	direktor	—	050 310 52 57	
21	[illegible]	[illegible] tam orta mək.	direktor	—	077 6044403	
22	Abdullayeva Tərranə İmran	Dağ Kəsəmən 2 №-li tam orta mək	direktor.	—	050 726 93 80	
23	Babanlı Nazilə Rəhim	Köçəsgər kənd 2 №-li tam orta mək.	direktor.	—	050 459 58 84	
24	Hakimova Aybəniz Heydər	Həsənsu kənd A. Mustafayev mək	direktor	—	050 585 01 19	
25	İsmayılova Gülənaz Əli	Qırılı kənd tam orta mək	direktor	—	0503825486	

Gəncə-Qazax yolunun genişləndirilməsi

İctimaiyyətlə görüş

Avqust 2012

Rayonun adı: Ağstafa

	Adı və soyadı	İşyeri	Tutduğuvəzifə	Məşğuliyyəti	Əlaqənömrəsi	İmza
1	Namazova Sadagət Səmi[illegible]	Qızıl kənd tam orta	müəllimə	—	6-20-64.	[illegible]
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						

Gəncə-Qazax yolunun genişləndirilməsi

İctimaiyyətlə görüş

Avqust 2012

Rayonun adı: Tovuz 03.08.2012

	Adı və soyadı	İşyeri	Tutduğuvəzifə	Məşğuliyyəti	Əlaqənömrəsi	İmza
1	İsrail İbrahimov	Qaraxanlı K. İ.H.V. [illegible]	Nümayəndə	–	050 366 07 97	
2	Bəhrat Hüseynov	Qovlar Bələdiyyəsi	Sədr	–	050-349-06-98	
3	Vəfa Hüseynov	Aşağı Quşçu [illegible]	Sədr	–	051 859 90-90	
4	Aslan Sadıqov	Aşağı Quşçu [illegible]	Nümayəndə	–	050-351-55-05	
5	Sədər Hüseynov	Əlibəyli kənd İƏD	nümayəndə	–	050-389-24-06	
6	Oruc Binnətov	Qovlar İƏD	nümayəndə	–	055-550-05-75	
7	Əsgərov Akif	Alakol İƏD	Nümayəndə	–	050 465-11-03	
8	Sədov Elmar	Alakol bələdiyyəsi	Sədr	—	050 264-60-[illegible]	
9	Hüseynov Samir	Öndər Qaraqaya İƏD	nümayəndə	–	055 252-20-22	
10	Hüseynov Cingiz	Xatınlı bələdiyyəsi	Sədr	—	050 519-73-02	
11	Cəfərov Abbas	Qaraxanlı bələdiyyəsi	bələdiyyə sədri		050 221-79-54	
12	Məmmədov Nurəddin	Xatınlı İƏD nümayəndə	nümayəndə	[illegible]	050 390-77-66	
13	Urliyeva Mirzəli Talib	Dondar Quşçu bələdiyyə	Sədr		050-389-28-60	
14	Bağırova Banu [illegible]	Eyyubbəy kənd İƏD	nümayəndə	" – "	050-494-34-[illegible]	
15	Cəlilov Elbar Dadaş	[illegible] kəndi	nümayəndə	" – "	050-643-[illegible]	
16	[illegible] Kafar İsmayıl	Əlibəyli kəndi	Su idarə nümayəndə	" – "	050 32238-30	
17	Məmmədov Ağa[illegible]	Aşağı Quşçu İƏD nümayəndə	nümayəndə	" – "	050-465-69-64	
18	Kərimov Nadiyat [illegible]	[illegible] RİN	nümayəndə	" – "	055-573-99-04	
19	İbrahimov Hidayət Adil	Şəkik Girdəxan İƏD	nümayəndə		070-736-44-99	
20	İbrahimov Nüləzə İsmail	Şəkik Girdəxan bələdiyyəsi	bələdiyyə sədri		050-309-09-55	
21	Məmmədov Rauf İlkin	Düz Cırdaxan İƏD	nümayəndə		050 362-36-86	
22	Qəhrəmanov Zaur İlqar	Düz Cırdaxan bələdiyyə	Sədr		050 390-22-52	
23	Namazov İxtiyar Bayram	Əlibəyli bələdiyyəsi	Sədr		050-524-24-72	
24	Hacıyev Azər Nurəddin	Bozalqanlı RİN	icra nümayəndəsi		050-493-76-[illegible]	
25	Vəliyev Səadət Qəmpir	Tovuz Televiziyası	baş müxbiri		050 462-27-03	

Gəncə-Qazax yolunun genişləndirilməsi

İctimaiyyətlə görüş

Avqust 2012

Rayonun adı: Tovuz

	Adı və soyadı	İşyeri	Tutduğuvezife	Məşğuliyyəti	Əlaqənömrəsi	İmza
1	[illegible] Elxan [illegible]	[illegible]	ƏHS	–	0503229756	
2	[illegible] Nəbi Allahverdi	Tovuz Su kanal idarəsi	ƏHS müavini		050 4056909	
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						

Gəncə-Qazax yolunun genişləndirilməsi

İctimaiyyətlə görüş

Avqust 2012

Rayonun adı: Şəmkir 03.08.2012

	Adı ve soyadı	İşyeri	Tutduğuvəzifə	Məşğuliyyəti	Əlaqənömrəsi	İmza
1	Səxavət Məhərrəmov	Şəmkir ES rəisi	rəisi	enerji ida	0502506813	[signature]
2	Elman Rufiyev	Şəmkir SSİ	Baş mühən	Suvarma	0502225522	[signature]
3	Akif İbrahimov	Şəmkir Maşın Kanal	rəisi	Su kanal	0502229433	[signature]
4	Nəriman Vəliyev	Şəmkir SQİİ	rəisi	SQİİ	0503794565	[signature]
5	Məmmədov Saleh Teymur	Təzəkənd İ.Ə.D	nümayəndə		050 326 18 05	[signature]
6	Dumanov Vaqif Ziyad	Yeniyol bələdiyyəsi	Sədr	bələdiyyə	050-364-48-13	[signature]
7	Qurbanov Əlikəbir Fəxrəddin	Yeniyol İƏD	sədr	[illegible]	050-201-5-08	[signature]
8	Rüstəmov Rüstəm İslam	[illegible] Şəm. şöb	müdir	Torpaq [illegible]	050 3627734	[signature]
9	Osmanov Əli [illegible]	Könüllü İ.Ə nümayəndə	müdir		050 536 06 09	[signature]
10	Əliyev Nəsrəddin Qurban	[illegible] İ.Ə nümayəndə	Sədr	icra nüm. si	050 518-25-25	[signature]
11	Ramazanov İsa Həbib	[illegible] İ.Ə.D nümayəndə	nümayəndə	icra nüm.	050 357 81 62	[signature]
12	Əhmədov Qalib Fəlmalı	[illegible] bələdiyyəsi	Sədr	Bələdiyyə	050 337 81 68	[signature]
13	Məmmədov [illegible]	[illegible] bələdiyyəsi	sədr	Bələdiyyə	050 635 32 34	[signature]
14	Həsənov Sabir [illegible]	[illegible]	Sədri	[illegible]	0519911771	[signature]
15	Hüseynova Dünyalı [illegible]	–"– [illegible] nümayəndəsi	Nümayəndə	[illegible] 050	630-85-23	[signature]
16	Nəsibova Aybəniz Abbas	Düyərli kən İƏD	Nümayəndə	icra nüm	318-35-03	[signature]
17	Yusifov [illegible]	Şəmkir T.K.Ə.			319-79-92	[signature]
18	Əlibəyov Nəsrəddin [illegible]	Şəmkir ƏİS	Baş mühən		541 21 57	[signature]
19	Hacıyev Məmməd Bayram	Sarıtorpaq İ.Ə.D	nümayəndə		315-26 54	[signature]
20						
21						
22						
23						
24						
25						

+ 20 not registered.

Rayonun adı: Qazax

№	Adı və soyadı	İş yeri	Tutduğu vəzifə	Məşğuliyyəti	Əlaqə nömrəsi	İmza
1	Alimov Saylı Camisat	Orta Salahlı-Qazaxbəyli	Bələdiyyə üzvü		070 – 921 – 80 - 69	
2	Qocayev Qəzənfər Bəhmən	Çaylı kənd icra nümayəndəsi			050- 270 – 21 - 62	
3	Vəliyev … Şükür	Çaylı kəmd sakini			29 – 30 - 305	
4	Qocayev Abdulla	……..			050 342 90 11	
5	Məmmədov Elshad	Kosalar bələdiyyəsi			051 841 79 16	
6	Əliyev Natiq	Bələdiyyə üzvü			055 432 90 95	
7	Əliyev Xudabi	Kosalsar kənd nümayəndəsinin müavini			050 568 84 56	

Rayonun adı: Ağstafa

№	Adı və soyadı	İş yeri	Tutduğu vəzifə	Məşğuliyyəti	Əlaqə nömrəsi	İmza
1	……	Qırıqlı kənd orta məktəbi	Müəllim		6 – 20 - 64	
2						
3						
4						
5						
6						
7						

Rayonun adı:Tovuz

№	Adı və soyadı	İş yeri	Tutduğu vəzifə	Məşğuliyyəti	Əlaqə nömrəsi	İmza
1	Məmmədov Elman Məmməd	….	Rəis			050 3223756
2	Ələkbərov Nəbi Allahverdi	Tovuz Su kənd idarəsi	Rəis müavini			050 4056909
3						
4						
5						
6						
7						

Rayonun adı: Şəmkir 09.08.2012

№	Adı və soyadı	İş yeri	Tutduğu vəzifə	Məşğuliyyəti	Əlaqə nömrəsi	İmza
1	Səxavət Məhərrəmov	Şəmkir EŞ	Rəis	…	0502506813	
2	Elman Quluyev	Şəmkir SSİ	Baş mühəndis	Suvarma	0502225228	
3	Akif Ibrahimov	Şəmkir...	Rəis	…	050 2229433	
4	Nərman Verdiyev	Şəmkir SQİİ	Rəis	…	050 3794565	
5	Məmmədov Saleh …	Təzəkənd kəndinin …	Nümayəndə		050 3261805	
6	Dumanov Vaqif Ziyad	Yenihəyat kəndinin bələdiyyəsi	Sədr	Bələdiyyə	050 3644813	
7	Orucov Mikayil Fərhad	Yenihəyat village …	Sədr	…	050 2015508	
8	Rüstəmov Rüstam Aslan	…	Müdir	Torpaq məsələləri	050 3627734	
9	Pənəhov Əli Hümbet	…	Müdir		050 5360609	
10	Əliyev Ələddin …	…	Sədr	İcra hakimiyyəti nümayəndəsi	050 5182575	
11	Ramazanov Isa Habib	…	Nümayəndə	İcra hakimiyyəti nümayəndəsi	050 3578162	
12	Əhmədob Qalib Gülmali	…	Sədr	Bələdiyyə	050 3378767	
13	Məmmədov Məharram	Abbaslı kəndininbələdiyyəsi	Sədr	Bələdiyyə	0519911771	
14	Həsənov Sabah Qidiz	Dəllyar-Ceyir bələdiyyəsi	Sədr	Bələdiyyə	051 9911771	
15	Hüseynova TünzalәƏləkbər	….	Nümayəndə	Sədr	630 8529	
16	Nasibova Aybeniz Namaz	Düyerli kəndi...	Nümayəndə	İcra hakimiyyəti nümayəndəsi	318 9903	
17	Yusifov …	Şəmkir…			319 79 22	
18	Hüseynov Ələddin …	Şəmkir	Baş mühəndis		541 2157	
19	Hacıyev Məhəccət Bayram	…	Nümayəndə		335 2654	