Initial Environmental Examination

Draft IEE Report
Improvement and Widening of Zhob–Mughalkot Section of N-50
January 2014

PAK: National Highway Network Development in Balochistan Project

Prepared by National Highway Authority for the Asian Development Bank.

ABBREVIATIONS

ADT	Average Daily Traffic
BEPA	Balochistan Environmental Protection Act
EMP	Environment Management Plan.
IEE	Initial Environmental Examination.
NEQS	National Environmental Quality Standards
NHA	National Highway Authority.
PD	Project Director/Project Coordinator
PEPA	Pakistan Environmental Protection Act
PMU	Project Management Unit
ROW	Right of Way
SPS	Safeguard Policy Statement
VOC	Vehicle Operating Costs

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Annexures

1. Introduction

1.1 Project Background

1. The Project relates to the upgradation, widening and improvement of Zhob–Mughalkot section of N-50 Highway. N-50 serves as the main road link between the provinces of Balochistan and Khyber Pakhtunkhwa passing through Bostan, Khanozai, Qila Saifullah, Gwal Haidazai Post, Mina Bazar, Zhob, Mughal Kot, Daraban and Dera Ismail Khan. The road section from Zhob to Mughalkot (81.21 km) is a part of this highway ending near the border of the two provinces. The road starts from the end of Zhob Bypass and ends at Mughal Kot. Figure 1.1 depicts the general location of the project road in the map of Pakistan whereas Figure 1.2 shows the specific project location.

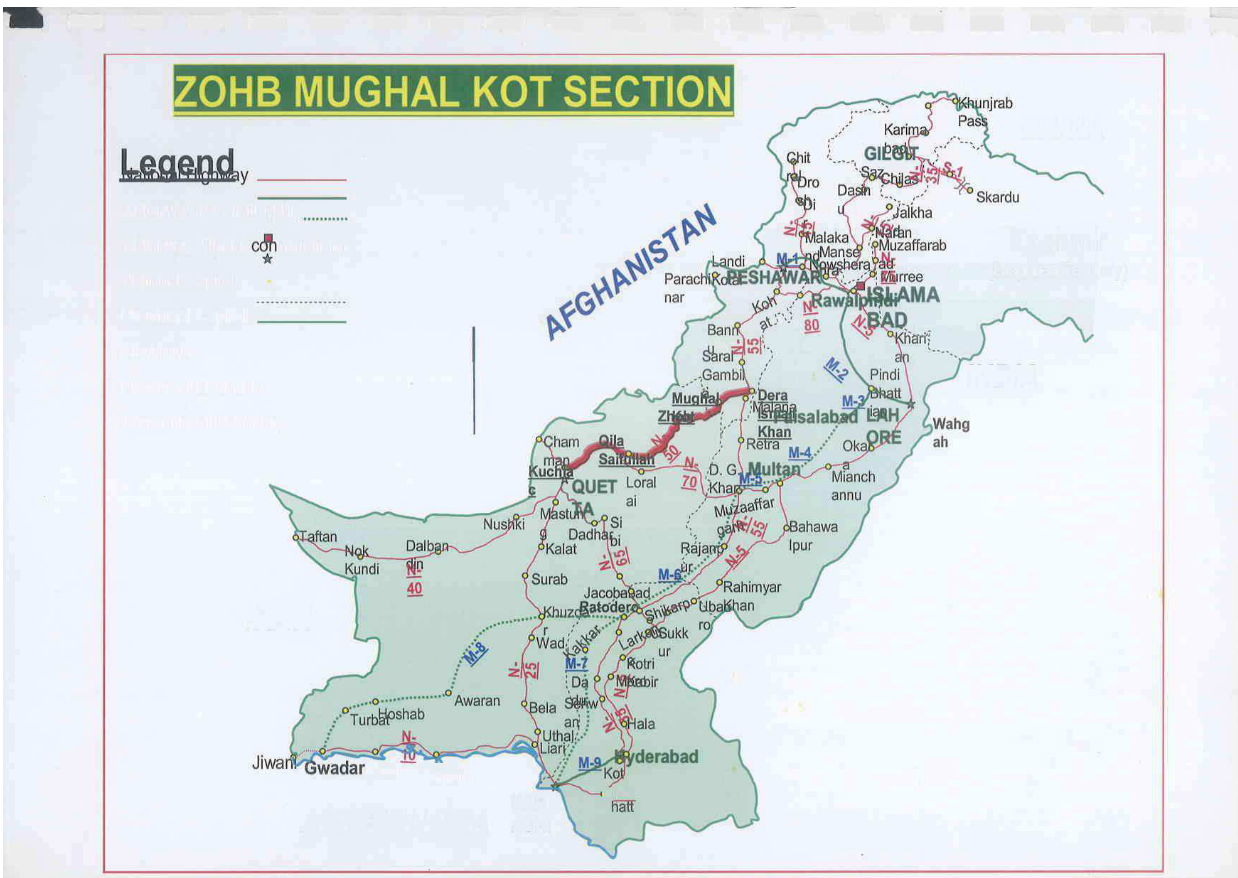


Figure 1.1: General location of project road

2. Through ADB financial support the Government of Pakistan intends to rehabilitate and improve the existing 3.65m wide Zhob–Mughalkot (N-50) road as two lane 7.3m wide carriageway with 2.5m shoulders on each side. As per design the total pavement width of the road will be 13.3m. The National Highway Authority (NHA) will be the Executing Agency (EA) for the project. The Project will rehabilitate and improve this section of National Highway to provide a dependable road transport network to promote interprovincial connectivity, reduce transportation time to economize the costs, provide all weather road to the community, and improve the developmental pace in the area.

3. This Initial Environmental Examination (IEE) Report presents the screening of potential environmental impacts of the proposed Project road and contains the mitigation measures in

order to eliminate or reduce the negative impacts to an acceptable level, describes the institutional requirements and provides an environmental management plan.

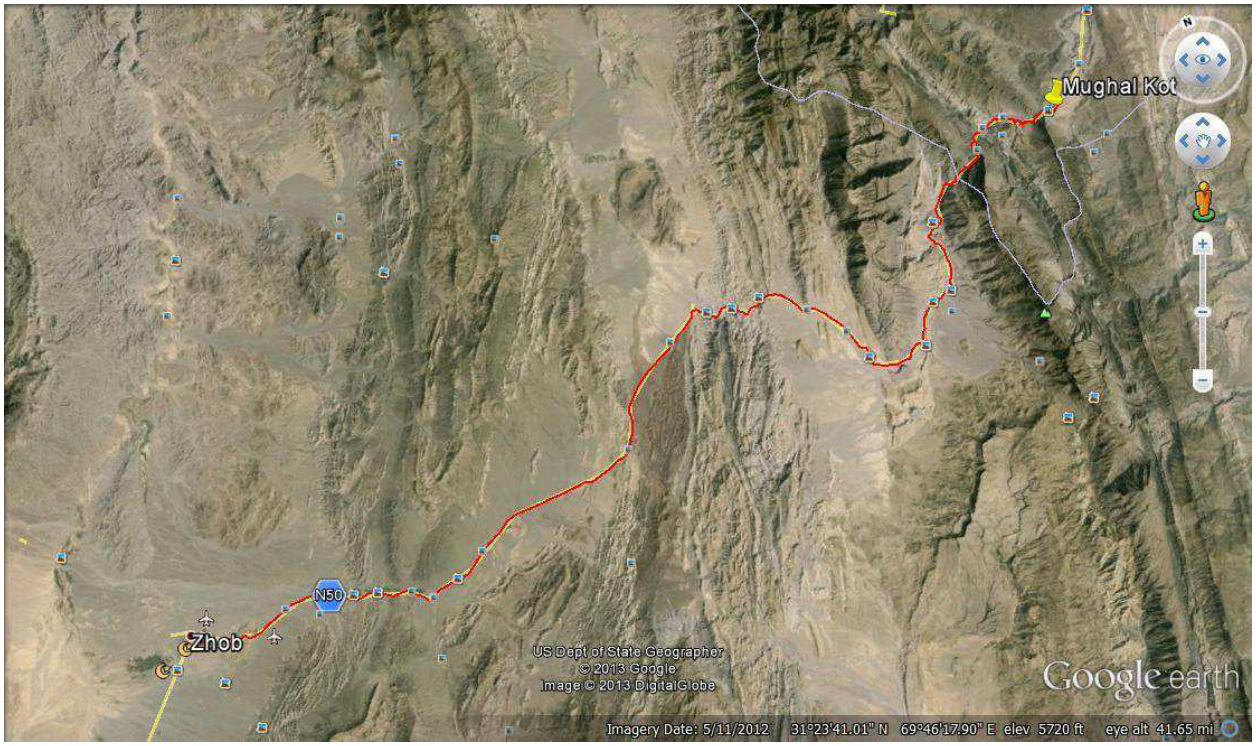


Figure 1.2: Specific location of project road

1.2 Existing Situation

4. The 79 km length of the Project road is in poor condition. The metalled part of the road is 4 to 5m wide with about 2m wide shoulders on either side and is in a highly deteriorated condition requiring upgradation. Top formation width of the road varies from 9m to 12m in plain areas, and 8m to 11m in hilly areas. The embankment height varies from 1.5m to 2.5m in plain areas. The road passes along several small villages/settlements; a list of structures/assets along the road is provided in Table 1.1.

1.3 Environmental Category of the Project.

5. According to ADB's Safeguard Policy Statement (SPS) 2009, a Rapid Environmental Assessment (REA) Checklist was prepared (Annexure-I). The Pakistan Environmental Protection Agency's "Guidelines for the Preparation and Review of Environmental Reports (2000) were also consulted. Based on the initial findings it was ascertained that only insignificant adverse environmental impacts are expected due to upgradation and improvement of the existing road, and thus the subject project is considered environmentally "B" category. Therefore an IEE has been conducted.

Table 1.1: List of Structures and assets along project road

Location Chainage start to end	**Description**
0+000 TO 0+200	Plants
0+025 TO 0+120	Building
0+250 TO 0+600	Building
5+625 TO 5+725	Graveyard
5+820 TO 5+860	Building
7+650 TO 7+700	Building
9+365 TO 9+700	Garden
10+400TO 10+655	Garden
10+800 TO 10+830	Graveyard
10+510	Building
13+100 TO 13+270	Garden
13+1 00	Building
13+360	Building
20+000 TO 20+120	Building & Petrol Pump
21+960 TO 22+050	Graveyard
25+000 TO 25+200	Building
25+275 TO 25+300	Graveyard
25+700	Building
29+750	Building
29+900 TO 30+100	Graveyard
37+400 TO 37+575	Graveyard
37+800	Building
37+960 TO 38+010	Building &Graveyagd
39+450	Building
38+100 TO 38+225	School & Hospital building
39+625	Building
43+1 00	Hotle building
46+725 TO 46+750	Hotle building
47+900 TO 48+025	Graveyard &Petrol Pump & building
48+950 TO 49+100	Building
49+825 TO 49+925	Building
50+025	Graveyard
50+225 TO 50+350	Building
51+575 TO 51+610	Building
51+730 TO 51+900	Building
52+1 00	Building
54+490 TO 54+575	Graveyard
54+900 TO 55+050	Building
57+710 TO 57+750	Building
60+310 TO 60+360	Graveyard
64+950 TO 65+100	Graveyard
68+160 TO 68+190	Check Post Building
68+640 TO 68+740	Graveyard
69+975	Hotel building

2. Policy and Legal Framework

2.1 General

6. This section provides an overview of the policy framework and national legislation that applies to the proposed project. The project is expected to comply with all national legislation relating to environment in Pakistan, and to obtain all the regulatory clearances required.

2.2 National Policy and Legal Framework

7. The Climate Change Division is the responsible authority for environmental protection policy making in Pakistan.

8. The Pakistan National Conservation Strategy (NCS) that was approved by the federal cabinet in March 1992 is the principal policy document on environmental issues in the country (EUAD/IUCN, 1992). The NCS outlines the country's primary approach towards encouraging sustainable development, conserving natural resources, and improving efficiency in the use and management of resources. The NCS has 68 specific programs in 14 core areas in which policy intervention is considered crucial for the preservation of Pakistan's natural and physical environment. The core areas that are relevant in the context of the proposed project are pollution prevention and abatement, restoration of rangelands, increasing energy efficiency, conserving biodiversity, supporting forestry and plantations, and the preservation of cultural heritage.

9. Prior to the adoption of the 18th Constitutional Amendment, the Pakistan Environmental Protection Act (PEPA) 1997 was the governing law for environmental conservation in the country. Under PEPA 1997 the Pakistan Environmental Protection Council (PEPC) and Pak EPA were primarily responsible for administering PEPA 1997. Post the adoption of the 18th Constitutional Amendment in 2011, the subject of environment was devolved and the provinces have been empowered for environmental protection and conservation. Subsequently, the Balochistan government amended PEPA 1997 as Balochistan Environmental Protection Act 2012, and Balochistan EPA (BEPA) is responsible for ensuring the implementation of provisions of the Act in Balochistan's territorial jurisdiction. BEPA is also required to ensure compliance with the NEQS and establish monitoring and evaluation systems.

2.3 Regulations for Environmental Assessment, Pakistan EPA

10. Under Section 12 (and subsequent amendment) of the PEPA (1997), a project falling under any category specified in Schedule I of the IEE/EIA Regulations (SRO 339 (I0/2000), requires the proponent of the project to file an IEE with the concerned provincial EPA. Projects falling under any category specified in Schedule II require the proponent to file an EIA with the provincial agency, which is responsible for its review and accordance of approval or request any additional information deemed necessary.

2.4 Regulatory Clearances, Balochistan EPA

11. In accordance with provincial regulatory requirements, an IEE/EIA satisfying the requirements of the Balochistan Environmental Protection Act (2012) is to be submitted to Balochistan environmental protection agency (BEPA) for review and approval, and subsequent issuance of NOC before the commencement of construction.

2.5 Guidelines for Environmental Assessment, Pakistan EPA

12. The Pak-EPA has published a set of environmental guidelines for conducting environmental assessments and the environmental management of different types of development projects. The guidelines that are relevant to the proposed project are listed below:

- Guidelines for the Preparation and Review of Environmental Reports, Pakistan, EPA 1997;
- Guidelines for Public Consultations; Pakistan EPA May 1997;

2.6 National Environmental Quality Standards (NEQS) 2000

13. The National Environmental Quality Standards (NEQS), 2000, specify the following standards:

- Maximum allowable concentration of pollutants (32 parameters) in municipal and liquid industrial effluents discharged to inland waters, sewage treatment facilities, and the sea (three separate sets of numbers);
- Maximum allowable concentration of pollutants (16 parameters) in gaseous emissions from industrial sources;
- Maximum allowable concentration of pollutants (two parameters) in gaseous emissions from vehicle exhaust and noise emission from vehicles;
- Maximum allowable noise levels from vehicles;

14. These standards apply to the gaseous emissions and liquid effluents discharged by batching plants, campsites and construction machinery. The standards for vehicles will apply during the construction as well as operation phase of the project. Standards for ambient air quality have also been prescribed.

2.7 ADB's Safeguard Policy Statement (SPS), 2009

15. The Asian Development Bank's Safeguard Policy Statement (SPS) 2009 requires that environmental considerations be incorporated into ADB's funded project to ensure that the project will have minimal environmental impact and be environmentally sound. Occupational health & safety of the local population should also be addressed as well as the project workers as stated in SPS. A Grievance Redress Mechanism to receive application and facilitate resolution of affected peoples' concerns, complaints, and grievances about the project's environmental performance is also established and provided in Chapter 8.

16. All loans and investments are subject to categorization to determine environmental assessment requirements. Categorization is to be undertaken using Rapid Environmental Assessment (REA) checklists, consisting of questions relating to (i) the sensitivity and vulnerability of environmental resources in project area, and (ii) the potential for the project to cause significant adverse environmental impacts. Projects are classified into one of the following environmental categories:

17. Category A: A proposed project is classified as category A if it is likely to have significant adverse environmental impacts that are irreversible, diverse or unprecedented. These impacts may affet an area lager than the sites or facilities subject to physical works. An environmental impact assessment (EIA) is required.

18. Category B: A proposed project is classified as category B if its potential adverse environmental impacts are less adverse than those of category A projects. These impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for category A projects. An initial environmental examination (IEE) is required.

19. Category C: A proposed project is classified as category C if it is likely to have minimal

or no adverse environmental impacts. No environmental assessment is required although environmental implications need to be reviewed.

20. Category FI: A proposed project is classified as category FI if it involves investment of ADB funds to or through a financial intermediary (FI).

2.8 Interaction with other Agencies

21. NHA is responsible for ensuring that the project complies with the laws and regulations controlling the environmental concerns of highway construction and operation, and that all preconstruction requisites, such as permits and clearances are met. This section describes the nature of the relationship between the NHA and concerned departments.

2.9 Provincial EPAs

22. NHA will be responsible for providing the complete environmental documentation required by the BEPA and remain committed to the approved project design. No deviation is permitted during project implementation without prior and explicit permission of the BEPA.

2.10 Provincial Departments of Forests and Wildlife

23. The clearing and grubbing for the Project road will involve clearing and uprooting of trees falling under construction limits (60-65 ft.) within the right of way. However, any removed trees of vegetation under private ownership will be compensated as per provision of the there is some disruption to vegetation or trees the project contractor will be responsible for acquiring a 'No-Objection Certificate' (NOC) from the concerned federal or provincial forest department. The application for an NOC will need to be endorsed by the NHA.

2.11 Provincial Governments

24. The NHA and its contractors must ensure that the project meets the criteria of provincial/district governments as related to the establishment of construction camps and plants, and the safe disposal of wastewater, solid waste, and toxic materials. NHA will coordinate and monitor environment-related issues.

2.12 Other Environment Related Legislations

25. Table 2.1 gives a summary of all legislations, guidelines, conventions and corporate requirements:

Table 2.1: Environmental Guidelines and Legislations

Sr. No.	Legislation/guideline	Description
1	**Balochistan Environmental Protection Act, 2012**	Post the adoption of the 18th Constitutional Amendment in 2011, the subject of environment was devolved and the provinces have been empowered for environmental protection and conservation. Subsequently, the Balochistan government amended PEPA 1997 as Balochistan Environmental Protection Act 2012, and Balochistan EPA (BEPA) is responsible for ensuring the implementation of provisions of the Act in Balochistan's territorial jurisdiction. BEPA is also required to ensure compliance with the NEQS and establish monitoring and evaluation systems.
2	**Pakistan Environmental Protection Act (PEPA) 1997**	Basic legislative tool empowering the Government of Pakistan to frame and enforce regulations for the protection of environment. The PEPA 1997 is broadly applicable to air, water, soil, marine and noise pollution, and handling of hazardous wastes. Penalties have been prescribed for those contravening provisions of the Act. Under section 12 of the PEPA 1997, no project involving construction activities or any change in the physical environment can be undertaken unless an IEE or EIA is conducted and a report submitted to the federal or provincial EPA.
3	**Pakistan Environmental Protection Agency Review of IEE and EIA Regulations, (2000)**	The Regulation classifies projects on the basis of expected degree of adverse environmental impacts and lists them in two separate schedules. Schedule I lists projects that may not have significant environmental impacts and therefore require an IEE. Schedule II lists projects of potentially significant environmental impacts requiring preparation of an EIA. The Regulations also require that all projects located in environmentally sensitive areas require preparation of an EIA. It also lists Projects not requiring either an EIA or an IEE.
4	**National Environmental Quality Standards (1993 and 2000)**	The NEQS specify standards for industrial and municipal effluents, gaseous emissions, ambient air requirements and emission levels for Sulfur dioxide and Nitrogen oxide, vehicular emissions and noise levels. The PEPA specifies the imposition of a pollution charge in case of non-compliance with the NEQS. The standards were last revised in 2000.
5	**National Environmental Policy (2005) (NEP)**	NEP is the primary policy of Government of Pakistan addressing environmental issues. The broad Goal of NEP is, "to protect, conserve and restore Pakistan's environment in order to improve the quality of life of the citizens through sustainable development". The NEP identifies a set of sectoral and cross-sectoral guidelines to achieve its goal of sustainable development. It also suggests various policy instruments to overcome the environmental problems throughout the country:

6	**Land Acquisition Act, 1894 Including Later Amendments**	The Land Acquisition Act, 1894, is a "law for the acquisition of land needed for public purposes and for companies and for determining the amount of compensation to be paid on account of such acquisition". The exercise of the power of acquisition has been limited to public purposes. The principles laid down for the determination of compensation, as clarified by judicial pronouncements made from time to time, reflect the anxiety of the law-giver to compensate those who have been deprived of property, adequately. The land needed for the construction of road will be acquired under normal conditions based on prevailing market prices or negotiated prices between NHA and the owners of land. Section 17(4) of the LAA will not be used in the absence of an emergency. Instead, the land will be purchased under willing-seller willing-buyer deal at agreed upon market rates and the seller will have the option not to sell the land, in case an acceptable deal for both the parties is not reached.
7	**The Forest Act (1927)**	The Act empowers the provincial forest departments to declare any forest area as reserved or protected. It empowers the provincial forest departments to prohibit the clearing of forest for cultivation, grazing, hunting, removing forest produce, quarrying and felling, lopping and topping of trees, branches in reserved and protected forests. No protected forest is situated in the Project Area.
8	**Canal and Drainage Act (1873)**	This Act prohibits corruption or fouling of water in canals (defined to include channels, tube wells, reservoirs and watercourses), or obstruction of drainage.
9	**Pakistan Penal Code (1860)**	It authorizes fines, imprisonment or both for voluntary corruption or fouling of public springs or reservoirs so as to make them less fit for ordinary use.
10	**Protection of Trees and Brushwood Act, 1949**	This Act prohibits cutting or lopping of trees and brushwood without permission of the Forest Department. The Forest Department will be approached for permission to cut trees along the road alignment.
NATIONAL ENVIRONMENTAL AND CONSERVATION STRATEGIES		
11	**National Conservation Strategy**	Before the approval of NEP the National Conservation Strategy (NCS) was considered as the Government's primary policy document on national environmental issues. At the moment this strategy just exists as a national conservation program. The NCS identifies 14 core areas including conservation of biodiversity, pollution prevention and abatement, soil and water conservation and preservation of cultural heritage and recommends immediate attention to these core areas.
12	**Biodiversity Action Plan**	The plan recognizes EIA as an effective tool for identifying and assessing the effects of a proposed operation on biodiversity

INSTITUTIONAL FRAMEWORK

13	**Environment and Conservation**	There is a well-established framework for environmental management in Pakistan. The Ministry of Environment deals with environment and biological resources. Within the ministry, the NCS unit established in 1992 is responsible for overseeing the implementation of the strategy. Two organizations, The Pakistan Environmental Protection Council (PEPC) and the Pak EPA are primarily responsible for administering the provisions of the PEPA, 1997. The PEPC oversees the functioning of the Pak EPA. Its members include representatives of the government, industry, non-governmental organizations, and the private sector. The Pak EPA is required to ensure compliance with the NEQS, establish monitoring and evaluation systems, and both identify the need to and institution of legislations whenever necessary. It is thus the primary implementing agency in the hierarchy. The Provincial Environmental Protection Agencies are formed by the respective provinces.

INTERNATIONAL CONVENTIONS

14	**The Convention on Conservation of Migratory Species of Wild Animals, (1981.21)**	The Convention requires countries to take action to avoid endangering migratory species. The term "migratory species" refers to the species of wild animals, a significant proportion of whose members cyclically and predictably cross one or more national jurisdictional boundaries. The parties are also required to promote or cooperate with other countries in matters of research on migratory species. There are no endangered species of plant life or animal life in the vicinity of the Project.
15	**Convention on International Trade in Endangered Species of Wild Fauna and Flora (1973)**	The convention requires Pakistan to impose strict regulation (including penalization, confiscation of the specimen) regarding trade of all species threatened with extinction or that may become so, in order not to endanger their survival further.
16	**International Union for Conservation of Nature and Natural Resources Red List (2000)**	Lists wildlife species experiencing various levels of threats internationally. Some of the species indicated in the IUCN red list are also present in the wetlands of Larkana

INTERNATIONAL ENVIRONMENTAL GUIDELINES

17	**ADB's Safeguard Policy Statement (SPS), 2009**	ADB's Safeguard Policy Statement (SPS), 2009 provides guidelines for environmental assessments of development projects. These guidelines help prospective projects identify impacts they will have on various environmental receptors. The guidelines call for carrying out EIAs or IEEs of projects based on severity of their impacts.

3. Description of the Project

3.1 Justification and Need for the Project

26. The N-50 significantly contributes towards the overall goal to facilitate north-south bound transitional and regional traffic with improved direct link between the Khyber Pakhtunkhwa and Balochistan provinces. Currently, N-50 from Kuchlak to Zhob section in Balochistan and Mughalkot to D.I. Khan in Khyber Pakhtunkhwa is improved as 7.3m wide carriage way with 2.5m paved shoulders on each side. The section from Zhob to Mughalkot (81.21 km) is the only bottle neck that hinders to foster the perceived development benefits.

27. Inadequate connectivity and access continue to pose a major problem to the regional economy and development, which particularly affects the poor who live predominantly (80%) in rural areas along the project road. This project will contribute to the GOP's overall goal to develop an effective national road network with improved interprovincial connectivity. The newly improved highway will reduce the transport costs in the project area and facilitate more efficient and cost effective movement of passengers and goods.

3.2 Need for Project

28. The alignment passes over vast stretches through rugged rocky plains where the present height of embankment and the existing cross-drainage structures are insufficient to cope with the hydraulic impacts resulting from sheet flows across these gently sloping plains. The pavement width varies between 3.0 and 4.5 m only, being particularly narrow in hilly areas. Shoulders are generally narrow, earthen and degraded. In areas with water regularly flowing to the embankment, deep cracks often extend into the surface layer. Cross drainage structures include concrete slab structures which are in poor condition and need replacement/rehabilitation while during rains the sheet flow from nearby hills causes traffic interruption due to flooding of the nullahs without bridges. The compound effects of the poor road condition without bridges result in augmented vehicle operation costs, increased accident risks, economic and other losses or constraints due to lengthy travel times.

3.3 Objectives of the Project

29. Due to improvements in most of the sections of N-50, especially improvement as a two-lane carriageway from Kuchlak to Zhob (300 Km), the traffic flux has considerably increased in the project section as well. The existing single lane Zhob to Mughalkot section of N-50 is a bottleneck for improved inter-provincial transport needs and socio-economic development of en-route population around project road. Hence to foster perceived development benefits, NHA planned to upgrade the project section of N-50 (81.21 Km) into an all weather road as two lane carriageway with treated shoulders and causeways replaced with bridges as per standards.

30. The prime objectives of the proposed Project are as follows:

- Improved inter-provincial connectivity.
- Increase the access of the rural and urban population to social services and markets, leading to improved quality of travel/livelihood.
- Enhance the efficiency of road network to minimize transportation cost through improvement and vehicle operating cost.
- Reduce the number of accidents.
- Improve regional as well as inter-provincial trade.

3.4 Proposed Project Activities

31. This project is a civil works project, to be carried out by contractors recruited on an international bidding process. It will comprise the following main activities:

- To meet traffic flow requirements, the bulk of the rehabilitation works (81.21 km total length) will include widening of pavement of the single carriageway to a standard width of 7.3 meter two lane carriage way, with 2.5 m shoulders on each side in the open terrain. If required (e.g. in the vicinity of retention walls protecting orchards etc.), the shoulder width will be kept flexible. The embankments will be widened and filled up at vertical level in accordance to the adjacent terrain and hydraulic impacts, with special protective measures against erosion as and where required.
- The horizontal curvature will be corrected, i.e. sharp curves will be smoothed as per standards required. The adopted design solutions will not necessitate land acquisition.
- To meet both the traffic flow requirements and safe driving standards,[1] both the horizontal and the vertical geometry will be improved. All such improvements will be confined within the existing ROW limits with no additional land acquisition.
- To meet the hydrological requirements, Substantial structure rehabilitation works are designed for reconstruction/re-dimensioning/adding bridges and other cross-drainage structures in accordance with newly calculated hydraulic impact modifications. All existing slab concrete culverts will be replaced by box culverts and cause ways will be replaced by new bridges to ensure all weather safe driving.
- To meet estimated axle loading, the existing road will not be dismantled but used as compacted sub-base for a newly improved embankment. The rehabilitated surface will receive strengthened asphalt pavement.
- To meet national highway safety standards, Road furniture, markings and traffic signs are further elements to improve the overall standard of this highway section.

3.5 Key Components of the Project

32. Following are the key components of the Project Road after final survey and design:

Rehabilitation of existing Road	81.21 km
Construction of New bridges (Replacement of cause ways)	9
Rehabilitation/ new Construction of Culverts	224

33. Following is the geometric design criteria of the Project Road

Road width (Travel Lanes)	: Two lanes of 7.3 m with each lane of 3.65m
Shoulder (outer)	: 2.5m wide, with 0.5 m rounding
Formation width	: 13.30 m wide
Minimum passing sight distance	
Plain areas	: 615m
Hilly Areas	: 410m
Minimum Stopping Sight Distance	
Plain Areas	: 160m
Hilly Areas	: 85m
Maximum super elevation	
Plain Areas	: 6.0%
Hilly Areas	: 6.0%

[1] The highway is designed for a travel speed of 100 km/hr in the open, non-urban terrain.

Minimum Radius of horizontal
Curve (Plain Areas) : 335m
Hilly Areas : 22.5m

Minimum 'K' Value "Crest" based on Passing sight distance
Plain Areas : 39m
Hilly Areas : 11m

Minimum 'K' Value "Sag" based on stopping sight distance
Plain areas : 38m
Hilly Areas : 18m

Minimum Curve Length
Plain Areas : 100m
Hilly Areas : 70 m

Maximum Gradient
Desirable max. gradient
Plain Areas : 2.5%
Hilly Areas : 3.0%

Absolute max. gradient
Plain Areas : 4.0%
Hilly Areas : 6.4%

Absolute min. gradient
Plain Areas : 0.3%
Hilly Areas : 0.3%

Embankment side slopes : 2:1

Design speed
Plain Areas : 90km/hr
Hilly Areas : 60km/hr

34. Road pavement design is based on latest traffic counts converted into Equivalent Standard Axle load (ESALs) projected for design period, results of soil investigation (CBR) taking into account local climatic condition.

3.6 Project Implementation Schedule

35. It has been assumed that the implementation of the Project shall take 30 months after start.

3.7 Sources of Construction Material

36. The project area is located in northern part of Balochistan. The existing road passes through flat terrain and partly through mountainous terrain. The surrounding mountains comprises mainly of slate, shale at some locations, conglomerate, dolomite, lime stone, sand stone, gypsum, glacial till and hard rock. These rocks are jointed, folded and slightly faulted. Near the existing road mostly gravel, boulders embedded in silt, sand and clay deposits are observed.

37. Borrow material for construction of embankment is easily available all along the existing alignment. Material for sub-base, base and aggregates can be obtained from adjacent mountains, from river/nullah beds and can be used after screening and crushing as the case may be. Fine aggregates are also available in river and nullah beds.

38. Along the existing road from Zhob to D.I.Khan different borrow areas on both sides of the road were explored. 7 borrow areas were identified and samples were collected and tested for suitability of road construction.

COARSE AGGREGATES

39. Huge deposits of limestone are exposed all along roadside. The limestone is dark grey to grey, massive, hard and compact. During the road widening activity, blasting to these deposits will produce sufficient quantity of limestone boulders and cobbles, which may be process for concrete aggregates.

FILL MATERIAL

40. Different types of fill materials are exposed in the area. Alluvium deposits along with gravitational regime forms fill materials in the area. Theses fill materials composed of gravels and cobbles with clayey and sandy matrix. Gravels ranges from Gap graded to well graded.

SAND

41. No appreciable sand deposits are seen along the roadside however; the bed of Zhob River may be a potential source of sand, while 2-3 km off road from Mughal Kot to Dera Ismael Khan thick to massive beds of friable sandstone are present. Numbers of hill torrents cut these sandstone beds therefore; sand deposits are expected downstream areas. However, detail investigation regard availability and quality for sand may be done recommended during construction phase.

IMPERVIOUS MATERIALS

42. Dark grey to greenish grey, medium to highly plastic shale are present as impervious material, which are exposed at different locations throughout the project area

3.8 Traffic

43. In order to assess the existing/normal traffic volume presently using the subject road, AAA & RDC undertook classified 24 hours continuous traffic count surveys in the months of July and September 2006 at Narwarsak Post at existing road counting various types of vehicles plying in each of the two directions. In order to have a fair estimate of traffic likely to use the proposed bypass, an origin and destination survey was also undertaken.

Table 3.1: Summarized average daily traffic volume of July & September 2006

SUMMARY OF AVERAGE DAILY TRAFFIC (ADT)			
ROAD : ZHOB - MUGHALKOT COUNT STATION : NARWARSK POST			
TYPE OF VEHICLES	ZHOB TO MUGHALKOT	MUGHALKOT TO ZHOB	ADT TOTAL
MOTORIZED TRAFFIC			
CAR/JEEP/PEJERO/PICK - UP	12	12	24
HIACE WAGON	161	156	317
MINI BUSES/BUSES	1	1	2
TRACTOR/TROLLY	5	4	9
TRUCKS 2 XL	263	187	450
TRUCKS 3 XL	38	28	65
TOTAL	480	388	868

AVERAGE ANNUAL DAILY TRAFFIC(AADT)			
ROAD : ZHOB - MUGHALKOT COUNT STATION : NARWARSK POST			
TYPE OF VEHICLES	ZHOB TO MUGHALKOT	MUGHALKOT TO ZHOB	AADT TOTAL
MOTORIZED TRAFFIC			
CAR/JEEP/PEJERO/PICK - UP	15	17	33
HIACE WAGON	58	63	121
MINI BUSES/BUSES	2	2	3
TRACTOR/TROLLY	6	9	15
TRUCKS 2 XL	100	111	211
TRUCKS 3 XL	16	18	34
TOTAL	197	220	417

These ADT were then projected using variable growth rates as given in the following table:

Table 3.2: Annual Growth Rates

TYPE OF VEHICLE	PERIOD				
	2007-2011	2012-2016	2017-2021	2022-2026	2027-2031
CAR/JEEP/PEJERO/PICK - UP	3.04	2.80	2.63	2.49	2.38
HIACE WAGON	3.91	3.62	3.40	3.24	3.10
MINI BUSES/BUSES	3.80	3.54	3.34	3.19	3.07
TRACTOR/TROLLEY	4.90	4.72	4.59	4.48	4.39
TRUCKS 2- XL	3.74	3.59	3.47	3.38	3.30
TRUCKS 3- XL	3.74	3.59	3.47	3.38	3.30

3.9 Construction Camps and Work Force

44. Campsites will be selected keeping in view the availability of an adequate area for establishing campsites, including parking areas for machinery, stores and workshops, access to communication and local markets, and an appropriate distance from sensitive areas in the vicinity; final locations will be selected by the contractor. The Contractor shall comply with clause SS-5 'Contractors camps and depots' of the Tender Documents. Contractor will provide staff for the execution of the project. NHA will supervise and monitor the project through Consultants. No shortage of man power is apprehended as all kind of staff required for the job will be locally available.

	Client/Contractor	Consultant
Professional/Technical Staff	**77**	**55**
Administrative Staff	**96**	**90**
Service	**120**	**90**
Skilled	**480**	**20**
Semi-Skilled	**720**	**-**
Unskilled	**1400**	**-**
Others	**-**	**-**

3.10 Machinery Requirement

45. The Project is located in remote, partly hilly, partly rolling and partly plain terrain. The working conditions have been rated as difficult, hard and this requires additional effort and inputs for running and maintenance of plant, equipment and machinery. The estimation of the requirement of has been made for each package. Following is a summary of type of equipment and machinery required:

No.	Equipment Type and Characteristics	Min. Number Required
1	Asphalt Plant	1
2	Asphalt Paver	2
3	Concrete Batching Plant	2
4	Crane 20 Ton	1
5	Concrete Transit Mixer	10
6	Asphalt Mix ready carrying dumpers	12
7	Concrete Pumps	4

4. Description of the Environment

4.1 General

46. Zhob derives its name from the Zhob River, which flows near Zhob town. The district, as well as the town, acquired the name Zhob in 1975. Previously it was known as Fort Sandeman, in deference to Sir Robert Sandeman, then Agent to the Governor General in Balochistan, who extended the British rule in the region.

47. The district lies between 30° 30' to 32° 05' north latitudes and 67° 26' to 70° 00' east longitudes. It is bounded on the north by Afghanistan and South Wazirestan agency of FATA, on the east by the tribal area adjoining Dera- Ismail -Khan District of NWFP and Musakhel district, on the south and south-west by Loralai and Killa Saifullah districts. Total area of district is 20297 square kilometers.

48. The description of various features of Project area environment including the climate, topography, surface/ groundwater and ecological resources etc. are presented in the following sub-sections.

4.2 Physical Resources

4.1.1 Topography

49. Topographically, the Zhob district is covered with mountains and hills intersected by the broad valley of Zhob and its tributaries. The Toba- Kakar range covers the western half of the district extending from the boundary of Afghanistan up to the Zhob River. The Suleman Range, locally called as the Kas-e-Ghar, lies on the eastern boundary of the district. The famous Takht-e-Sulaiman or Solomon's Throne is the highest peak of this range with a height of about 3441m above sea level. The general elevation of the district is 1500 to 3000 meters above mean sea level. The topography of the Project area varies considerably from rolling in valley areas to very steep slopes in mountain ranges. The slope of the existing road varies from 1.5% to 2.5% in plain area and 3% to 6.5% in hilly area following the topography of the surrounding area.

4.1.2 Climate

50. The climate of Zhob District is hot and dry in summer and cold in winter. June is the hottest month with mean maximum and minimum temperatures of about 37°C and 23°C respectively. January is the coldest month with mean maximum and minimum temperatures of about 13°C and -1°C degree respectively. Dust storms occur in summer from July to September accompanied by thunderstorms. In winters the wind blows from the west and is very cold. The winds from the southwest and east are also common, the latter invariably brings rain. The wind from the north occasionally blows during September to April and brings drought and damages standing crops. Rainfall is scanty and varies with the altitude. Most of the rainfall is received during the winter season. The average annual rainfall in the district is 288 mm.

4.1.3 Geology and Soils

51. The greater part of the Zhob district, beyond the left bank of river Zhob consists almost entirely of an extensive series of calcareous sandstone and shale. The general soil conditions along and adjacent to the road alignment is alluvial in plain/ valley areas and sandstone and shale in hilly areas. No substantive mineral extraction activity exists in the district.

4.1.4 Siesmology

52. According to the seismic zoning map of Balochistan, the Project area in district Zhob

area falls in seismic Zone 0 i.e. negligible damage zone.

4.1.5 Surface and Groundwater

53. The two principal drainage channels of the district are the Zhob and the Kundar Rivers, both flowing into the Gomal River. The general direction of the rivers is from southwest to northeast. A number of seasonal streams/nullahs exist across and along the existing road. Data about the quality and quantity of groundwater is not available for the area. Field observations show the absence of any tube-wells and hand pumps in the area. Some springs exist in the area from where water is extracted for drinking purposes.

4.2 Ecological Resources

4.2.1 Flora

54. The principal trees and plants found in Zhob district are wild olive (shinay), pistachio, chilgoza or edible pine and wild almond in high lands. Other trees include willow, tamarisk (along the streams), pastawana (grewia oppostifolio) and spalnai (calotropis gigantea). No significant flora exists along the existing road alignment except some linear plantation of Eucalyptus and some grape orchards along certain reaches of the road. Shrubs are also found on both sides of the road. No reserve/protected forests or any endangered species of trees, grasses or shrubs have been reported in the Project area

4.2.2 Fauna

55. Wild animal in the Zhob district include wolves, jackal, hyena, fox, deer and porcupine. Leopards and black bear are occasionally found in the high hills in the Suleman range. Wild pigs are seen along the Zhob River while straight horned markhor, wild sheep are present in moderate numbers in the Shinghar Mountains, at a distance of about 5km from the project road.

56. Among the game bird chakor, partridge and pigeon are numerous in higher altitudes. Sand grouse, quail and the Houbara bustard are found in plains. Other birds are dove, hoopoe, starling and vegetal. Jay black bird, wood pigeon, cuckoo and thrush live in high ranges while wild duck and pelican are seen along the Zhob River in winter.

57. Snake and scorpion are common everywhere in Zhob. Fish (Mahsir) are found in every running stream and in Zhob River, some of which weigh up to 8 lbs. The road passes through the area, where no forest/ game reserve, wild life sanctuary or any protected areas are present. No endangered species of animals and mammals, birds and reptiles have been reported in the area.

4.3 Human and Economic Development

4.3.1 General

58. Most parts of District Zhob are hilly and barren with very limited water resources for agriculture purposes. However, during recent years tube wells have become quite abundant with the result that agricultural activity has registered a rise. But most of the agricultural area of district is “Barani" i.e. rain-fed. There are two cropping seasons, Kharif and Rabi. Rabi crops are sown between October and mid February and harvested in June. Kharif crops are sown from April to July and harvested by the end of October. Grapes are grown in abundance on the foothills of the mountains. Other fruit trees include almond, apricot and apple.

59. The land along the road is mostly barren without significant agricultural activity. Some grape and olive orchards are present along the road at a few places. The inadequacy of urban

services, especially sewerage, drainage and solid waste management have worsened the quality of life of the people.

4.3.2. Irrigation

60. Only 16,206 acres of land is irrigated throughout the district. The majority of the area in the district is irrigated by springs. The poor quality of rural roads hinders access from farm to the market affecting the earnings of the local population.

4.3.3 Transportation and Communication

61. Zhob is linked by air with major cities of the country. A Fokker flight operates from Quetta linking Zhob with Multan, Dera Ismail Khan, Peshawar and Islamabad. Zhob is 320 km from Quetta, and 225 km from Dera Ismail Khan. However, the road link with Dera Ismail Khan is for most part a dirt track passing through water streams. The poor condition of the road acts as a deterrent for an increase in inter-provincial transportation and commercial exploitation of the route. The narrow railway linking Quetta with Zhob became moribund in 1984 and the service is no longer available.

4.3.4 Trade and Industry

62. Trade and trading activity in the district is largely in the informal sector because of proximity with Afghanistan. Regular formal trade is relatively limited and mostly confined to consumable items.

4.3.5 Health Facilities

63. Apart from district headquarters hospital at Zhob, there are 15 basic health units, and 2 rural health centers in the district. Some private clinics, dispensaries, traditional medicine and homeopathic dispensaries are also functioning in various parts of the district.

4.3.6 Historical and Archeological Sites

64. A number of mounds, ruins, and caves exist in Zhob district, which have historical and archeological importance. However, no historical and archeological sites exist in the near vicinity of the road.

5. Potential Environmental Impacts and Mitigation Measures

65. Environmental impacts related to design, construction, operation and maintenance phases of the Project have been identified. Following is a brief description of the environmental impacts and the proposed mitigation measures to minimize the negative impacts if any.

5.1 Design/Pre-Construction Phase

5.1.1 Land Acquisition and Resettlement

66. Since the Project road will be constructed and improved within the available Right of Way (ROW), no negative impacts are anticipated related to land acquisition and resettlement.

5.1.2 Soil Erosion and Landslides

67. Soil erosion and landslide can be a potential environmental issue during the widening and improvement of the road. The intensity of this impact will vary at different locations depending on the type of soil / rock, drainage and hydrological pattern of the concerned area. Sediment transport to natural streams flowing downhill may increase considerably if not properly mitigated. This phenomenon may cause serious environmental impacts like landslides, slumps, slips and other mass movements in the road cuts.

68. Erosion mitigation measures will be a part of the road design including measures both physical and biological such as slope stabilization, embankment reinforcement and use of stepping to maintain the angle of repose and vegetation and plantation. Similarly the designer will adopt following mitigation measures to control land slide:

- Provision of masonry breast walls.
- Provision of ditch type drains along the toe.
- Provision of small toe walls against adversely dipping rock beds.

5.1.3 Flooding

69. A number of non perennial streams and nullah cross the road at various locations which are subject to flash floods from the hills during rains. There is a great variation of rainfall pattern in the project area and the flow variation is tremendous during different seasons of the year. Heavy and intensive rains in the hilly areas often results in quick and high velocity flows. Properly designed drains along the road and cross drainage structures across the road will be required to minimize serious negative impacts during construction and operation stages of the Project.

70. The designer will check the adequacy of all the culverts / bridges against the expected flash floods and suggest improvements or new construction for catering the design flows. An adequate number of new culverts and bridges will be provided to carry the design flows without causing any flooding.

5.1.4 Plantation and Vegetation

71. The area on both sides of the road is mostly devoid of any vegetation and plantation. Also some of the trees/ orchards presently existing along the road are clear of the proposed improvement; hence no tree cutting will be required.

72. The designer will, however, include in the design road side plantation of additional trees to enhance the environmental aesthetic all along the route. During the construction stage 5,000 new trees will be planted on both sides of the road.

5.2 Construction Stage

5.2.1 Soil Erosion

73. Embankment works such as excavation of earth, cutting operations, embanking, clearing of vegetations may result in soil erosion, loss of vegetation and habitat. During rainy season soil erosion may occur damaging the earthen shoulders and the road structure. The mitigation measures will include:

- Pitching at high embankments in critical areas; and
- Plantation of grasses and shrubs for slope protection.
- Trimming down of slopes.
- Proper removal of all the loose material lying within the right of way.

5.2.2 Disposal of Spoil

74. Disposal of spoil / surplus material may be another issue likely to cause negative environmental impacts, if not properly mitigated during construction of the road. Negative impacts may be caused on the receiving lands due to improper disposal of spoil including silt runoff, change of land use, sedimentation of receiving water bodies and loss of aesthetic values.

75. To mitigate the negative impacts, the spoil will be disposed of in an environmentally acceptable manner by transporting in enclosed containers and dumping at sites approved by the executing agency. Contractors will be made responsible through necessary provisions in the contract documents for proper disposal of the spoil.

5.2.3 Air Pollution Control

76. Vehicular movement and running of construction machineries may result in emission and dust generation from construction causing public health risks, nuisance and other impacts on the bio-physical environment. Mitigation measures will include:

- Regular maintenance of vehicles, equipment and machinery used for construction to ensure that the emission levels conform to the NEQS;
- Monitoring of air quality parameters;
- Spraying water at the earth mixing sites and along the Katcha road sides. The frequency of water spraying will be at least two times a day but it will be variable depending upon climatic conditions on a particular day ; and
- Work safety measures like dust masks will be used to ensure no health risks for operators.

5.2.4 Noise Control

77. Running of construction machinery may result in noise from vehicles and equipment. Mitigation measures will include:

- The plants and equipment used for construction will strictly conform to noise standards;
- Selection of up-to-date equipment and plant, with reduced noise levels ensured by suitable and inbuilt damping techniques and appropriate muffling devices;
- Providing the construction workers with suitable hearing protection like ear cap, ear muff etc.
- Regular monitoring of noise levels.

5.2.5 Flora

78. Although linear plantation done by NHA along the project road will be affected from RD 0 to 11, the number of trees affected will be replaced as per NHA's policy. Plantation of indigenous species of trees (5000 nos.) will be carried out at selected locations, depending upon soil characteristics and availability of water.

5.2.6 Camp Site Related Impacts

79. Location of camp site may result in loss of vegetation and assets on the selected land, and dissatisfaction on rehabilitation measures after completion. Also improper sanitation & waste disposal facilities at camps may pose health risks to work force and public if not properly managed. Mitigation measures will include:

- Minimizing the removal of existing plants at camp sites;
- Plan for rehabilitation of camp site upon completion;
- Provide pit latrines or, as required, septic tanks to receive all sanitary wastewaters.

5.2.7 Borrow Pit Excavation Activities

80. Although the road will be constructed using the existing embankment, yet borrow soil will be needed for widening of formation width. Borrow pit excavation activities may cause soil erosion, damage to road embankment and public health risks. Mitigation measures will include:

- No excavations will be allowed within distance of 100 m to ROW ;
- Soil erosion along the borrow pit shall be regularly checked to prevent / mitigate impacts on adjacent lands; and
- In case borrow pits fill with water, measures will be taken to prevent the creation of mosquito-breeding sites.

5.2.8 Wages and Work Regulations

81. Inequities in wages, underpayment and gender-biased wages may result in non-conducive work environment for the work force during construction works. Mitigation measures will include:

- Ensuring pre-defined minimum wages;
- Ensuring women receive wages equal to the wage paid to men for equal works;
- Child labour will be strictly ruled out.

5.2.9 Health and Safety of Workers and Public

82. The proposed construction activities are of such nature, which can impose severe impacts on health & safety of the workers and the public. The rock cutting operations and blasting works at high mountains can pose serious health and safety risks for the workers and the public. Health and safety of the workers and the public during the construction phase will be ensured by implementing the following measures:

- The contractor will ensure that construction labour is trained in safety procedures for all relevant aspects of construction.
- The executing agency will make regular checks that the contractor is following safe practices.
- In order to ensure that all work is carried out safely, every team employed by the contractor will be headed by a fully trained supervisor with easy access to emergency services.

- Proper First Aid facility will be established by the contractor and an appropriate number of site personnel will be trained in the use of First Aid equipment.
- Formal emergency procedures will be developed for each construction site in the event of an accident.
- Advance warnings shall be given to the people likely to be affected or at risk due to the fall of debris because of construction operations
- The safety of the public at all stages of the construction will be ensured by appropriate public education and safety measures such as use of barriers and flags.

5.2.10 Social Balance and Public Relations

83. Local residents may resist contractor's attitudes; cultural clashes may affect the public relation of the contractor with the local population. Mitigation measures will include:

- Establishment of formal links with local communities and grievance redress mechanisms including community leaders; and
- Employ local community (unskilled) labour for construction works.

5.3 Operation Phase

5.3.1 Soil Erosion

84. The newly constructed embankment may be damaged due to soil erosion during rainy season causing silt runoff to surrounding areas during operation phase of the Project. Mitigation measure will include a regular programme for visual inspection for erosion damages on embankment and structures and immediate repair works.

5.3.2 Plantation and Vegetation

85. The trees planted on road side and grass during construction stage may die if not adequately looked after during the operation stage of the Project. The mitigation measures will include a regular programme of visual inspection of plant species' survival rate and status of maintenance during the operation stage.

5.3.3 Ambient Air Quality and Noise Levels

86. The project road is an existing road with very small traffic loads. The present traffic volume in year 2006 is approximately 500 vehicles per day hence affect of vehicular emissions on ambient air quality is not very significant. Also due to this increase in traffic volume, no negative impacts are envisaged on ambient air quality and noise levels of the area during operation stage of the Project due to improvement in riding quality, reduction in travel time and by avoiding unnecessary stoppages and road blockages.

5.3.4 Socio-Economic Impacts

87. The construction activities for the road will generate jobs for the local people. In addition indirect economic activities will increase i.e., hotels, shops, petrol pumps may come up along the highway during the operation stage.

88. A large number of non-locals will come for working on various jobs; therefore there is a possibility of social or cultural conflict. It is recommended that the services of local skilled or unskilled local labour may be utilized as far as possible. The influx of non-locals may however have some positive impacts also, including the possibility of bringing awareness and cultural uplift of the Project Area.

89. Business and trade activity will increase significantly providing economic benefits to the

people living in the area. The improvement in existing transportation facilities will boost tourism in the area. The Project may impart different skills to the local residents and training on the Project will help them in their future life and hence human resource development will take place for future progress of the area. Level of basic necessities like health, education and transportation are expected to be enhanced benefiting the people residing in the area.

90. The overall socioeconomic benefits of the Project being more than the negative impacts will result in raising the standard of living and alleviation of poverty in the project area.

6. Environmental Management and Monitoring Plan

6.1 Introduction

91. The Environmental Management and Monitoring Plan provides an overall approach for managing and monitoring environment and social related impacts and describes the institutional framework and resources required to implement it.

92. Chapter 5 of this provides the details about the environment screening process, impacts on environmental components with proposed remedial measures to avoid/minimize the adverse environmental impacts of the project. Accordingly the Environmental Management Plan (EMP) has been developed to effectively implement the monitoring and mitigation measures identified in the IEE to ensure that adverse environmental impacts are minimized and acieve desired economic benefits without compromising the environmental resource base of the project area.

6.2 Objective of Environmental Management Plan

93. The Environmental Management Plan provides a mechanism to address the adverse environmental impact of a project during its design, construction, and operation phases to accelerate project benefits, and to introduce standards of good practice to be adopted for all project works.

94. The objectives of the EMP are to:

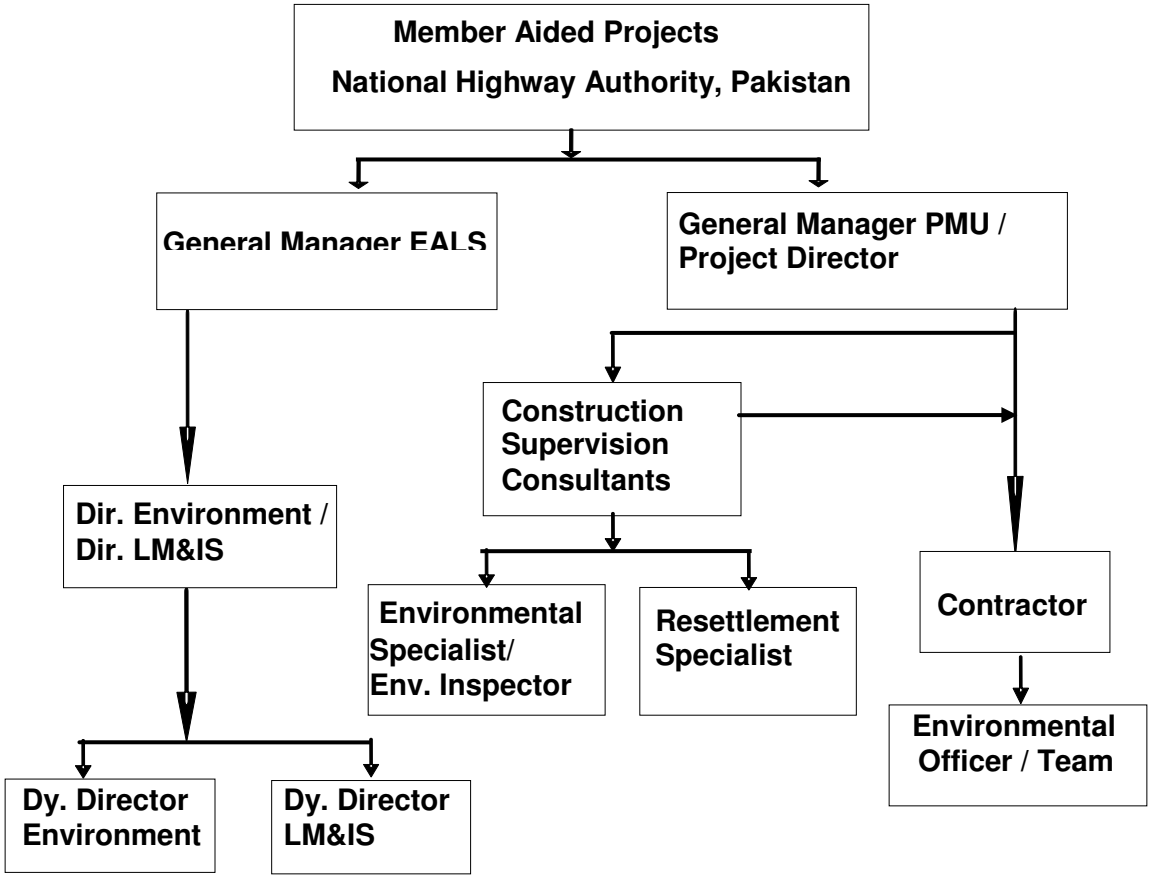
- Define the responsibilities of the project proponents, contractors, construction, supervision consultants and environmental monitors;
- Facilitate the implementation of the mitigation measures identified in the EIA;
- Define a monitoring mechanism and identify monitoring parameters;
- Provide a procedure for timely action in the face of unanticipated environmental situation; and

6.3 Environmental Management/ Monitoring and Reporting

95. During the construction phase the overall responsibility for the implementation and monitoring of Environmental Management Plan rests with the General Manager (GM) Project and Project Director (PD). The GM Project/PD through assistance from the Supervision Consultants Environmental Staff and the Environment Team of the Environment, Afforestation, Land and Social (EALS) Unit of NHA will supervise the implementation of the proposed mitigation measures and monitor the implementation progress in field. Monthly Environmental Monitoring data/reports will be incorporated in the project implementation progress reports to be shared with ADB and such monthly reports will be consolidated into bi-annual monitoring reports and submitted to ADB for review and clearance. Upon clearance all such reports will be uploaded on NHA and ADB websites.

96. The organizational structure for the Environmental Management / Monitoring implementation is shown in Figure 6.1

Figure 6.1 Organization Chart for Environment Management / Monitoring implementation



6.4 Impact Screening and Detailed Impact Analysis

97. During the IEE process a detailed impact analysis was carried out with respect to interface of project actions with the biophysical and social environment along the project corridor. For this purpose the direct corridor of impact was determined for project civil works to assess the project's impacts on environmental parameters. Accordingly, the mitigation measures to be implemented and monitored during different stages of the project have been proposed to minimize the adverse impacts

6.5 Corridor of Impact

98. Except for the establishment of contractor's camp site with equipment/material storage yards and construction material, and borrow sites, all construction activities will remain on the existing alignment within available ROW, and no new road (bypass) is considered. Thus the vast majority of the impact corridor will be restricted on the existing RoW. However, there are a few situations where the impact corridor goes beyond the limits of the carriageway, shoulders and embankments, which will be included in this IEE. These include:

- Areas where campsites, asphalt mixing plant, crushers, material stacks and storages will be established on temporarily leased land
- Borrow sites for sub-base construction material
- Quarry material

- Haulage tracks and temporary diversion lanes

99. As for the limit of traffic-related gaseous and noise emissions, an impact zone of 100 m from the CL has been considered. Section below provide brief about the project impacts due to project location/site, design, construction and operation. While activity wise environmental issues, mitigation measures with implementation mechanism and institutional responsibility are provided in the Environmental Management Matrix below.

a. Environmental Impacts due to Project Location

100. **Negative Impacts:** Taking into account the sparsely populated area, the absence of marked agriculture activities and vegetation, and the limited availability of surface waters with low groundwater table, the absence of ecological sensitive areas in the immediate vicinity of the project corridor, no major impacts were identified since the entire project will use the existing alignment. Widening to standard width will in most cases only involve a physical interference up to 3 meters from the existing shoulder. In no cases valuable or planted vegetation would be affected along the entire road corridor. The use of dynamite may be required at few occasions where the horizontal geometry needs to be corrected in hilly stretches cutting through rocky sediments.

101. Potential sources of project location impacts may include borrow material excavation that may result in marred landscapes if not properly managed. However, given the vast abundance of suitable sub-grade material along the project road, as the soil of Zhob and Shirani Districts consists prevailingly of gravely soils, shingle gravel, hard soil and rock with very poor fertility there is little likelihood of such impacts.

102. **Beneficial Impacts:** Most beneficial impacts associated with the improved connectivity and road conditions are of long-term in nature. They are fully appreciated once the project enters the operation phase and are therefore discussed below under section d.

b. Environmental Impacts due to Project Design and Specifications

103. During Design, improper design solutions may lead to increased safety risks, damage to public amenities and landscape issues. Proper design solutions are particularly important in the field of controlling noise and air pollution associated with increased traffic conditions. Of special concern is, even at this early stage, the selection of borrow sites and a number of planning issues related to the establishment of camp sites. However, these latter two aspects are treated in detail in the subsequent section.
Specific environmental problems associated with the selected design solutions, and those being addressed in the EMP, could include:

- Loss of homesteads, assets and agricultural / horticultural land [A.1.2]
- Interference with public life, local economics [A.1.1] [2], and due to siting of project works near settlements, and traffic congestions [A.2.1]
- Disturbance of the surface and groundwater regime due to under-dimensioning of cross-drainage structures [A.3.1];
- Inadequately designed structures with respect to ambient environmental conditions, e.g. flash floods, or seismic risks [A.3.2], or to cause drainage problems in built-up

[2] [Brackets] refer to the respective remedial mitigation measures described in the EMP, Matrix below.

areas [A.3.1];
- Loss of roadside vegetation and plantation [A.4.1]; disturbance to ecological resource base of the area [A 4.2]
- The Project design could deteriorate or aggravate the ambient air quality or noise levels [A.5.1];
- Disposal of harmful construction materials and waste management [A.5.2];
- Loss of productive land for borrow pits and/or undesired excavation practices [A.6.1];
- The acquisition of borrow material could interfere with existing land-uses and result in impacts on local water resources [A.6.2];
- Interruption of public amenities and services by affecting utilities [A.7.1],
- Cultural heritage sites could be affected [A.8.1].

c. Environmental Impacts Resulting from Construction Activities

104. During this project phase the majority of anticipated impacts are of adverse but temporary in nature – most if not all can be minimized by appropriate mitigation measures. In all cases, the identified impacts are localized on a small corridor adjacent to construction and haulage sites. The EMP indicates that all identified impacts and respective mitigation measures are duly incorporated in the tender and contract documents, while the core of the Supervision Consultant's task is to monitor the Contractor's compliance with these clauses.

105. At this project stage the most common problems to address with choice of location are those associated with the **siting of work camps** [B.1.1], vehicle park and material stacks. Contractor camps, particularly if located in close vicinity to existing settlements, may become a source of environmental impacts, social tensions and disputes over a number of conflicting issues such as:

- Risks that the construction works and influx of migrant/outside laborers may result in social severance, changes of traditional lifestyles and employment patterns [B.1.1];
- Imbalance in job opportunities with locally recruited labour [B.1.1];
- Loss of vegetation and assets on the land chosen as preferred site [B.1.2];
- Workers living, health safety, security and sanitation facilities, including camp site security [B.1.4. and B.1.5];
- Risks and nuisances with the creation of waste and sewage [B.1.3, B.3.2 and B.8.2];
- consumption of local water [B.3.1], and fuel wood resources [B.8.2];
- Public health and hygiene problems [B.8.2];
- Competition for natural resources, e.g. drinking water, range land and local products [B.8.2 and B.8.4];
- Acerbating the fuel wood shortage in the region, and/or conflicts with other users [B.8.2];
- Cultural clashes and security problems with migrant laborers, including trafficking, smuggling and prostitution [B.8.1 and B.8.2];
- Poaching of local wildlife by workers [B.6.1];
- Increase of crimes associated with road improvement [B.8.3];
- Dissatisfaction over the status of clearing the work camps after completion. [B.1.2];
- Locations of temporary construction resources like buildings and huts etc, if not properly removed in accordance to initial plan, may contribute towards accelerated ribbon development and encroachment [B.1.2.].

106. It is therefore advisable to start the process of site selection for work camps and heavy equipment at an early stage before construction commences. The contractor shall be responsible to prepare and submit Site Specific Environmental Management Plan with Camp/equipment and material yard layout plan including site restoration plan after decommissioning of camp site. The SC will approve the lay out plan and SSEMP and monitor the implementation progress through out project construction phase.

107. Construction activities encompass a number of **issues and risks for both the workers and the public general** that need to be addressed, such as:

- Labour wages including insurances, medical precautions safety installations, protective clothing, etc [B.2.1];
- Child Labour, inequities in wages and gender-bias payment may create dissatisfaction among labourers [B.2.2];
- Waste material and run-off from sanitation facilities may cause environmental problems and nuisance to the public if not addressed with a waste management plan [B.1.3]
- Hazardous materials may create several adverse impacts if not handled with proper protective measures [B.2.3];
- Production of construction waste/surplus materials including waste materials (e.g. bituminous scrapes) from construction activities could be harmful to human health or the bio-physical environment [B.2.4];
- Soil compaction and changes in the edaphic properties of soil may affect local groundwater resources and land-use options [B.2.5];
- Fuel and lubricants used in construction works and vehicle operation may contaminate soil and water resources [B.2.6];
- Soil Erosion, Loss of vegetation and habitat due to excavation of earth, clearing of vegetations etc [B. 2.7]
- Spoil material (e.g. from dismantling the existing road) could, if not properly re-used as sub-base material, pose environmental problems when not dumped in assigned locations. Improper disposal of bituminous substances may contaminate ground water resources and create landscape nuisance. [B.2.4 & B.2.7]

108. **Borrow areas** require special attention, as they can inflict a number of issues such as:

- Procurement of borrow material may cause conflicts with other land-uses, change soil and hydraulic properties in the borrow area, and can attribute to landscape deterioration and loss of vegetation and habitats [B 2.8 and B.2.9];
- Exploitation of borrow areas can eventuate in land disputes and marred landscapes if not properly rehabilitated after completion [B.2.9 and B.2.11];
- Unsuitable excavation methods in close vicinity of the embankment will result in erosion problems and generation of stagnant water ditches prone to become breeding grounds for water-borne disease vectors [B.2.10 and B.2.11].

109. The contractor shall avoid to barrow material from any unapproved borrow site and shall be responsible to submit Site Specific Environmental Management Plan including material transportation and Borrow sites restoration measures before abandoning the borrow sites. The SC will approve the SSEMP and monitor the implementation progress throughout project construction phase.

110. In addition to above Construction works may conflict with local resources, land-uses and quality of life, such as:

- Extraction of water by the contractor can lead to conflicts with local water users, for example, the water abstraction from local sources may result in competition for water with local residents and farmers (e.g. in case of drought or during cropping time); [B.3.1];
- Contamination of surface waters by increase of dissolved particles, spillage or harmful substances (e.g. washing of trucks, loaders and other equipment in local rivers) [B.3.2];
- Contamination of soil groundwater water arising from sanitary and other liquid waste spillage; [B.3.2];
- Blocking local drainage structures [B.3.2];
- Construction activities and wastes can pollute surface and groundwater [B.3.2 and B.3.3];
- The ambient air quality with subsequent public health risks, is subject to temporary deterioration due to vehicular emissions and dust development [B.4.1 and B.4.3];
- Asphalt mix plants, batching plants and crushers are particular detrimental air polluters that need special attention [B.4.2];
- Ambient noise levels and vibrations are equally increased by the operation of construction equipment that need a number of stringent remedial measures, including the construction of noise barriers in sensitive locations [B.5.1];
- Night working practices exacerbate the discomfort and health impacts of the affected local communities [B.5.1];
- Accessibility and mobility constraints in built-up areas are likely to cause disruption of social cohesion and household economies if traffic diversions are not properly selected and managed [B.7.1];
- Increased accident risk at construction and/or temporary traffic diversion sites, especially when located within or adjacent to settlements [B.7.1];
- Children are especially at high accident risk wherever construction and heavy vehicular movement takes place [B.7.2];
- Safety concerns regarding construction-related accidents also concern the work force that need provided with adequate protective measures [B.7.2], including the elaboration of a contingency plan in case of major accidents;
- Blasting can trigger landslides and changes in the hydraulic regime if not carried out in a controlled manner and relying on a professional hydro-geological assessment [B.3.4];
- Blasting for construction and quarrying purposes is likely to cause safety hazards for the workers, local residents and passers-by [B.3.5];
- Surplus hill cut rocks, if not properly disposed, can block or alter waterways and contribute to gully erosion [B.3.6].
- Un-announced mobilizing of construction workers and heavy construction machinery may cause topographic changes, affect local land-uses and provoke dispute with the local residents, especially when sensitive sites are affected such as schools, hospitals, madrasas and mosques. [B.8.1];
- Internationally recruited constructing firms can become sources of social conflicts when employing staffs who are unfamiliar with local customs, restrictions and way of life [B.8.1 and B.8.2]. This refers particularly to the rigid customs of *chadar* and *purdah*.

111. Among the **beneficial impacts** generated during this project phase are increased prospects for the local (prevailingly poor) population to find up to 5,000 temporary jobs. Given the low population density and the scarcity of finding additional sources of income this will particularly benefit the local economy. Nomadic migrants may equally become particularly interested in finding seasonal income opportunities. Relatively labour-intensive methods of construction will be adopted which maximises employment opportunities for the local people, and to make a positive contribution to rural poverty alleviation and the development of new skills which can be used on future projects. In addition, local shop keepers and restaurants will find increased economic return based on the needs by construction workers and supplementary services.

d. Environmental Impacts during Project Operation

112. **Negative Impacts:** After completion of the construction works, the improved highway may cause several adverse impacts that need to be addressed. The design is made to generate high operating speeds and higher vehicular densities which will invariably lead to over-speeding. Increased traffic volume will affect public health and quality of life. Such adverse impacts, if not properly addressed, will include (i) deterioration of ambient air[3] quality [C.2.1], (ii) increase in noise levels and vibrations [C.3.1], (iii) increase of accidents and spills/contamination with hazardous materials (e.g. oil spills) [C..5.1.and C.5.2.], and (iv) creation of hazardous and undesired habitats like abandoned borrow pits [B.2.11.], Other concerns relate to accidents due to wildlife collisions and exploitation [C.4.1 and C.4.2], and flash floods. [A.3.1]

113. Road and highway development brings increased economic opportunities for locals, however, it can it lead at the same time towards negative changes in the socio-economic setting, for example price increase for amenities and land, acceleration of communicable diseases or other undesired development.

114. **Beneficial Impacts:** Tree plantations proposed as prime measure for environmental enhancement within the ROW will serve multiple functions such as adding to landscape aesthetics, emission absorbents, timber, fodder and habitat enrichment. Embankment plantations will contain soil erosion and act as primary buffers and absorbents in case of accidents resulting in oil and other spills.

115. The highway will also benefit the local poor residents, many of them small farmers of shepherd who need to bring their products safely and without losses to the net market outlets. The road improvement projects have on the long run a confirmed positive impact on alleviating poverty and enhancing the local socio-economic conditions. For example, the proposed project will directly reduce poverty by lowering the costs of transport for the poor traveling to labor and produce markets, to health and to education facilities. The public general, in particular the nomadic groups, will benefit from the road safety awareness programs proposed to be incorporated in the project design.

116. More and substantial benefits are to be expected once the 81.21 km connection between Zhob and Mughalkot will be improved and will enable heavy traffic to travel safely to D.I. Khan and the central economic regions of the country, including the metropolis. It is expected that with the complete improvement of the missing section the N-50 will become both a strategic and economic significant road for inter-provincial traffic.

[3] The scope of this IEE did not make provision for first hand measuring air quality and noise level parameters; therefore, secondary information and tests are cited to assess comparable situations.

6.6 Environmental Training

6.6.1 Capacity Building and Training

117. Capacity building and training programs are necessary for NHA staff in order to control negative impacts of road construction, maintenance and operation. They also need training for monitoring and inspecting road projects for environmental impacts and for implementation of mitigation measures.

118. The details of this capacity building and training program are presented in the Table below:

Table 6.1: Capacity Development and Training Programme

Provided by	Organized by	Contents	No. of trainees	Duration	Cost (Rs.)
Pre-Construction Phase Monitoring consultants/ Organizations offering specialized services in environmental management and monitoring	Director (E&A)	Short seminars and courses on: Environmental Management Plan and Environmental Monitoring Plan	Three seminars for NHA project staff	3 days	150,000/
Construction Phase Monitoring consultants/ organizations offering specialized services in social management and monitoring	Director (E&A)	Short seminars and courses on: Environmental Risks associated with construction phase Development of Environmental Performance Indicators Occupational Health and Safety (OHS) issues	Three seminars for NHA Project staff dealing in social/land matters	3 days	150,000/
Operational Phase Monitoring consultants/ organizations offering specialized services in Occupational Health and Safety (OHS) issues	Director (E&A)	Short lectures relating to Road Safety (Policy measures/implementation) Development of Green Belt and Environment Up gradation	Two seminars for Contractor's staff	2 days	100,000/
TOTAL			**400,000** **(Rs. 0.4 million)**		

6.6.2 Environmental Monitoring Costs

119. The following table gives cost estimates for monitoring air quality, water quality and noise monitoring:

Table 6.2: Cost Estimates for Environmental Monitoring

Sr. No	Monitoring Component	Parameters	Quantity	Amount (Rs.)	Details
1	**Air Quality**				
	Ambient Air Quality	PM_{10}	12	300,000	12 samples @ Rs. 25,000/sample
	Asphalt Plant stack emissions	SO_2, NO_X, CO, HC, O_3	40	400,000	40 samples @ Rs. 10,000/sample
2	**Water Quality**				
	Surface Water	Common ions, TDS, TSS, etc	25	575,000	Fortnightly testing of water samples drawn from streams and water courses during construction along their banks @ Rs. 23,000/ per sample
	Drinking Water	Common ions, TDS, BOD, Coliforms, etc	6	48,000.00	6 samples @ Rs. 8,000/ sample
3	**Noise Levels**	**dB(A)**	**24**	**96,000**	**24 readings @ Rs. 4,000/per reading**
4	**Contingencies**			**70,950**	**5% of monitoring cost**
	Sub Total			**1,489,950**	
	Equipment required				Provision for a camera, lap top, GPS, noise meter and a computer has already been made in the EMP Budget
	Total Cost of Monitoring			**1,439,550**	

7. Public Participation and Consultation

7.1 Introduction

120. General public, elected representatives, local councilors and informal community leaders including members of non-government organizations (NGOs) were asked to state their current perceptions of priorities for improvements to the urban environmental infrastructure in their areas and about the likely impacts of the Project during construction and operation phases. Due to social constraints women's groups could not be contacted. The main objectives of the public information campaign and public consultation were as follows:

- To share the information about the proposed project, its components and activities with affected people;
- To obtain cooperation and participation of the general public in Project planning and implementation processes;
- To establish accessible and effective grievance redress procedures; and
- Create a sense of ownership among the stake holders regarding the Project.

7.2 Identification of Main Stakeholders

121. Stakeholders identified include local representatives, government officials, NGOs and general public. All these stakeholders have different types of stakes according to their interests and professions.

7.3 Approach for Public Consultation

122. The approach adopted towards public participation was to disseminate information, soliciting inputs and getting consensus on issues and propose mitigation measures. This approach was put into practice through consultation with NHA and public meetings, meetings with influential people of the districts, workshops and roadside consultations with pedestrians, vehicle drivers, roadside vendors etc were held. The first consultation process was held in 2008-2009 during the preparation of this environmental assessment report. Subsequently, further consultations were held in September 2013 during the updation of this report.

7.4 Meetings with Stakeholders

123. During the first round of consultations meetings were held with the local communities and Engineers of Communication and Works (C&W) Department, Balochistan and the district Coordination Officer Loralai in March 2008. During discussions with residents and site visits, it has been revealed that local people are generally aware of the Project and are in favor of its construction. In February 2009 a meeting was also held with the General Manager, ADB Projects in Quetta.

124. In the second round of consultation held in 2013, meetings were held with the Director General BEPA, Deputy Director (Technical) BEPA, Deputy Commissioner, Loralai, Executive Engineer (Buildings and Revenue), Loralai, Deputy Director (Agriculture) Loralai, and Deputy Director (Maintenance) Loralai. NHA staff with whom consultations were held included General Manager Balochistan, Director Maintenance Quetta, Deputy Director Maintenance Loralai, and Deputy Director Land/ Legal Quetta.

125. Consultations were also held with community members of villages along the road alignment. Since the Project road alignment generally follows the existing alignment and only widening/improvement in the road geometry is being done, the Project is generally accepted and people want this Project to be taken up.

7.5 Stake Holders Concern

126. The most common concerns noticed during the public meeting are listed as under:

Highway Design

- The design of road should be least disturbing the local agriculture and economic activity. For example the provision of bypass at north of the city may severely interfere with the agriculture of the area and hence locally unaccepted.
- Sufficient cross drainage structures should be provided to avoid flooding of the area.
- The Highway alignment should minimum effect the local settings and to avoid the severance of the area while passing through the populated area.
- The respectful local customs should be taken in account in a design and should be maintained during construction.
- Highway Construction
- Avoid undue delays in construction to limit the inconvenience to the public cause by the road construction.
- Adopt majors to minimize dust, smoke and noise pollution during construction.
- Avoid dumping of the materials during the construction and to carry out proper site clearance after completion of the construction activities.
- Provision of properly formed and maintained diversions during construction.
- Inclusion of local labour and workforce up to the maximum possible extent in project construction activities.
- Highway Operations
- Erection of informatory regulatory and cautionary signs to eliminate operational hazards
- Control over speeding and the use of loud pressure horns near populated area.
- Specify speed limits particularly in populated area.
- Proper maintenance of cross drainage structure to avoid flooding of road and adjacent area.

127. These concerns will be addressed through the proper implementation of the EMP. The list of consulted persons during consultations held in 2013 is attached as Annexure V.

8. Grievance Redress Mechanism

8.1 General

128. In order to receive and facilitate the resolution of affected peoples' (AP) concerns, complaints and grievances about the Project's environmental performance, a Grievance Redress Mechanism (GRM) will be established at the Project. The GRM will address the APs' concerns and complaints proactively and promptly, using an understandable and transparent process that is gender responsive, culturally appropriate, and readily accessible to all segments of the APs at no costs and without retribution. The mechanism will not impede access to the country's judicial or administrative remedies.

8.2 Grievance Redress Committee, Focal Points, Complaints Reporting, Recording and Monitoring

129. NHA will facilitate the establishment of the Grievance Redress Committee (GRC) at the project location prior to the Contractor's mobilization to site. The GRC will be headed by the Project Director, and members will include Deputy/ Assistant Director Env of NHA's Environment, Afforestation, Land and Social (EALS) Unit., Asst. Director Land, the Environment Specialist of the Supervision Consultant and the contractor's Environment, Health and Safety (EHS) officer. The role of the GRC is to address the Project related grievances of the affected parties that are not resolved satisfactorily through the initial stages of the GRM.

130. NHA will assist the project affected communities/villages identify local representatives to act as Grievance Focal Persons (GFPs). The GFPs will be responsible for i) acting as community representatives in formal meetings between the project team and the local community he/she represents; ii) communicating the community members' grievances and concerns to the contractor during project implementation.

131. A pre-mobilization public consultation meeting will be convened by NHA's EALS Unit and attended by the GFPs, Supervision Consultant, contractor, Project representative and other interested parties (e.g. district level representatives, NGOs). The objectives of the meeting will be as follows:

- Introduction of key personnel of each stakeholder including roles and responsibilities;
- Presentation of project information of immediate concern to the communities by the contractor (timing and location of specific construction activities, design issues, access constraints etc.) This will include a brief summary of the EMP - its purpose and implementation arrangements;
- Establishment and clarification of the GRM to be implemented during project implementation including proactive public relations activities proposed by the project team, Supervision Consultant and contractor to ensure that communities are continually advised of project progress and associated constraints throughout project implementation period;
- Elicit and address the immediate concerns of the community based on information provided above

132. Following the pre-mobilization public consultation meeting, environmental complaints associated with the construction activity will be routinely handled through the GRM as explained below:

- Individuals will lodge their environmental complaint/grievance with their respective community's nominated GFP.

- The GFP will bring the individual's complaint to the attention of the contractor.

- The contractor will record the complaint in the onsite Environmental Complaints Register (ECR) in the presence of the GFP.

- The GFP will discuss the complaint with the contractor and have it resolved.

- If the contractor does not resolve the complaint within one week, then the GFP will bring the complaint to the attention of the Supervision Consultant's Environmental Specialist. The SC's Environment Specialist will then be responsible for coordinating with the contractor in solving the issue.

- If the complaint is not resolved within two weeks the GFP will present the complaint to the Grievance Redress Committee (GRC).

133. The GRC will have to resolve the complaint within a period of two weeks and the resolved complaint will have to be communicated back to the community. The contractor will then record the complaint as resolved and closed in the Environmental Complaints Register.

134. Should the complaint not be resolved through the GRC, the issue will be adjudicated through local legal processes.

135. In parallel to the ECR placed with the contractor, each GFP will maintain a record of the complaints received and will follow up on their rapid resolution.

136. NHA's project office will also keep track of the status of all complaints through the Monthly Environmental Monitoring Report submitted by the contractor to the SC and will ensure that they are resolved in a timely manner.

9. Conclusions and Recommendations

137. The upgradation and widening of the Zhob–Mughalkot section of N-50 highway will contribute towards the economic and social development of the region. The benefits from the Project are primarily due to reduced transport costs, shorter travel time, and positive environmental impacts including a reduction in dust levels through paving of the road shoulder. Potential negative environmental impacts will be minimized by implementing the EMP and the environmental monitoring plan. This project is the only option which fulfils political, security, financial, and environment requirements of the inhabitants of the area. In the long term the provision of an all year access facility could offer enormous development potential for the people and area.

138. Secondary data has been used to assess the environmental impacts of the Project. This IEE report highlights all potential environmental impacts associated with the Project and recommends mitigation measures. All environmental impacts associated with the Project need to be properly mitigated, through the existing institutional arrangements described in this report.

139. The majority of the environmental impacts are associated with the construction phase of the Project. The implementation of mitigation measures during this period will be the responsibility of the Contractor. Therefore, the required environmental mitigation measures will have to be clearly defined in the bidding and contract documents, and appropriately qualified environmental staff retained by the Contractor to supervise the implementation process.

140. This IEE concludes that no major negative environmental impacts are likely to occur due to construction and normal operations of the proposed Project, provided mitigation measures are implemented and the proposed monitoring program is adequately carried out. The EMP includes measures to minimize project impacts due to soil erosion, air and noise pollution, waste generation etc. Cumulative impacts of this Project should be viewed with a “corridor” and regional.

141. The Project has been assigned environmental category B in accordance with the ADB’s Safeguard Policy Statement (SPS) 2009, and Schedule II as per PEPA, IEE and EIA Gazette Notification, 2000’

ANNEXURE – I

Rapid Environmental Assessment Checklist (REA)

Rapid Environmental Assessment (REA) Checklist

Instructions:

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

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

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

Country/Project Title:

Sector Division:

Screening Questions	Yes	No	Remarks
A. Project Siting **Is the project area adjacent to or within any of the following environmentally sensitive areas?**			
▪ **Cultural heritage site**			
▪ **Protected Area**			
▪ **Wetland**			
▪ **Mangrove**			
▪ **Estuarine**			
▪ **Buffer zone of protected area**			
▪ **Special area for protecting biodiversity**			
B. Potential Environmental Impacts **Will the Project cause…**			
▪ **encroachment on historical/cultural areas; disfiguration of landscape by road embankments, cuts, fills, and quarries?**			
▪ **encroachment on precious ecology (e.g. sensitive or protected areas)?**			
▪ **alteration of surface water hydrology of waterways crossed by roads, resulting in increased sediment in streams affected by increased soil erosion at construction site?**			

Screening Questions	Yes	No	Remarks
▪ **deterioration of surface water quality due to silt runoff and sanitary wastes from worker-based camps and chemicals used in construction?**			
▪ **increased local air pollution due to rock crushing, cutting and filling works, and chemicals from asphalt processing?**			
▪ **risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation during project construction and operation?**			
▪ **noise and vibration due to blasting and other civil works?**			
▪ **dislocation or involuntary resettlement of people?**			
▪ **dislocation and compulsory resettlement of people living in right-of-way?**			
▪ **disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?**			
▪ **other social concerns relating to inconveniences in living conditions in the project areas that may trigger cases of upper respiratory problems and stress?**			
▪ **hazardous driving conditions where construction interferes with pre-existing roads?**			
▪ **poor sanitation and solid waste disposal in construction camps and work sites, and possible transmission of communicable diseases (such as STI's and HIV/AIDS) from workers to local populations?**			
▪ **creation of temporary breeding habitats for diseases such as those transmitted by mosquitoes and rodents?**			
▪ **accident risks associated with increased vehicular traffic, leading to accidental spills of toxic materials?**			
▪ **increased noise and air pollution resulting from traffic volume?**			
▪ **increased risk of water pollution from oil, grease and fuel spills, and other materials from vehicles using the road?**			
▪ **social conflicts if workers from other regions or countries are hired?**			

Screening Questions	Yes	No	Remarks
▪ **large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?**			
▪ **risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation?**			
▪ **community safety risks due to both accidental and natural causes, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning.**			

Climate Change and Disaster Risk Questions **The following questions are not for environmental categorization. They are included in this checklist to help identify potential climate and disaster risks.**	Yes	No	REMARKS
• **Is the Project area subject to hazards such as earthquakes, floods, landslides, tropical cyclone winds, storm surges, tsunami or volcanic eruptions and climate changes (see Appendix I)**			
▪ **Could changes in temperature, precipitation, or extreme events patterns over the Project lifespan affect technical or financial sustainability (eg., increased erosion or landslides could increase maintenance costs, permafrost melting or increased soil moisture content could affect sub0-grade).**			
▪ **Are there any demographic or socio-economic aspects of the Project area that are already vulnerable (eg., high incidence of marginalized populations, rural-urban migrants, illegal settlements, ethnic minorities, women or children)?**			
▪ **Could the Project potentially increase the climate or disaster vulnerability of the surrounding area (e.g., by encouraging settlement in areas that will be more affected by floods in the future, or encouraging settlement in earthquake zones)?**			

Note: Hazards are potentially damaging physical events.

ANNEXURE – II
NEQS GUIDELINES AND WHO STANDARDS

National Environmental Quality Standards for Gaseous Emission

Parameter	Source of Emission	Existing Standards	Revised Standards
Smoke	Smoke Opacity not to exceed	40% or 2 on Ringlemann scale	40% or 2 on Ringlemann scale or equivalent number
Particulate matter	Boilers and furnaces Oil fired Coal fired Cement Kilns b) Grinding crushing, clinker, coolers and related processes, metallurgical processes, converter, blast furnaces and cupolas	 300 500 200 500	 300 500 300 500
Hydrogen Chloride	Any	400	400
Chlorine	Any	150	150
Hydrogen Flouride	Any	150	150
Hydrogen Sulphide	Any	10	10
Sulphur oxides	Sulfuric acids/sulfuric acid plants Other plants	400 400	5000 1700
Lead	Any	50	50
Mercury	Any	10	10
Cadmium	Any	20	20
Arsenic	Any	20	20
Copper	Any	50	50
Antimony	20	20	20
Zinc	Any	200	200
Oxides of Nitrogen	Nitric Acid Manufacturing Unit Gas Fired Oil Fired Coal Fired	400 400	400 400 600 1200

WHO Guideline Values for Community Noise in Specific Environment

Specific Environment	LA eq (dB)	LAmax Fast (db)
Out door living area	55	
School class rooms and pre-schools (indoor)	35	
School Playground (outdoors)	35	
Hospitals Ward rooms (indoor	30 30	40
Hospital Treatment rooms (indoors)	#1	
Industrial, commercial, shopping and traffic areas (indoors and out doors)	70	110

#1= as low as Possible

WHO Drinking Water Quality Standards

Sr. No.	Constituent, mg/L	Recommended limit (1961 European)
1	Ammonia	0.5
2	Chlorides	350
3	Copper	0.05[a]
4	Flourides	1.5
5	Iron	0.1
6	Magnesium [b]	125[b]
7	Nitrates	50
8	Oxygen	5.0
9	Phenols	0.001
10	Sulphates	250
11	Zinc	5.0

a Maybe higher for new piping

b if 250mg/L SO_4 is present, Mg not to exceed 30mg/L

ANNEXURE – III

ENVIRONMENTAL MANAGEMENT PLAN

ENVIRONMENTAL MANAGEMENT PLAN for Zhob-Mughalkot N-50 Section

Activities and Actions	Environmental Issue/Component	Proposed Mitigation Measures	Reference to Contract Document	Approximate Location	Timeframe	Mitigation Budget	Institutional Responsibility	
							Implementation	Supervision
A DESIGN AND PRE-CONSTRUCTION PHASE								
A.1 ALIGNMENT AND SHOULDER WIDTH OPTIONS								
A.1.1 Formation width in built-up areas	Hindrance of market opportunities, loading and vending activities	In built-up areas, consider widening on either side with minimum impacts on the built-up properties, Incorporate technical design features that allows flexible shoulder width near settlements, Explore the incorporation of additional parking lots and bus bays in market areas		Possibly only in few built-up areas; in towns - ditto -	throughout project life		Technical Design Engineer	
A.1.2 Land acquisition	Loss of homes, assets and land	Follow the existing road alignment with all construction activities confined within available ROW limits to fully avoid land acquisition. For clearance of encroachments prepare Resettlement Plan and provide compensation for all affected assets.		In built-up & crop lands	observe prescribed notification		Designer Resettlement Expert	
A.2 SAFETY								
A.2.1. Design highway to standards with special reference to local dangers	Uneasy traffic flow, Hazardous driving conditions due to slope instability/ rock fall in hilly areas, congestion and accident hazards nearby settlements and livestock crossing points along the project route.	Provide markings for centre and edge lines and stop lines at junctions, bus stops, Include bus, taxi and rickshaw bays in built-up areas Warning signage where landslide/rock fall occur Give due consideration (traffic signage) to areas where livestock / camels are crossing		Applies particularly for areas in settlements on entire alignment and the hilly tracts	throughout project life		Technical Design Engineer	

Activities and Actions	Environmental Issue/Component	Proposed Mitigation Measures	Reference to Contract Document	Approximate Location	Timeframe	Mitigation Budget	Institutional Responsibility	
							Implementation	Supervision
A.3 STRUCTURES								
A.3.1. Location in area with strong sheet and flash flow risks	Flash flows may damage structures or cause drainage problems in urban areas	Adequately design cross-sections of drainage structures based on hydraulic studies, taking regional/local lessons learned into consideration Protective measures against scour problems at bridges and culverts (gabions at abutments, retaining- and wingwalls, aprons for culverts); In built-up areas, provide sufficient sizing of drains with control measures to reduce flow velocity. All structures will be constructed with reasonable safety against seismic acceleration		throughout Project Corridor	throughout project life		Technical Design Engineer - ditto - - ditto - - ditto -	
A.3.2. Location in area with strong seismicity	Seismic activities may damage structures	Adequately design all structures based on material/construction studies that take into account activities up to the seismic scales indicated in the seismicity maps. Seismic loads for bridges to be computed in accordance to Draft Seismic Code of Pakistan. In consultation with local authorities, contingency planning measures for rapid remedial reconstruction of structures in case of seismic or other natural disasters (e.g. earthquake or extraordinary floods).		throughout Project Corridor	throughout project life		Technical Design Engineer NHA/ Maintenance and Local Authorities	
A.4 ROADSIDE VEGTATION AND ECOLOGICAL RESOURCE BASE OF THE AREA								
A.4.1. Loss of roadside vegetation due to widening formation	Loss of plants in an area with already scarce biodiversity, and loss of functional benefits from roadside plants	Incorporate technical design to minimize removal of roadside plantation Apply flexibility in decision as which side to be widened, or in reducing locally the shoulder width Plan for compensatory planting for each felled, 2 plants of similar floral function Disallow introduction of exotic species or species with known environmental setbacks.		entire alignment *in situ* planning decision - ditto – all along alignment	throughout project life	NHA roadside plantation budget	Technical Design Engineer NHA / Planning and Design - ditto - - ditto -	

Activities and Actions	Environmental Issue/Component	Proposed Mitigation Measures	Reference to Contract Document	Approximate Location	Timeframe	Mitigation Budget	Institutional Responsibility	
							Implementation	Supervision
A.4.2. Distur-bance to ecological sensitive areas near highway	Traffic accidents with wildlife, particularly mi-gratory birds and night-active predatory mammals	Incorporate cautionary signage to raise attention of road users for wildlife crossing in areas at risk Assist in public awareness programs where applicable, e.g. planning of wildlife information signboards		All along alignment, specifically near sections or areas of Wild life crossing.	throughout project life	Included in the O&M budget of the EMP	Technical Design Engineer	
A.5 MAINTAINING AIR QUALITY AND NOISE LEVELS								
A.5.1. Increase of traffic intensity	Increase of air and noise pollution and associated health risks for roadside residents	Incorporate technical design features that enable continual traffic flux and avoid congestions (e.g. signboards, speed limits, speed bumpers, bays); Include design measures to prevent blockage of carriageways by road side vendors, particularly in the vicinity of local market places. Consider noise barriers in sensitive areas		at towns and villages - ditto - mosques, schools	throughout project life		Technical Design Engineer - ditto - - ditto -	
A.5.2. Creation and burning of wastes at or near camp site	Air pollution associated with burning garbage	Planning for burning sites in due distance to human settlements Disallow siting for work camps, including waste dump sites, in distances closer than 1 km to any inhabited areas; Incorporate technical design features for refuse collection containers at sites that would minimize burning impacts; Devise plan for safe handling, storage and disposal of harmful materials.	include include include	Pertaining to settlement areas only at prospective campsite - ditto -	During construc-tion		NHA , in bid documents NHA , in bid documents Design Consultant - ditto ´-	NHA/ Env. Dept. - ditto - - ditto - - ditto -
A.6 SOIL AND BORROW MATERIAL								
A.6.1. Excavation of earth from borrow areas	Change of edaphic characteristics; loss of topsoil; impact on agriculture	Agricultural areas will be avoided for borrowing of materials, unless requested by the landowner for lowering the land to create new irrigation polders Contractor needs to obtain approval from SC/ENV for excavation and for plan of rehabilitating the site after excavation.	include include	Borrow areas at/near agriculture and irrigation areas	Long-lasting conse-quences		NHA , in bid documents NHA , in bid documents	NHA/ Env. Dept. - ditto -

Activities and Actions	Environmental Issue/Component	Proposed Mitigation Measures	Reference to Contract Document	Approximate Location	Timeframe	Mitigation Budget	Institutional Responsibility	
							Implementation	Supervision
A.6.2. Acquisition of conglome-rate and rocky sub-base material	Degradation of existing river beds, alteration of surface and groundwater regime, land-use conflicts	Excavation in farmlands and at river sites close to settlements will be prohibited. Instead, explorations of nullahs in the uninhabited desert lands are recommended for sand borrow. Maximum use of existing quarries for conglomerates from approved and formerly used quarry sites Lands could also be selected through community consultation, which could subsequently be developed into fishponds or other productive purposes.	include include include	At all agri-cultural sites and Zhob River in close vicinity to Zhob t.b.d t.b.d.	Long-lasting consequen-ces		NHA , in bid documents NHA , in bid documents Design Consultant / Sociologist	NHA/ Env. Dept. - ditto - NHA/ Env. Dept.
A.7 UTILITIES								
A.7.1. Public utilities	Public utilities to be affected may create disrupt-ion of public services and economics	Timely notifications and consultations with respective agencies; All public utilities (e.g. water pipes, power/ telephone lines, OFC likely to be impacted by the carriageway widening need be re-located well ahead to works commencement.	include	To be checked all along the project corridor	None, if timely organized and implemen-ted	GOP	NHA to notify all concerned line agencies	Respective depart-ments of NHA
A.8 CULTURAL HERITAGE								
A.8.1. Cultural properties	Impacts on mosques, shrines, madrasas graveyards and archaeological sites	Widening activities avoid any interference with cultural heritage sites. In case of unavoidable interference prior notification and consultation for consensus on procedures and options (e.g. relocation/re-building) or any other form of agreed compensation.	include include	To be checked all along the project corridor	At planning stage	Included in Meeting Budget of EMP	NHA , in bid documents Design Consultant / Sociologist	NHA/EALS NHA/ EALS
B CONSTRUCTION PHASE								
B.1 CAMP SITE								
B.1.1. Site selection	Acceptability to public/owner; interferences	Contractor need obtain clearance permit for siting work camps, stack yards & workshop, Contractor must present to RE a copy of the agreement made with the landowner, Layout plan for camp site, to be approved by the SC/ENV indicating space allocation for areas including, office, laboratories/workshops,	include include include		at selection stage for Camp Sites	at Contractor's cost	Contractor Contractor Contractor	SC and NHA/ EALS SC/ ENV

Activities and Actions	Environmental Issue/Component	Proposed Mitigation Measures	Reference to Contract Document	Approximate Location	Timeframe	Mitigation Budget	Institutional Responsibility	
							Implementation	Supervision
		residential, equipment/machinery and construction material yards and waste collection, treatment and disposal facilities						SC / EVN NHA/ EALS
B.1.2. Site clearing and preparation, and re-installation works after contract completion	Loss of vegetation and assets on the selected land, and dissatisfaction on rehabilitation measures after completion	Site Specific Environmental Management plan for establishment and decommissioning of the camp site by contractor approved by SC/ENV Avoid removal of existing grown trees at camp sites, and contractor to furnish photographical and botanical inventory and plan for vegetation removal & rehabilitation at campsite Plantation of 2 new trees as compensatory plantation near end of construction works,	include include include	at prospective Camp Sites - ditto – - ditto –	while establishing Camp Sites	All at Contractor's cost	Contractor Contractor Contractor	SC/ENV/RE NHA/ EALS SC/ENV/RE NHA/ EALS SC/ENV/RE/ NHA/ EALS
B.1.3. Sanitation & waste disposal facilities at camps	Health risks to work force and public if not properly managed	The Contractor will provide a proper waste management plan for all solid and liquid wastes approved by SC/Env. Sewage treatment facility will be designed (pit latrines or, as required, septic tanks) and located to ensure that no water pollution takes place. Lined repair and maintenance areas/workshops and wash areas will be constructed within the camp site or at site approved by the SC/RE, for the receipt of waste oil/lubricant storage and control of pollution from wash waters from construction machinery.	include include include include	At all solid and liquid waste collection and latrine sites of camps	throughout operation of work camps	all to be borne by Contractor	Contractor Contractor Contractor Contractor	SC/ENV SC/ENV SC/ENV/RE SC/ENV RE
B.1.4. Camp site security	Security hazards and related conflicts	Proper storage and fencing/locking of storage rooms containing hazardous material Employment of guard for storage rooms. Provision of adequate security against sabotage, petrol pilfering and theft.	include include include	at Construction camp locations	throughout construction period	all to be borne by Contractor	Contractor Contractor Contractor	SC/ENV/RE SC/ENV/RE SC/ENV/RE
B.1.5. Work safety and hygienic conditions	Health risks if living facilities provide unsafe and/or unfavorable conditions	Provision of adequate sanitation, washing, cooking. and dormitory facilities including light up to satisfaction approved by the SC; regular pest control measures in dormitories Obligatory warning of work staff if pest hazard is imminent or detected;		valid for entire construction area	throughout construction period	all to be borne by Contractor	Contractor Contractor	SC/ENV SC/ENV

Activities and Actions	Environmental Issue/Component	Proposed Mitigation Measures	Reference to Contract Document	Approximate Location	Timeframe	Mitigation Budget	Institutional Responsibility	
							Implementation	Supervision
				Throughout operation of work camps	- ditto -		Contractor	SC/ENV
B.2 CONSTRUCTION WORKS								
B.2.1. Work safety and hygienic conditions	Health risks if work conditions provide unsafe and/or unfavorable work conditions	Obligatory insurance against accidents to work labourers Providing basic medical training to specified work staff, and basic medical service and supplies to workers Protection devices (ear muffs) will be provided to the workers operating in the vicinity of high noise generating machines		valid for entire construction area Throughout operation of work camps	throughout construction period - ditto -	all to be borne by Contractor	Contractor Contractor Contractor	SC/ENV SC/ENV SC/ENV
B.2.2. Wages and Work Regulations	Inequities in wages, underpayment and gender-biased wages	The Contractors will agree to pre-defined minimum wages Women must receive wages equal to the wage paid to men for equal works Wages shall be made public to all labourers Child labour will be strictly ruled out; Contractor has to respect local festivals and religious customs that may interfere with work performance temporarily; Sub-Contractors have to adhere to the same wage principles	include include include include include include	at all Construction sites	throughout construction period	all to be borne by Contractor	Contractor Contractor Contractor Contractor Contractor Contractor	SC/ENV SC/ENV SC/ENV SC/ENV/RE SC/ENV/RE SC/ENV
B.2.3. Storage, handling, transport of hazardous construction materials	Work safety and human health risks	Provision and ensuring use of protective clothing for labourers handling hazardous materials, e.g. helmet, adequate footwear for bituminous pavement works, protective goggles, gloves etc.	include	at all Construction sites	throughout construction period	all to be borne by Contractor	Contractor Contractor	SC/ENV/RE SC/ENV/RE
B.2.4. Creation of construction waste material	Contamination of soil from construction wastes and quarry materials and landscape change	All spoils will be collected stored disposed off as approved by SC/ENV and landscape will be restored back near to its original conditions before handing over. Non-bituminous wastes from construction activities will be dumped in sites approved by the	include include	All construction sites and entire project area	During construction	all to be borne by Contractor	Contractor Contractor	SC/ENV/RE SC/ENV

Activities and Actions	Environmental Issue/Component	Proposed Mitigation Measures	Reference to Contract Document	Approximate Location	Timeframe	Mitigation Budget	Institutional Responsibility	
							Implementation	Supervision
		SC/ENV/RE, in line with the legal prescriptions for dumpsites, and covered with a layer of the conserved topsoil.	include				Contractor	
B.2.5. Movement of vehicles in the con-struction site and along the haulage routes	Soil compaction and alteration of percolation and vegetation pattern; Damage to properties and utilities	Construction vehicles, machinery and equipment will move, or be stationed in the designated ROW, to avoid unnecessary compaction of soil. Damages will be instantly repaired and/or compensated at Contractor's obligation Water and soil quality will be monitored as envisaged in the Environmental Monitoring Plan	include include	throughout Project Corridor	During construction at defined schedule	borne bv Contractor Monitoring budget of EMP	Contractor Contractor SC/ENV	SC/ENV/RE SC/ENV/RE EPA
B.2.6. Movement, maintenance and fuelling of construction vehicles	Contamination of soil and groundwater from fuel and lubricants	Construction vehicles and equipment will be properly maintained and refuelled in such way that oil/diesel spillage does not contaminate the soil. Fuel storage and refuelling sites will be kept away from drainage channels. Oil and grease traps will be provided at fuelling locations, to prevent contamination of water. Unusable debris shall be dumped in nearest landfill sites. Waste oil and oil soaked cotton/ cloth shall be sold off to authorized vendors Water quality will be monitored as envisaged in the Environmental Monitoring Plan	include include include include include	At all perennial river bed crossings at all work sites - ditto - - ditto -	During construction at defined schedule	Engineering Cost to be borne by Contractor - ditto - - ditto - - ditto -	Contractor Contractor Contractor Contractor Contractor Contractor	SC/ENV/RE SC/ENV/RE SC/ENV SC/ENV/RE SC/ENV SC/ENV
B.2.7. Embankment works: Excavation of earth, cutting operations, embanking, clearing of vegetations	Soil Erosion, Loss of vegetation and habitat	Stone pitching and retaining walls will be made at high embankments in critical areas (> 40% gradient) As applicable and needed, plantation of grasses and shrubs will be done for slope protection. Soil erosion checking measures such as the formation of sediment basins, slope drains, etc, will be carried out. Soil erosion along the road shall be visually	include include include	At all sites where high embankments are required, e.g. near bridges	During construction - ditto . - ditto .	Engineering Cost Engineering Cost Engineering Cost	Contractor Contractor Contractor	SC/ENV/RE SC/ENV/RE SC/ENV/RE

Activities and Actions	Environmental Issue/Component	Proposed Mitigation Measures	Reference to Contract Document	Approximate Location	Timeframe	Mitigation Budget	Institutional Responsibility	
							Implementation	Supervision
		checked as given in the environmental monitoring plan.	include		Construction/ operation stage	Engineering/ Maintinance Cost	Contractor/ NHA maintenance	SC/ENV/RE
B.2.8. Procurement of construction materials	Soil erosion, change of hydraulic patterns and landscape degradation following unauthorized use of quarries & borrow areas	No productive land or land adjacent to agricultural / irrigated land will be used Non-productive, barren lands in broken terrain, nullahs and publicly recognized waste lands should be given preference as been recommended for borrowing materials; Aggregate required for road construction procured from quarries need approval from NHA.	include include include	Quarries and borrow areas	During the construction phase		Contractor Contractor Contractor	SC/ENV/RE SC/ENV/RE SC/ENV/RE
B.2.9. Borrow pit land lease agreement	Land disputes, Soil erosion, loss of potential crop land, loss of vegetation and landscape degradation	The Contractor must obtain any necessary permits for borrow pits from the competent authorities, including NHA The Contractor must present a copy of the agreement made with the landowner to the SC/ENV; The Contractor will Prepare Site Specific Environmental Management Plan including bio-physical inventory of the site with photographic documentation, and present it to the SC/ENV for review and approval; This documentation will be used as criteria for the rehabilitation obligations agreed.	include include include	All borrow sites in entire project area	During construction Before starting borrow excavation Upon com-pletion of excavation	all to be borne by Contractor	Contractor Contractor Contractor	SC/ENV/RE SC/ENV/RE EPA, SC/ENV
B.2.10. Borrow pit excavation activities	Soil Erosion, damage to road embankment and public health risks	No excavations are allowed within distance of 100 m to ROW In borrow pits the depth of the pit will be regulated so that the sides of the excavation will have a slope not steeper than 1: 4. Soil erosion along the borrow pit shall be regularly checked to prevent / mitigate impacts on adjacent lands. In case borrow pits fill with water, measures have to be taken to prevent the creation of mosquito-	include include include include	All borrow sites in entire project area	During borrow Upon com-pletion of excavation	all to be borne by Contractor	Contractor Contractor Contractor Contractor	SC/ENV/RE SC/ENV/RE SC/ENV/RE EPA, SC/ENV

Activities and Actions	Environmental Issue/Component	Proposed Mitigation Measures	Reference to Contract Document	Approximate Location	Timeframe	Mitigation Budget	Institutional Responsibility	
							Implementation	Supervision
		breeding sites.						
B.2.11. Provisions for rehabilitation of borrow pit	Soil Erosion, derelict land-uses, conflicts, visual sores in the landscape,	Abandoning borrow areas without proper rehabilitation measures will be disallowed. The Contractor's agreement with the landowner in case of privately owned land or state waste land must determine the options and appropriate measures for rehabilitation of the borrow pit as per approved SSEMP by the SC/ENV including replantation aiming at double amount of trees removed from the site.	include include	All borrow sites in entire project area	Upon completion of excavation - ditto -	all to be borne by Contractor	Contractor Contractor	SC/ENV/RE EPA, SC/ENV
B.3 WATER								
B.3.1. Use of water for construction and consumption	Conflict with local water demand	The contractor will make arrangements for water required for construction in such a way that the water availability and supply to nearby communities remain unaffected. For construction purposes, water shall be drawn from surface water bodies on priority and as available.	include include	Throughout Project Area	During construction	all to be borne by Contractor	Contractor Contractor	SC/ENV SC/ENV
B.3.2. Spillage of liquid wastes	Risk of polluting surface and groundwater from liquid waste spillage, drainage and run-off from construction sites	Application of good engineering and construction practice The contractor shall ensure that construction debris do not find their way into the minor drainage channels which may get clogged. Work on river banks will be kept to a minimum with retaining walls constructed Prohibit washing of machinery and vehicles in surface waters, provide sealed washing basins and collect wastewater in sedimentation/retention pond	include include include include	Throughout Project Road Near settlements throughout area with surface waters	During construction	all to be borne by Contractor	Contractor Contractor Contractor Contractor	SC/ENV/RE SC/ENV SC/ENV SC/ENV/RE
B.3.3. Earth- and stone-work, other construction activities affecting water resources	Contamination of water due to construction waste	Construction work close to the streams or other water bodies will be avoided, especially during monsoon period. Take precautions construct temporary or permanent devices to prevent water pollution due to increased siltation	Include include	Throughout Project Road	During construction		Contractor Contractor	SC/ENV SC/ENV

Activities and Actions	Environmental Issue/Component	Proposed Mitigation Measures	Reference to Contract Document	Approximate Location	Timeframe	Mitigation Budget	Institutional Responsibility	
							Implementation	Supervision
		Wastes must be collected, stored and taken to approved disposal site.	include		At approved dump site	all to be borne by Contractor	Contractor	SC/ENV
B.3.4. Earth- and stone-work, in hill cuts requiring blasting	Uncontrolled explosions can trigger landslides and affect hydraulic regime	Pre-blasting geological, geomorphologic and hydrological studies Application of good engineering and construction practice, particularly while defining doses for explosives with due consultation with experts Small iterative blasts at shorter distances instead of few massive loads, and blasting from top to bottom of hill. All conditions stipulated by concerned authorities in explosive use permits need to be complied with in toto.	include include include include	At prospective blasting sites	as applicable, during construction	all to be borne by Contractor	Contractor Contractor Contractor Contractor	SC/ENV/RE SC/ENV/RE SC/ENV/RE SC/ENV/RE
B.3.5. Use of explosives for hill cuts	Safety hazards to workers, and passers-by; Uncontrolled triggering with accident consequences	Application of good engineering and construction practice, particularly while preparing for explosion, i.e. securing wider area, optical and acoustical warning signs; Provision of protective equipment for workers Elaboration of contingency plan, including the stand-by of first aid equipment and heavy dozers.	include include include	At prospective blasting sites	as applicable, during construction	all to be borne by Contractor	Contractor Contractor Contractor	SC/ENV/RE SC/ENV/RE SC/ENV/RE
B.3.6. Surplus of hill cut rocks	Surplus hill cut rocks, can block or alter waterways and contribute to gully erosion	Contractor needs submit a plan for using and/or proper disposal of surplus material in a way to prevent contamination and blockage of surface waters as well as dumping of this excess material in river valleys or in designated forest areas. Site Specific Environmental management plan prepared by contractor, approved by SC/ENV will include rock cutting and slope stabilization methodologies, impact and mitigation measures and management/ disposal of the cut rock for subsequent monitoring by SC/ENV during construction phase.	include	At prospective blasting sites	as applicable, during construction	all to be borne by Contractor all to be borne by Contractor	Contractor	SC/ENV/RE

Activities and Actions	Environmental Issue/Component	Proposed Mitigation Measures	Reference to Contract Document	Approximate Location	Timeframe	Mitigation Budget	Institutional Responsibility	
							Implementation	Supervision
B.4 AIR POLLUTION CONTROL								
B.4.1. Vehicular movement and running of machineries	Emission from construction vehicles and machinery, causing public health risks, nuisance and other impacts on the bio-physical environment	To avoid congestions and traffic blockade Traffic Management Plan for both public traffic and construction machinery will be prepared by Contractor and approved by the SC/ENV and will be monitored during construction. All temporary service and access roads will be regularly water-sprayed to minimize the dust generation: Schedules will be adjust-ted to actual needs, determined by the SC All vehicles, equipment and machinery used for construction will be regularly maintained to ensure that the pollution emission levels conform to the NEQS. Air quality parameters will be monitored at determined sites and schedule determined by the SC/ENV, Vehicles delivering hot mix asphalt shall be covered to control emission of fumes along the road.	include include include include include	all diversions in populated areas at workshops of Contractor t.b.d. e.g. 5 locations	throughout construction period	to be borne by Contractor - ditto - - ditto - - ditto - - ditto - Monitoring budget of EMP	Contractor Contractor Contractor Contractor Contractor approved monitoring agency	SC/ENV/RE SC/ENV/RE SC/ENV/RE SC/ENV/RE SC/ENV SC/ENV
B.4.2. Running of asphalt mix plants, crushers, etc.,	Dust generation from construction machineries causing health risks to operating workers, impact on bio-physical environment	All machinery and plants will be placed at min. 1 km at downwind direction to human settlements. Ensure proper control measures to reduce the level of dust emissions from, hot mix plants, crushers and batching plants Work safety measures like dust masks shall be taken by the contractor to ensure no health risks for operators	include include include	at sites of hot mix plant	throughout construction period	All to be borne by Contractor	Contractor Contractor Contractor	SC/ENV/RE SC/ENV/RE SC/ENV/RE
B.4.3. Transportation of materials, and other construction activities that create dust and emissions	Dust and emissions from machineries causing health risks to operators; impacts on the bio-physical environment	Vehicles delivering loose and fine materials like sand and fine aggregates shall be covered to reduce spills on existing road. Ambient air quality monitoring will be carried out in accordance to the Environmental Monitoring Plan; Once the monitored parameters are above the prescribed NEQS-limits suitable control measures	include include include	Throughout Project Road Construction sites near the major settlements	During construction	Engineering Cost Monitoring budget of EMP	Contractor Contractor through approved monitoring	SC/ENV/RE SC/ENV SC/ENV

Activities and Actions	Environmental Issue/Component	Proposed Mitigation Measures	Reference to Contract Document	Approximate Location	Timeframe	Mitigation Budget	Institutional Responsibility	
							Implementation	Supervision
		must be taken.					agency	
B.5 NOISE CONTROL								
B.5.1. Running of construction machinery	Noise from vehicles, asphalt plants and equipment	The plants and equipment used for construction will strictly conform to noise standards specified in the NEQS. Vehicles and equipment used will be fitted, as applicable, with silencers and properly maintained. Nearby settlements construction activities will be restricted between 6 a.m. and 08 p.m. Hedges as noise barriers in sensitive areas (in front of schools, hospitals, mosques etc). In accordance with the Environmental Monitoring Plan noise measurements will be carried out at locations and schedule specified by the SC/ENV to ensure the effectiveness of mitigation measures.	include include include include include	At hot mix plant, batching plants & Construction sites Built-up areas Schools along the length of project road Monitoring near villages/ settlements etc.	During construction	all to be borne by Contractor	Contractor Contractor Contractor Contractor Contractor	SC/ENV SC/ENV SC/ENV/RE SC/ENV/RE SC/ENV
B.6 FAUNA AND FLORA								
B.6.1. Access to sensitive areas and fragile ecosystem	Poaching on wildlife, collecting wild plants, disturbance of ecosystem	Felling of trees or plants for collection of fire wood for cooking and execution of works will be prohibited No open fires will be allowed Restoration of vegetated areas damaged Strict instructions from the Contractor to work staff (particularly the cooks) with respect to poaching local wildlife	include include include include	Near sensitive areas described in the IEE, e.g Takatu Mountain Range	throughout construction period	all to be borne by Contractor	Contractor Contractor Contractor	SC/ENV/RE SC/ENV SC/ENV
B.7 ROAD SAFETY AND COMMUNITY LIFE								
B.7.1. Vehicular movement at construction	Accident risks, particularly inflicting local communities who are not familiar	Timely public notification on planned construction works. Close consultation with local communities to identify optimal solutions for diversions to maintain community integrity & social links as well as for	include include	Throughout Project Road, particularly near the settlements	throughout construction period	all to be borne by Contractor	Contractor Contractor	SC/ENV/RE SC/ENV/RE

Activities and Actions	Environmental Issue/Component	Proposed Mitigation Measures	Reference to Contract Document	Approximate Location	Timeframe	Mitigation Budget	Institutional Responsibility	
							Implementation	Supervision
sites and access/service roads	with presence of heavy equipment	road safety campaigns Provision of proper safety signage at sensitive/accident-prone spots. Setting up speed limits in close consultation with the local stakeholders	include include	and sensitive locations (schools, health centres, etc)			Contractor Contractor	SC/ENV/RE SC/ENV/RE
B.7.2. Risks associated with construc-tion activities	Accident and health risks	Ensure safety code for work staff is observed, ensuring the provision and wearing of safety equipment required for specific works. A readily available and updated first aid unit including an adequate supply of dressing materials and a staff with basic medical knowledge at every constructions site. Elaboration of a contingency planning in case of major accidents Adequate signage, lightning devices, barriers and persons with flags during construction to manage traffic at construction sites, haulage and access roads. Road safety education will be divulged to drivers operating construction vehicles	include include include include include	at all Project work sites	throughout construction period	all to be borne by Contractor	Contractor Contractor Contractor Contractor Contractor	SC/ENV SC/ENV SC/ENV/RE SC/ENV SC/ENV/RE
B.8 SOCIAL BALANCE AND PUBLIC RELATIONS								
B.8.1. Cultural differences between contractor and locals	Locals may resist Contractors attitudes; Cultural clashes particularly when international contractors are engaged	Timely and full public consultation and announcement of mobilizing equipment Establishment of formal links with affected communities, Plan for social grievance redress mechanisms including the local administration and community leaders.	include include include	entire Project Area	throughout construction period	all to be borne by Contractor	Contractor, in close consultation with Local Authorities	SC/ENV/RE SC/ENV/RE SC/ENV
B.8.2. Conflicts arising due to the mix of local & migratory job seekers	Social disturbance and dissatisfaction with employing outsiders	Familiarize outside labourers on local etiquettes (e.g. chadar and purdah) Aim at obliging the contractors to employ local community (unskilled) labour for construction works; An agreed minimum unskilled labour and	Include, include	town areas	From early construction period until operation commences	all to be borne by Contractor	Contractor Contractor	SC/ENV/RE SC/ENV/RE

Activities and Actions	Environmental Issue/Component	Proposed Mitigation Measures	Reference to Contract Document	Approximate Location	Timeframe	Mitigation Budget	Institutional Responsibility	
							Implementation	Supervision
		employment rate for women, at equal pay like men, will be negotiated at early stage.	include					
B.8.3. Human Trafficking and HIV/AIDS	Conflicts related to smuggling, transmissible diseases and trafficking	Establish mechanisms to settle conflicts at early stage Enforce/support enforcement of drug control and anti-smuggling laws Awareness and Training of contractor staff on HIV/AIDS and human trafficking. Assist to public awareness programs as applicable, by contacting/collaborating with locally community.	include include include	throughout entire project area, particularly at truck stops/hotels	throughout construction period	all to be borne by Contractor	BPG Police NGOs / CBOs	SC/ENV/RE SC/ENV SC/ENV
B.8.4. Use of local resources and products	Competition for natural resources e.g. with farmers livestock raisers and nomads for range lands	Water supply and sanitation facilities will not exacerbate the existing shortages and environmental hazards; Contractors should primarily seek their own sources of water in due distance (min. 1 km) from local user's wells. Ensure labour forces do not exploit adjacent forest resources without written permit from forest owners or local community leaders.	include include include	agricultural area with tubewell irrigation	throughout construction period	all to be borne by Contractor	Contractor Contractor Contractor	SC/ENV SC/ENV SC/ENV
B.9 ARCHAEOLOGICAL SITES								
B.9.1. Encountering archaeological sites during earth works	Impacts of historically important sites and damage to fossils, artefacts, tombs, structure etc, as defined in 1975 Antiques Act	In case of detecting any archaeological artefact, structure, tomb etc., the Contractor needs immediately halt all works at the find site and immediately inform the SC and EA of the fact. SC (ENV) through NHA will inform within shortest time to Archaeological Department in Quetta/Karachi. In the event of such finding, the Contractor has the duty to secure the site against any intrusion until the archaeological expert will decide on further action.	include Include, refer to Antiques Act 1975	throughout entire project area, including borrow sites	throughout construction period	all to be borne by Contractor	Contractor SC/ENV/ NHA Contractor	SC/ENV/RE MoC SC/ENV/RE

Activities and Actions	Environmental Issue/Component	Proposed Mitigation Measures	Reference to Contract Document	Approximate Location	Timeframe	Mitigation Budget	Institutional Responsibility	
							Implementation	Supervision
C OPERATION PHASE								
C.1 WATER AND SOILS								
C.1.1. Drainage of runoff from roads into water bodies	Water Pollution from storm waters containing hazardous substances	All drainage channels/facilities kept clean and operational. Water quality monitoring of receiving water bodies will be carried out during operation phase at schedule approved by the SC/ENV If monitored parameters are above the prescribed limit, suitable control measures will be taken		Throughout Project Area	at schedule defined in the monitoring plan	Monitoring budget of EMP	SC/ENV[4] together with approved laboratory	NHA/ED
	Congestion of drainage structures near settlements	Ensure proper cleaning scheme for keeping drainage structures clear of debris and blockage		In all built-up areas	as required		Town Committee Local authorities	
C.1.2. Vehicular movement	Contamination from spills due to traffic and accidents	The spills at the accident sites will be cleared immediately and disposed off properly		throughout Project Area	as incident happening		NHA	NHA/ED
C.2 AMBIENT AIR QUALITY								
C.2.1. Vehicular movement	Emission from vehicular traffic causing public health risks, nuisance and other impacts on the bio-physical environment	Roadside tree plantations as applicable and feasible under harsh climatic conditions; plants should be selected in accordance to their ability to absorb emissions Regular road maintenance to ensure good surface condition Speed limits at sensitive locations Regular vehicle check to control/ensure compliance with NEQS Enforcement and penalties against traffic rules violators		Where applicable - ditto - Near Zhob sensitive spots	schedule as per NHA roadside plantation scheme at schedule defined in the monito-ring plan	included in Project Costs Monitoring budget of EMP	Afforestation Wing/NHA NHA Highway Police/EPA Highway Police/ NHA	EALS/NHA

[4] Responsible only until termination of Supervision Contract.

Activities and Actions	Environmental Issue/Component	Proposed Mitigation Measures	Reference to Contract Document	Approximate Location	Timeframe	Mitigation Budget	Institutional Responsibility	
							Implementation	Supervision
C.3 NOISE LEVEL AND VIBRATIONS								
C.3.1. Vehicular movement	Traffic-related noise pollution and vibrations from engines, tires and use of (pressure) horns	Noise measurements will be carried out at locations and schedule specified by the EALS to ensure the effectiveness of mitigation measures, e.g speed limits and noise control plantations at sensitive spots. According to monitoring results, additional soft sound barriers in form of trees and hedges will be discussed with the affected pubic and planted if agreed Signs for sensitive zones (health centers / educational institutions etc.) will to disallow the use of pressure horns; Enforcement and penalties against traffic rules violators		Monitoring at specified location as applicable at sensitive spots - ditto - - ditto -	at schedule defined in the monitoring plan as needed as needed regularly	Monitoring budget of EMP	DD ENV NHA Afforestat-ion Wing/ NHA Highway Police/ NHA	EALS/NHA EALS/NHA
C.4 FAUNA AND FLORA								
C.4.1. Vehicular movement	Accidents with wildlife	Provision of proper safety signage and. display of signboards alerting drivers' attention on wildlife and environmental issues related to safe driving and wildlife encounters. Special awareness campaigns about wild life protection with help of concerned authorities and local community		Along the road near sensitive areas. Awareness Compaigns/workshop events	Operation Stage	O & M budget of EMP	SC/ENV/ NHA DD/ENV	EALS/NHA EALS/NHA
C.4.2. Roadside Plantation	Maintenance of Flora	Monitoring of survival of trees at the rate of 75 % should be done in the first year of the operation phase and suitable mitigation measures should be taken to protect the trees Efforts will be made for proper maintenance of planted trees, shrubs and grasses to maintain greenery and aesthetics		Throughout Project Road	Operation Stage	O & M budget of EMP NHA roadside plantation	Afforestat-ion Wing/DD ENV/NHA NHA Maintenance	EALS/NHA

Activities and Actions	Environmental Issue/Component	Proposed Mitigation Measures	Reference to Contract Document	Approximate Location	Timeframe	Mitigation Budget	Institutional Responsibility	
							Implementation	Supervision
C.5 ROAD SAFETY								
C.5.1. Vehicular movement	Accidents involving hazardous materials	In case of spillage, the report to relevant departments will be made. Efforts will be made to clean the spills of oil, toxic chemicals etc. as early as possible.		at any location such accident occurs	Operation Stage	to be borne by perpetrator	NHA Maintenance Local Authorities	
C.5.2. Vehicular movement	General road safety issues	Traffic and ROW management to avoid encroachments adjacent to shoulders within safety zone along settlements Traffic control measures including speed limits will be enforced		throughout Project road	Operation stage	NHA budget	NHA Maintenance Highway Police/ NHA	
C.6 SOCIAL AND ECONOMIC DEVELOPMENT								
C.6.1. Increase in facilities, mobility, access, and shipment of goods	Impacts related to desired and undesired development following road sector projects	Control of encroachment and ribbon development along improved highway Control and enforcement against smuggling and other crimes		Throughout Project road	Operation stage	included in monitoring costs	NHA Maintenance Highway Police & Local law enforcing Agencies	

Abbreviations:
NHA = National Highway Authority
EALS = Environment Afforestation Land and Social
SC = Supervision Consultant
ENV = Environmental Expert, contracted by Supervision Consultant
RE = Resident Engineer, contracted by SC.

ANNEXURE – IV

DETAILS OF PUBLIC CONSULTATIONS

Locations	# Participants		Issues Raised	Action Taken/Proposed
	Male	Female[5]		
Kiosks and road side vendors & Shopkeepers at Kili Hasan Zai.	10	0	- Big influx of transport, more economic opportunities. - Temporary Disruption of livelihoods due to road expansion. - Impacts on health during construction due to dust and pollution caused by construction machinery & visitors. - Social issue due to outside labour during construction.	- Loss of livelihood will be compensated and employment opportunities will be explored for local affected population. - During construction proper sprinkling of water will be carried out at construction sites to and construction machinery will be kept in good working condition to control pollution. - Awareness program being proposed.
Orchard Owners and local population at Kili Taki.	13		- Loss of assets and fruit trees due to widening of road. - Drainage issues during construction phase. - Resource (water) exploitation leading to limited supply to locals. - Increase in accidents due to increased number of construction vehicle and increased speed limits during operation.	- Due care will be ensured to avoid loss of assets and if any, it will be compensated adequately. - The natural drainage of the area will be ensured throughout construction phase and cross drainage structures are included in design. - Local water supplies will be ensured and contractor will make its own water arrangements away from community resources for construction purposes. - Measure like speed limits, traffic signage are included in design while during construction flag mans will be deputed near construction sites and haulage routes for traffic control to avoid accidents.
Truck Drivers at Manikhawa	05	0	- High rate of accidents in over-takings due to narrow road, sharp pavement edges & rough surface. - Excessively high return trip time leading to loss of time. - High wear & tear and extra fuel	- The proposed improvement will cater the safety and security of road users with decreased number of accidents. - Improved road with improved speed limits is likely to reduce return trip timings, reduced cost of maintenance & fuel savings.

[5] Due to Socio-cultural norms of project area the women did not participated in road side consultation.

Locations	# Participants		Issues Raised	Action Taken/Proposed
	Male	Female[5]		
			consumption. - Interruption in traffic flow and inconvenience due to lack of traffic management & lack of alternative crossings during construction.	- Better road surface will minimize the tier and weir of the vehicles. with and remove - Diversions will be provided and proper traffic management plan will be prepared prior to start of construction work.
Local population at Manikhawa and Narowask	07	0	- Loss of assets, livelihood sources and business opportunities. - Air pollution from including dust and emissions from asphalt plant and other construction machinery like haulage trucks other moving vehicles. - Disturbance due to traffic noise & vibrations. - Social conflicts due to presence of outside labour.	- Land acquisition will be avoided at all costs and the affected assets located within ROW will be fully compensated at replacement cost. - The Asphalt plant or any machinery producing pollution at source will be installed at a distance of 1 Km from any nearby settlement. While proper water sprinkling will be ensured on construction site and haulage routes. - During construction contractor will ensure that silencers are properly installed on construction machinery to minimize the noise levels and Night time work will be prohibited. - The camp sites will be established at a distance of 1 Km from nearby settlement and hiring of local labour will be promoted. - A prompt system for land compensation as per market rates in a transparent manner.

ANNEXURE – V

List of Participants of Consultations

FOCUS GROUP DISCUSSION (N-50) PROJECT AT KILLI HASAN ZAI DATED 06th OCTOBER, 2013			
S.#	**NAME**	**FATHER/HUSBAND'S NAME**	**VILLAGE/LOCATION**
1.	Gulab Khan	Lal Baig	Killi Hasan Zai, Zhob District.
2.	Khaliq Dad	Haji Jahan Dad	Killi Hasan Zai, Zhob District.
3.	Paindai	Haji Baik	Killi Hasan Zai, Zhob District.
4.	Sultan	Ghulam	Killi Hasan Zai, Zhob District.
5.	Muhammad Aiyaz	Mushoo	Killi Hasan Zai, Zhob District.
6.	Ghulam Rasool	Balo Khan	Killi Hasan Zai, Zhob District.
7.	Abdul Haleem	Abbas Khan	Killi Hasan Zai, Zhob District.
8.	Abdul Ghaffar	Haji Zareef	Killi Hasan Zai, Zhob District.
9.	Ghulam Shah	Sahib Jan	Killi Hasan Zai, Zhob District.
10.	Sharbat Khan	Muhammad Sadique	Killi Hasan Zai, Zhob District.

FOCUS GROUP DISCUSSION (N-50) PROJECT AT TAKAI KILLI DATED 06th OCTOBER, 2013			
S.#	**NAME**	**FATHER/HUSBAND'S NAME**	**VILLAGE**
1.	Dolat Khan	Lal Baig	Killi Takai, Zhob District
2.	Misal Khan	Asal Khan	Killi Takai, Zhob District
3.	Abdul Razzaq	Mulakhtol	Killi Takai, Zhob District
4.	Hashim Khan	Murrad Khan	Killi Takai, Zhob District
5.	Sallah Muhammad	Baz Muhammad	Killi Takai, Zhob District
6.	Daweood Khan	Janan	Killi Takai, Zhob District
7.	Sardar Muhammad	Sabir	Killi Takai, Zhob District
8.	Abdul Rasheed	Abdul Ghani	Killi Takai, Zhob District
9.	Azeem Khan	Alam Khan	Killi Takai, Zhob District
10.	Muhammad Ali	Haidar	Killi Takai, Zhob District
11.	Asmat Ullah	Baz Muhammad	Killi Takai, Zhob District
12.	Abdul Raheem	Haji Hazrat Khan	Killi Takai, Zhob District
13.	Kamal Khan	Murad Khan	Killi Takai, Zhob District

FOCUS GROUP DISCUSSION (N-50) PROJECT AT TAKAI KILLI DATED 06th OCTOBER, 2013			
S.#	**NAME**	**FATHER/HUSBAND'S NAME**	**VILLAGE**
1.	Dina Khan	Painda Khan	Asoo Band Manikhawa , Shirani District
2.	Malik Mark Khan	Tarveez Khan	Manikhawa , Shirani District
3.	Allaudin	Umar Draz	Asoo Band Manikhawa , Shirani District
4.	Nazar Muhammad	Afzal Hayat	Asoo Band Manikhawa , Shirani District
5.	Khan	Nazar Khan	Narwask, Shirani District
6.	Muhammad Din	Khair Din	Narwask, Shirani District
7.	Muhammad Amin	Sardar Khan	Asoo Band Manikhawa , Shirani District

Consultation with Road Users/Truck owners			
S.#	**Driver/Owner Name**	**Vehicle No and Make**	**Destination**
1.	Zaib Khan	QE -3542, Truck	Trevlleing from DI Khan to Quetta
2.	Haidyatullah	KF – 5281 Truck	Trevlleing from Loralai to Peshawar
3.	Mosa Khan	QT – 2527, Truck	Trevlleing from Kan Mahterzai to Islamabad.
4.	Naseebullah Khan	KF – 3284, Truck	Trevlleing from Quetta to Peshawar.
5.	Aftab Khan	QT – 3304, Truck	Trevlleing from Quetta to Rawalpindi.