

# Initial Environmental Examination

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May 2012

## PAK: Flood Emergency Reconstruction Project

Prepared by National Highways Authority for the Asian Development Bank.

## **CURRENCY EQUIVALENTS**

(as of 31 May 2012)

Currency unit	–	Pakistani Rupees (PRs)
PRs1.00	=	\$0.01069
\$1.00	=	PRs93.53

## **ABBREVIATIONS**

ADB	Asian Development Bank
AOI	Area of Influence
BOD	Biological Oxygen Demand
CMS	Conservation of Migratory Species
COD	Chemical Oxygen Demand
COSHH	Control of Substances Hazardous to Health
EC	Electrical Conductivity
EIA	Environmental Impact Assessment
EALS	Environment Afforestation Land and Social
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
EPA's	Environmental Protection Agencies
ESIA	Environmental & Social Impact Assessment
FAO	Food and Agriculture Organization
CA	Cultivated Area
GRC	Grievance Redress Committee
IEE	Initial Environmental Examination
M&E	Monitoring and Evaluation
NCS	National Conservation Strategy
NEQS	National Environmental Quality Standards
NOC	No-Objection Certificate
O&M	Operation and Maintenance
NHA	National Highway Authority
PEPA	Pakistan Environmental Protection Act
PEPC	Pakistan Environmental Protections Council
PHS	Public Health and Safety
PMU	Project Management Unit
PPE	Personal Protective Equipment
RSC	Residual Sodium Carbonate
SAR	Sodium Adsorption Ratio
SFA	Social Frame Work Agreement
SMO	SCARPS Monitoring Organization
SOP	Survey of Pakistan
SOP	Soil Survey of Pakistan
TDS	Total Dissolved Solids
US-EPA	United States Environmental Protection Agency
WAPDA	Water and Power Development Authority
WHO	World Health Organization WWF Worldwide Fund for Nature

## **NOTES**

- (i) The fiscal year (FY) of the Government of the Islamic Republic of Pakistan and its agencies ends on 30 June.
- (ii) In this report, "\$" refers to US dollars.

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**ROAD PROJECT (N-95)**

**INITIAL ENVIRONMENTAL EXAMINATION (IEE)**

**IEE REPORT**

**May 2012**

**Submitted to**



**ASIAN DEVELOPMENT BANK**

**Submitted by**



**NATIONAL HIGHWAY AUTHORITY (NHA)**

**NHA HQ, 27, Mauve Area, G-9/1, Islamabad**

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**LIST OF ABBREVIATION**

ADB	Asian Development Bank
AOI	Area of Influence
BOD	Biological Oxygen Demand
CMS	Conservation of Migratory Species
COD	Chemical Oxygen Demand
COSHH	Control of Substances Hazardous to Health
EC	Electrical Conductivity
EIA	Environmental Impact Assessment
EALS	Environment Afforestation Land and Social
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
EPA's	Environmental Protection Agencies
ESIA	Environmental & Social Impact Assessment
FAO	Food and Agriculture Organization
CA	Cultivated Area
GRC	Grievance Redress Committee
IEE	Initial Environmental Examination
M&E	Monitoring and Evaluation
NCS	National Conservation Strategy
NEQS	National Environmental Quality Standards
NOC	No-Objection Certificate
O&M	Operation and Maintenance
NHA	National Highway Authority
PEPA	Pakistan Environmental Protection Act
PEPC	Pakistan Environmental Protections Council
PHS	Public Health and Safety
PMU	Project Management Unit
PPE	Personal Protective Equipment
RSC	Residual Sodium Carbonate
SAR	Sodium Adsorption Ratio
SFA	Social Frame Work Agreement
SMO	SCARPS Monitoring Organization
SOP	Survey of Pakistan
SOP	Soil Survey of Pakistan
TDS	Total Dissolved Solids
US-EPA	United States Environmental Protection Agency

WAPDA      Water and Power Development Authority

WHO        World Health Organization WWF Worldwide Fund for Nature

## **EXECUTIVE SUMMARY**

### **THE PROJECT**

1. The Road Rehabilitation and Construction will be 135 km long and will be carried on Chakdara-Mingora-Manglour-Kwazakhela-Madyan-Bahrain-Kalam N-95. It is an important road which serves the entire area from Chakdara to Kalam. Due to unprecedented floods of August 2010, road has been badly damaged all along over River Swat. Therefore, NHA has planned New Road Construction of N-95 with improved specifications to withstand future mega floods and earthquakes.

The Project activity will consist of the following:

- Construction of the new road
- Rehabilitation of existing road
- Construction of new belly bridges
- Construction activities
- Labor Camps

2. For the purpose of the above an Initial Environmental Examination (IEE) Report has been prepared to ensure the following objectives:

- Apply ADB's Environment safeguards
- The applicable environmental administrative and legal frame work on the project
- Environmental & social base line data of the project area of influence (AOI)
- Assessment of potential environmental impacts and determining mitigation measures of expected adverse impacts

3. Develop a basic Environmental Management Plan (EMP) Framework (inclusive of all major environmental aspects and risk bases assessment plan) and envisaged EMP implementation cost.

4. The base line data was developed and analyzed to identify potential environmental impacts of the project. An Environmental Assessment Checklist methodology was adopted to identify the high risk activities and suggest their mitigation measures. Where possible, eliminating the risk by altering the scope or method of execution of work was preferred rather than minimizing the risk with control measures.

5. The “no project” option is considered inappropriate. In view of the long term and wide spread benefits of safe and a long term from New Road Construction of N-95.

### **Legal and Administration Framework Policy**

6. According to ADB Safeguard Policy Statement, projects are to be categorized into three environmental categories; A, B, or C. All the anticipated adverse environmental impacts of the project are mitigable, temporary, nature and localized. Also there is no environmentally sensitive or archeological site falling within project area of influence; therefore the project is classified as Category B.

7. The nature and scope of work and the environmental setting of the AOI (established through REA Checklist) indicates that there will neither be any significant adverse impact to the environment nor there would be any irreversible ecological damage due to the project activities. All the adverse impacts either would be temporary or would be easily mitigable. The projects benefits on the other hand would easily outweigh any small and temporary adverse impacts. The project will have significant positive environmental and social benefits by uplifting the aesthetics of the area and also through providing better efficiency.

### **Description of the Environment**

8. The project area of influence (AOI) is the area likely to be effected by the project, including all its ancillary aspects such as power transmission corridors, pipelines, canals and access roads, borrow & waste disposal sites, batching plant and labor camp as well as unplanned development induced by the project. The populated areas near the proposed projects are as follows:

Pangora	Lunday gao
Fiza ghat	Kashgor gao
Imam deri	Khwazakhela
Sangora	Fatehpur
Sirgota	Chikri
Kot sher abad	Madyan
Kot mera	Piya
Roshan abad	Kalam

9. River Swat is the main source of surface water. There is existence of small water spring from uphill's which are also ultimately falling into river Swat. These springs are source of drinking water for the locals.

10. The socio-economic structure of project area is primarily business community based on tourism. The Community economy depends upon season earning from tourism. 100 % population is Muslims. The ratio of female population is lower than male i.e. male 60%: female 40%. Average family size is about 10 members with a range between 4 – 15 members per household. Mostly the families are used to live in a joint family system. The age of around 50% of the farmers engaged in farming fell between 20 – 60 years. General trend in the younger age groups is to diversify away from agriculture.

11. Social consultation was carried out with officials and local communities. The aim was to solicit views on the proposed project and incorporate their concerns, demands and needs into Environmental Management Plan (EMP) and Social Framework Agreement (SFA). Indirect women consultations were carried out to incorporate gender issues in the social assessment. The idea of New Road Construction of N-95 was hailed by almost all the interviewees. The flora of the project area can be divided into two parts i.e. riverian Flora and inland Flora.

### **Environmental Impacts and Mitigation Measures**

12. Most of the adverse environmental and social impacts of the Project will be associated with the construction phase. Except for resettlement issues which would need to be addressed carefully, the remaining impacts associated with the construction phase will be temporary, reversible, phased over a period of time, localized and manageable.

13. The air quality was analysed and found reasonably clean and no obvious source of air pollution was located in the vicinity of the project area of influence. However there are kacha paths and may cause dust pollution during traffic movement. Air quality shall be controlled by regular spraying of water on kacha paths. All vehicles, machinery, equipment and generators used during construction activities will be kept in good working conditions to minimize the exhaust emissions. Cutting & burning trees and shrubs as a fuel shall be prohibited and clean source of energy should be provided at the contractor's camp e.g. gas cylinders etc. Noise, air quality and water sources shall be monitored periodically, as specified in IEE report. All the work activities should be restricted within the allowed working hours.

14. There is no designated environmentally protected or archaeological site falling within the direct project area of influence. The Project will not have any significant impacts on fish, fishermen communities, wildlife and wildlife habitat. However, monitoring measures have been recommended to ensure that any unforeseen impacts can be identified, compared with baseline and mitigated during the implementation stage. All forest, wildlife and fisheries laws should be fully respected and abided by the contractor and his work force. No fire arms should be carried out by the contractor's work force.

15. During construction, the Contactor's work force is expected to be largely available from the local population, which will enhance the economic opportunities for the locals of working age group. Socioeconomic conditions of the project area will generally have positive impacts due to the project implementation i.e. availability of jobs during construction phase.

16. The Project will also improve some of the social infrastructure as part of the repair and rehabilitation. The representation of women and other vulnerable groups will be ensured in the Project benefits.

17. It is very important to protect the water sources during the construction phase from accidental spills of diesel or any chemical, as any spill could percolate to the groundwater through the sandy stratum at site. All the solid waste and wastewater generated from the project activities and contractor camp shall be disposed-off according to the waste disposal plan, which would be a component of the EMP.

18. The proposed project will bring about a net-positive benefit in terms of improvement of the area. Continuous environmental monitoring will be carried out for the entire construction phase, to ensure due diligence of environmental performance. The EMP will also ensure reporting of all non-conformances and their rectification within a specified period of time along with safety, health and environment (SHE) audits

## **CONCLUSION**

19. It is anticipated that all environmental and social issues involved during the construction and operational phase of the project are manageable, therefore it is concluded that the project is environment friendly, financially viable, economically sustainable, generally neutral and pro-poverty alleviation.



## 1. INTRODUCTION

### 1.1 GENERAL

20. The National Highway 95 or N-95 is a highway located in the Khyber Pakhtunkhwa (KP) province of Pakistan. It is often used as a bypass for the N-45 and connects the cities of Chakdara-Mingora-Manglour-Kwazakhela-Madyan-Bahrain-Kalam. N-95 passes from Chakdara-Mingora-Manglour-Kwazakhela-Madyan-Bahrain-Kalam having total length of about (135) of KP.

21. Khyber Pakhtunkhwa (KP) locally Pakhtunkhwa formerly known as the North-West Frontier Province (N.W.F.P) and various other names, is one of the four provinces of Pakistan, located in the north-west of the country. It borders Afghanistan to the north-west, Gilgit-Baltistan to the north-east, Azad Kashmir to the east, the Federally Administered Tribal Areas (FATA) to the west and south, Balochistan to the south and Punjab and the Islamabad Capital Territory to the south-east.

22. The main ethnic group in the province is the Pashtuns; other smaller ethnic groups include most notably the Hazarewals and Chitralis. The principal languages are Pashto, locally referred to as *Pukhto*.

23. Asian Development Bank (ADB) is providing financial assistance for the following activity:

- Construction jurisdiction of rehabilitation of N-95 including new alignment comprised of approximately 135 Km road starting from Fatehpur upto Kalam.
- Construction of new belly bridge.
- Capital cost of the project is Rs. 5.75 billion.

National Highway Authority (NHA) will execute and supervise the construction work of the Road.

### 1.2 PROJECT DETAILS

24. NHA has planned to construct the existing N-95 passes from Chakdara-Mingora-Manglour-Kwazakhela-Madyan-Bahrain-Kalam having total length of about 135 Km in NWFP. Construction will be carried out from Fatehpur upto Kalam covering road distance.

25. This report comprises the Initial Environmental Examination (IEE) study of the National Highway N-95. The IEE study takes into account the natural environment (air, water, land, flora & fauna), human health and safety. This study evaluates the project's potential environmental risks and impacts in its areas of influence and outlines planning, designing and implementation by preventing, minimizing, mitigating or compensating for adverse environmental impacts and enhancing positive impacts

throughout project implementation. The base line data was developed and analyzed to identify potential environmental impacts of the project. An Environmental Assessment Checklist methodology was adopted to identify the high risk activities and suggest their mitigation measures. Where possible, eliminating the risk by altering the scope or method of execution of work was preferred rather than minimizing the risk with control measures.

26. The Social Assessment (SA) has been conducted to evaluate the project's potential positive and adverse effects on the affected people and to examine project alternatives where adverse effects may be significant. The breadth, depth and type of analysis in the social assessment are proportional to the nature of the project and scale of its potential effects, positive or adverse, on the affected people.

### 1.3 BACKGROUND

27. The N-95 is a highway located in the Khyber Pakhtunkhwa province of Pakistan. It is often used as a bypass for the N-45 and connects the cities of Chakdara-Mingora-Manglour-Kwazakhela-Madyan-Bahrain-Kalam.

28. Chakdara is a town in Lower Dir District of Khyber-Pakhtunkhwa. It is located north of Malakand on the north bank of the Swat River, in a commanding position near the entrance to Swat District and at the entrance to Lower Dir. It is about 130 km from Peshawar and 48 km away from Saidu Sharif. Chakdara Bridge is located at 88 - Km near Batkhela on N-45 from where N-95 (Batkhela - Kalam) also starts

29. Mingora being lifeline of trade and business activity is the main central city of Swat valley adjacent to Saidu Sharif. It offers food outlets, restaurants and hotels. Locally produced items beautifully displayed at its main bazaar, shops, show rooms etc. include semi-precious stones, embroidered dresses, hand woven ladies shawls, bed sheets and woodwork. Traditional ornaments and antiques are available at shops. Visitors on trips to Swat valley usually stroll its bazaars for shopping at the end of their journey. You can find emerald mines in hills northward of the town, famous worldwide for their expensive and valuable emeralds.

30. Encircled by mountains the picturesque tourist resort of Miandam is at a distance of about 57 km from Saidu Sharif. Surrounding mountains during the summer do not allow the sun to cast its shadows on this attractive resort making it the coolest place. A PTDC motel, few hotels and official guest houses keep this beautiful place alive in summer seasons. It provides a refreshing view of large forests, fruit orchards and flowing streams.

31. Being home town of Kohistani inhabitants, Kalam is like an earthly paradise in Swat Valley. Located at a distance of 40 km from Bahrain, Kalam is the main town of

this region presenting one of the most panoramic natural beauty. The people known as Kohistanis are its original inhabitants proud of their own language and still unchanged traditions.

32. A fascinating view of 6471m Falaksair Peak with its melting snow even during summers from Matiltan (3000m) is ecstatic. The journey is incomplete without seeing and going to Mahodand, a famous lake, about 23 km beyond Matiltan. The picturesque Kalam provides road access to reach magnificent valleys of Ushu (2286m), Utrot (2225m) and Gabral (2286m) above sea level, where journey through green forests and beautiful view of landscape is mesmerizing. Rivers and lakes at Kalam offer good trout fishing after getting permits obtainable from the Fisheries Department.

#### 1.4 PROJECT LOCATION

33. N-95 passes from Chakdara-Mingora-Manglour-Kwazakhela-Madyan- Bahrain-Kalam having total length of about 135 Km KP. It is proposed to construct a new road on N-95 from Fatehpur upto Kalam covering road distance of 50 Km for this purpose.



Figure – 1.1: Location Map of the Proposed Project.

#### 1.5 PROJECT CATEGORIZATION

34. According to ADB Safeguard Policy Statement, projects are to be categorized into three environmental categories; A, B, or C. All the anticipated adverse environmental impacts of the project are mitigable, temporary nature and localized. Also there is no environmentally sensitive or archeological site falling within project

area of influence; therefore the project is classified as Category B. This report comprises the Initial Environmental Examination (IEE) of the proposed project to fulfill the requirements according to ADB's guidelines.

## **1.6 OBJECTIVES OF THE REPORT**

35. The main objectives of the report are as follows:

- The application of environmental administrative and legal frame work on the project.
- Develop Environmental Baseline Data for the project Area of Influence (AOI); derive land use and environmental maps.
- Assessment of potential environmental Impacts and development of mitigation measures to cater for adverse impacts.
- Preparation of framework of Environmental Management Plan (EMP) and envisaged EMP implementation cost for this project.
- Environmental approval from government agency; Environmental Approval for the construction of National Highway (N-95).

## **1.7 METHODOLOGY OF PERFORMING THE STUDY**

36. The environmental and social data were collected and analyzed for the overall environmental study area. Data was collected during site visits and stake holder consultation works. The concerned departments and institutions are Wildlife, Forestry & Fishery Department, Water Management Office, Irrigation, NHA and Land Revenue etc.

37. The base line data was developed and analyzed to identify potential environmental impacts of the Project. A risk based methodology was adopted to identify the high risk activities and suggest their mitigation measures. Where possible, eliminating the risk by altering the scope or method of execution of work was preferred rather than minimizing the risk with control measures. Public consultations were also undertaken including a gender study to take into account the public point of view about the project.

## **1.8 ENVIRONMENTAL AND RESETTLEMENT ISSUES**

38. The project activities include construction of National highway N-95. This will cause some disturbance due to construction activities on the main site and the allied sites involving borrow material, camping grounds, material dump, machinery yard, and necessary facilities for the staff and labor to be engaged for the construction of the

project. The materials and labor shall have to be carried from the Depot/camp to the work sites. There is no such irreversible adverse environmental impact of the project but the construction-related impacts such as air pollution, noise and use of community resources can be well mitigated through the proper implementation of the mitigation measures, which have been identified in this report. The construction of road is within the Govt. land, so no private land or property acquisition will be involved anywhere during construction.

## **1.9 STRUCTURE OF THE REPORT**

This report is divided into following chapters:

Executive Summary

Chapter No.1:	Introduction
Chapter No. 2:	Policy, Law and Administrative Framework
Chapter No. 3:	The Project Description
Chapter No. 4:	Environmental Baseline Conditions
Chapter No. 5:	Study of Alternatives
Chapter No. 6:	Public Consultation
Chapter No. 7:	Impact Assessment, Mitigation and Enhancement Measures
Chapter No. 8:	Environmental Management Plan
Chapter No. 9:	Grievance Redress Mechanism
Annex	

## **2. LEGAL AND ADMINISTRATIVE FRAMEWORK POLICY**

39. This chapter 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 legislations and Asian Bank Guidelines relating to environmental and social issues, and all the required regulatory clearances will be obtained.

40. The environmental study includes primarily Pakistan Environmental Protection Act 1997 (PEPA 1997), Pakistan IEE and EIA review regulations (2000) and Asian Development Bank SPS 2009. All other laws and guidelines relevant to the project have also been reviewed. Synopses of relevant laws and guidelines are provided in this chapter.

### **2.1 REGULATORY REQUIREMENTS IN PAKISTAN**

41. Under section 12 (with subsequent amendment) of the 1997 Act, a project falling under any category specified in Schedule I (SRO 339(1)/2000), requires the proponent to file an IEE with concerned federal agency (Pak-EPA). Projects falling under any category specified in schedule II require the proponent to file an EIA with the federal agency. Within ten working days of the lodging of IEE or EIA, the federal agency will confirm that the document submitted is complete for the purpose of review.

### **2.2 NATIONAL CONSERVATION STRATEGY**

42. The Pakistan National Conservation Strategy (NCS) was approved by federal cabinet in March 1992 and is the principal policy document on environmental issues in the country. The NCS outlines the country's primary approaches towards encouraging sustainable development, conserving natural resources and managing 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, conserving biodiversity and preservation of cultural heritage.

### **2.3 NATIONAL ENVIRONMENT POLICY**

43. The National Environmental Policy provides an overarching framework for addressing the environmental issues facing Pakistan, particularly pollution of fresh water bodies and coastal waters, air pollution, lack of proper waste management,

deforestation, loss of biodiversity, desertification, natural disasters and climate change. It also gives directions for addressing the cross sectoral issues elaborating the underlying causes of environmental degradation and international obligations. The policy provides broad guidelines to the Federal Government, Provincial Government, Federally Administrated Territories and Local Government for addressing environmental concerns and ensuring effective management of their environmental resources.

## **2.4 GUIDELINES FOR ENVIRONMENTAL ASSESSMENT**

44. The Pak-EPA has published set of environmental guideline for conducting environmental assessment and the environmental management of different types of development projects. The guidelines relevant to the proposed Project are listed below.

### **2.4.1 Guidelines for the Preparation and Review of Environmental Reports, Pakistan Environmental Protection Agency, 1997**

45. The guidelines, targeted at project proponents, specify:

- The nature of the information to be included in environmental reports
- The minimum qualification of the EIA conductors appointed
- The need to incorporate suitable mitigation measures during project implementation
- The need to specify monitoring procedures

The report must contain baseline data relating to the project area, an interpretation of the data and mitigation measures.

### **2.4.2 Guidelines of Public Consultation, Pakistan Environmental Protection Agency, May, 1997**

46. These guidelines deal with possible approaches to public consultation and techniques for designing an effective program of consultation that reaches out to all major stakeholders and ensure that their concerns are incorporated in any impact assessment study.

## **2.5 ENVIRONMENTAL INSTITUTIONS AND THEIR RESPONSIBILITIES**

### **2.5.1 Provincial EPA**

47. National Highway Authority (NHA) will be responsible for providing the complete environmental documentation required by the provincial EPA and remain committed to the approved project design. No deviation is permitted during project implementation without the prior and explicit permission of the EPA.

### **2.5.2 Provincial Departments of Forestry and Wildlife**

48. Wildlife department nominates any sensitive wildlife area as game reserve or highly sensitive area as wildlife sanctuary. A competent person should manage the work activities in wildlife sensitive areas to minimize any adverse impacts on wildlife habitat. However no environmentally sensitive area has been identified within the direct influence of the project activities.

### **2.5.3 Local Government and Municipalities**

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

### **2.5.4 Environment Afforestation Land and Social (EALS)**

50. National Highway Authority (NHA) has established an Environment Afforestation Land and Social unit to address the environmental and social issues in a timely and effective manner during operation, maintenance, rehabilitation, and construction activities. EALS has developed checklists for rehabilitation and construction works. EALS may also be involved as an independent environmental monitoring organization during construction phase of this Project.

### **2.5.5 Environment-Related Statutes**

51. This section outlines statutes apart from the Pakistan Environmental Protection Act, 1997, which are relevant to the project.



- **The Forest Act, 1927 (and Provincial Acts and Rules)**

52. The Act, inter alia, deals with the matters related with protection and conservation of natural vegetation/habitats. It empowers the concerned agency to declare protected and reserved forest areas and their maintaining. In spite of the fact that it recognizes the right of people for access to the natural resources for their household use, it prohibits unlawful cutting of trees and other vegetation from forest reserve area. The permission is required prior to undertake any tree cutting from the Forest Department. No tree cutting is envisaged during the project activities.

- **Provincial Wildlife (Protection, Preservation, Conservation and Management) Act, Ordinances and Rules**

53. In addition to empowering provincial wildlife department to establish game reserves, parks, and wildlife sanctuaries, these acts regulate the hunting and disturbance of wildlife. This law will help in eliminating any trespassing into protected areas.

- **Antiquities Act, 1975**

54. The Antiquities Act relates to the protection, preservation and conservation of archaeological/historical sites and monuments. There are no archeological site(s) or cultural heritage site inside or in the AOI of the project. Nevertheless if there is chance find during the construction phase this law would provide due guidance.

- **Provincial Local Government Ordinances, 2001**

55. These ordinances, issued following the devolution process, establish regulations for land use, conservation of natural vegetation, air, water, and land pollution, the disposal of solid waste and wastewater effluents, as well as matters related to public health and safety.

- **Factories Act, 1934**

56. The clauses relevant to the project are those that are related with the health, safety and welfare of workers, disposal of solid waste and effluent, and damage to private and public property. The Factories Act also provides regulations for handling and disposing of toxic and hazardous materials. There are no factories / industries inside the project area.

- **Land Acquisition Act 1894**

57. Land Acquisition Act (LAA), 1894 is the primary law governing land acquisition in Pakistan. For the acquisition of land, the above-mentioned Act, rules and regulations

are followed. No land acquisition is required for the project.

## 2.6 ASIAN DEVELOPMENT BANK GUIDELINES

58. The Asian Development Bank's Safeguard Policy Statement (SPS) 2009 require that environmental considerations be incorporated in to 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 9.

### ▪ Environment Categorization

59. All loans and investments are subject to categorization to determine environmental assessment requirements. Categorization is to be undertaken using Rapid Environmental Assessment (REA), 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:

**Category A:** Projects with potential for significant adverse environmental impacts. An Environmental Impact Assessment (EIA) is required to address significant impacts.

**Category B:** Projects judged to have some adverse environmental impacts, but of lesser degree and/or significance than those for category A projects. An initial environmental examination (IEE) is required to determine whether or not significant environmental impacts warranting an EIA are likely. If an EIA is not needed, the IEE is regarded as the final environmental assessment report.

**Category C:** Projects unlikely to have adverse environmental impacts. No EIA or IEE is required, although environmental implications are still reviewed.

**Category FI:** Projects are classified as category FI if they involve a credit line through a financial intermediary or an equity investment in a financial intermediary. The financial intermediary must apply an environmental management system, unless all subprojects will result in insignificant impacts.

## 2.7 NATIONAL ENVIRONMENTAL QUALITY STANDARDS (NEQS)

60. The NEQS specify the following standards:

- Maximum allowable concentration of the Pollutants, (32 parameters) in emission and liquid industrial effluents discharged to inland water.
- Maximum allowable concentration of pollutants (16 parameters) in gaseous emission.
- Maximum allowable exhaust emissions and noise emission from vehicles.
- Maximum allowable noise level from vehicles
- Maximum allowable limits for Drinking Water
- Maximum allowable limit for Ambient Air Quality

Tables attached as Annex C

## 2.8 INTERNATIONAL CONVENTIONS

61. Pakistan is signatory to a number of International Conventions, Protocols and Understandings relating to the environment. Those relevant to the project are described in the following paragraphs.

- **Convention on Biological Diversity**

62. The Convention of Biological Diversity was the outcome of the “Earth Summit” held in Riode-Janeiro in 1992. The Convention binds the signatories to respect, protect and conserve the earth environment and bio-diversity through sustainable use of natural resources. In all development projects in Pakistan the protocols of this convention are respected in letter and spirit.

- **Ramsar Convention**

63. The Convention on Wetland of International Importance, especially on Waterfowl Habitats held in Iran in 1972 at village Ramsar in Iran, places an obligation on the signatories to protect habitats of migratory waterfowl. There is no notified Ramsar site within the AOI of the project.

- **Bonn Convention**

64. The Convention on the conservation of migratory species of wild animals was held in Bonn in 1979. The Convention broadens the scope of Ramsar to include migratory species other than water fowl. Not being a Ramsar site, this protocol is not obligatory for N-95 Road Project. But it will be respected during

construction phase to the extent that no damage is caused to habitat of any species.

### 3. THE PROJECT

#### 3.1 GENERAL

65. The National Highway 95 or N-95 is a highway located in the Khyber Pakhtunkhwa province of Pakistan. It is often used as a bypass for the N-45 and connects the cities of Chakdara to Kalam.

66. The project area of influence (AOI) is the area likely to be effected by the project, including all its ancillary aspects such as power transmission corridors, pipelines, canals and access roads, borrow & waste disposal sites, batching plant and labor camp as well as unplanned development induced by the project.

The populated areas near the proposed projects are as follows:

- Chakdara
- Mingora
- Manglour
- Lai Kot
- Pangora
- Roshan abad
- Fiza ghat
- Lunday gao
- Imam deri
- Kashgor gao
- Sirgota
- Tehsil khawailkhera
- Kwazakhela
- Madyan
- Bahrain
- Fatehpur
- Kot sher abad
- Chikri
- Kot mera
- Tehrain
- Piya
- Pishmaal
- Kalam

67. River Swat is the main source of surface water. There is existence of small water springs, which are also ultimately falling into river swat and source of drinking water.

#### 3.2 OBJECTIVES OF THE PROJECT

68. Main objectives of the N-95 Road Project are as follows:

- Rehabilitate the existing road
- Construction of a new belly bridge
- Mitigate any adverse impacts (physical, biological or social).

### **3.3 DESCRIPTION OF THE PROJECT**

69. NHA has planned to construct the existing N-95 passes from Madyan to Kalam having total length of about (135) km of KP. The N-95 is a highway located in the Khyber Pakhtunkhwa province of Pakistan. It connects the cities of Chakdara-Mingora-Manglour-Kwazakhela-Madyan-Bahrain-Kalam. It is also popular among tourists for recreational purposes. The proposed road project is going to be rehabilitated (along with some new alignment). The capital cost of the proposed project is Rs. 5.75 billion.

#### **3.3.1 Project Activities**

70. The Project activity will consist of the following:

- Rehabilitation and Construction of the N-95 road
- Construction activities
- Labor Camps
- Clearing of vegetation
- Asphalt Plant
- Waste disposal
- Excavation from borrow areas and their restoration

#### **3.3.2 Environmental Assessment**

71. The base line data was developed and analyzed to identify potential environmental impacts of the project. An Environmental Assessment Checklist methodology was adopted to identify the high risk activities and suggest their mitigation measures. Where possible, eliminating the risk by altering the scope or method of execution of work was preferred rather than minimizing the risk with control measures.

72. According to ADB Safeguard Policy Statement (SPS 2009), projects are to be categorized into three environmental categories; A, B, or C. All the anticipated adverse environmental impacts of the project are mitigate able, temporary, nature and localized. Also there is no environmentally sensitive or archeological site falling within project area of influence; therefore the project is classified as Category B.

## 4. ENVIRONMENTAL AND SOCIAL BASELINE

### 4.1 GENERAL

73. The Purpose of this chapter is to establish the baseline conditions for the physical, biological and the social aspects of environment of the project area. The data was collected regarding the physical environment, biological environment and social aspects of the study area during stake holder consultation and technical visits conducted by the environment team.

### 4.2 AREA OF INFLUENCE

74. This Chapter describes the environmental, social and biological baseline conditions of the project area. The baseline conditions have been established on the basis of the data collected from the field, and through unstructured interaction with the local communities as well as the officials from various departments. In addition, the published data (secondary data) was also used to provide background information about the project area.

75. Locations such as the Chakdara-Mingora-Manglour-Kwazakhela-Madyan-Bahrain-Kalam are the major areas of influence.

76. The project area of influence (Aol) is referred to all those areas which may be affected directly or indirectly by the project activities. This includes the following:-

Pangora	Roshan abad
Fiza ghat	Lunday gao
Imam deri	Kashgor gao
Sirgota	Tehsil khawailkhera
Mingora	Fatehpur
Kot sher abad	Chikri
Kot mera	Tehrain
Piya	Madyan
Kalam	Pishmaal

77. River Swat is the main source of surface water in the proposed project jurisdiction. There is existence of small water springs, which are also ultimately falling into river swat as source of drinking water for the locals.

### 4.3 PHYSICAL ENVIRONMENT

#### 4.3.1 Geology

78. The metamorphic sequence in Lower Swat is consists of the Precambrian-Cambrian Manglaur formation unconformably overlain by the Alpurai group which is subdivided into the Carboniferous or younger Marghazar formation, and the Triassic or younger Kashala, Saidu, and Nikanai Ghar formations. A third unit, the Jobra formation of unknown age, is present as discontinuous lenses unconformably below the Alpurai group. Type sections are indicated for each rock unit. Comparison with the stratigraphy in the Peshawar Basin indicates that the Lower Swat area existed as a highland with active normal faulting during and perhaps before deposition of the Marghazar formation. The Marghazar formation appears to be a rift facies that correlates with the Panjal Traps of western India. The Kashala and Nikanai Ghar formations represent a transition to a stable shelf environment. These units may correlate, in part, with the Zaskar Supergroup of western India. The Saidu formation may represent drowning of the shelf as it was pulled down and overridden by the Main Mantle Thrust suture melange. It may correlate with the Lamayuru Formation of western India. The Alpurai group thus records a depositional history from Late Paleozoic breakup of Gondwana, to development of a passive Mesozoic shelf, to drowning of the shelf at the onset of Himalayan orogeny. (Joseph A *et al.*, 1993).

#### 4.3.2 Physiography

79. The province is broadly divided into three different zones with their peculiar physical stratum. The northern part of the province is adorned with beautiful valleys having 5 rivers running roughly north to south inter alia the Chitral, Dir, Swat, Indus and Kaghan. These valleys are on the northern edge of the monsoon belt, fairly green and partially wooded in their southern sections. The southern part of the province is below the monsoon belt and consists of low, rocky mountain and wide, gravelly plains.

#### 4.3.3 Soil Type

80. Swat Valley was studied for two widely used pesticides; cypermethrin and endosulfan. A total of 63 soil samples were collected from 27 villages selected for this purpose. The collected soil samples were extracted with n-hexane; pesticides were separated, identified and quantified by a GC-ECD system. Endosulfan was 0.24 - 1.51 mg kg<sup>-1</sup> and 0.13 - 12.67 mg kg<sup>-1</sup> in rainfed and irrigated areas, respectively.



The residual level of cypermethrin was comparatively high with a level of 0.14 to 27.62 mg kg<sup>-1</sup> and 0.05 to 73.75 mg kg<sup>-1</sup> in rainfed and irrigated areas, respectively. For assessing the possible causes of pesticide residues in soil, 360 farmers were interviewed. It was found that both, cypermethrin and endosulfan, apart from agriculture were also widely misused for fishing in the entire stretch of River Swat and its tributaries. River Swat is used for irrigation in Swat Valley and this wide misuse of pesticides can also contribute to pesticide residue in soil. (M. Nafees *et al.*, 2009).

#### **4.3.4 Surface Water & Ground Water of the Vicinity Area**

81. Surface water sources include the streams, springs and rivers which provide water for irrigation and other utilities. Ground Water refers to the water obtained from aquifers, hand pumps, tube wells or other deep well injections. Ground water is a source of drinking water for the communities.

- **Surface Water**

82. The main source of the surface water in the vicinity of proposed project area is Swat River which is running along with the N-95 proposed project. This source of water is used for irrigating the crops, orchids and other agriculture lands. Communities are utilizing this source of surface water for other utilities e.g., Bathing, Washing etc.

**Table - 4.1: Summary of Surface Water Quality Analysis**

Sr. No.	Parameters	Units	WHO Guide lines	River Swat
1	Temperature	°C	....	8.0
2	pH Value	....	6.5-8.5	7.8
3	Arsenic	mg/l	0.00	0.0
4	Chloride	mg/l	250	10
5	Fluoride	mg/l	1.5	BDL
6	Sulphate	mg/l	250	5
7	Sulphide	mg/l	--	BDL
8	Sodium	mg/l	200	2.1
9	Potassium	mg/l	--	0.8
10	TSS	mg/l	--	37
11	TDS	mg/l	1000	170
12	Chromium Total	mg/l	0.05	BDL
13	Lead	mg/l	0.05	BDL
14	Iron	mg/l	0.3	0.07
15	Nitrate	mg/l	50	0.1
16	Total Colony count	Cfu/ml	< 500	80

- Ground Water**

83. The snow melt and rain water seeps into the ground to recharge the local aquifer of the mountains but reappears at places in the form of springs. The domestic water requirement of the communities is generally met from the spring water. It has been observed that the settlements are located where spring water is available in addition to the availability of level ground for housing and cultivation. The quality of spring water is reported by locals to be good. The water is free from contamination because of filtrating action of the strata through which it is passing.

**Table – 4.2: Summary of Ground Water Quality**

Sr. No.	Parameters	Units	WHO Guide lines	Spring water
1	Temperature	°C	....	10
2	pH Value	....	6.5-8.5	7.1
3	Arsenic	mg/l	0.01	0.00
4	Chloride	mg/l	250	15
5	Fluoride	mg/l	1.5	BDL
6	Sulphate	mg/l	250	10
7	Sulphide	mg/l	--	BDL
8	Sodium	mg/l	200	4.0
9	Potassium	mg/l	--	0.6
10	TSS	mg/l	--	25
11	TDS	mg/l	1000	125
12	Chromium Total	mg/l	0.05	BDL
13	Lead	mg/l	0.05	BDL
14	Iron	mg/l	0.3	0.09
15	Nitrate	mg/l	50	1.23
16	Total Colony count	Cfu/ml	< 500	75

#### 4.3.4 Climate

84. Swat is lying in the Temperate Zone in the northern mountainous ranges of the Indo-Pak Sub-Continent, therefore, here weather is affected by all the climatic factors "latitude, altitude and rain bearing winds" (the cyclone and monsoon winds). In summer, Swat comes under the influence of the monsoon, while in winter; it is affected by the Cyclonic Current from the Mediterranean Sea.

- **Temperature**

85. The height of Swat varies from 2500 ft to 7500 ft, therefore, this is colder zone. January is the coldest month of the year. The temperature, generally, remains between 40°F and 45°F (2°C to -2°C). The water-freezing season is from the last week of December to the end of February. In mountainous areas it takes more than three months.

- **Precipitation**

86. Winter rains start in December and last to the end of February. When the rainfall starts once, it remains continuous to one or two weeks. This continuous rainfall is

called Jarai. The rain of this season is usually, with slow fall and small drops. In the plain, the snowfall takes place from 15th January to the end of February. But in mountainous areas, the snow period is from the beginning of December to the end of March. (In November, the snow also falls on mountains, but melts soon.)

87. Spring rains from March to May are regarded as the spring rains. In this season, the rainfall occurs in shower with thunder and lightening, and the drops are bigger. The lengthened period of the continuation of the spring rains is destructive for the muddy homes of the poor villagers.

88. In summer rains there is usually a gap of one dry month, June, between the rains of spring and summer. The summer rains begin in July, and end in September. These rains are not so continuous. They are in intermittent position. Sometimes the rainfall takes place suddenly with hailstones, which results in the damages to property and lives. The rain of this season falls with shower and lightning. The annual rainfall is about 50 inch. The general effects of the weather condition are cold winter and warm summer, and the coldest winter in mountainous areas.

#### **4.3.4 Ambient Air Quality**

89. The primary factors that determine the air quality of a region are the possible sources of air pollution, the type and intensity of pollutant emissions, existing levels of air emissions, and the local meteorological conditions. Air Quality of Project Area is fine due to absence of any Industry in the project zone. No significant sources of pollution like Industrial emissions, vehicle exhaust, were observed.

90. Anthropogenic air pollution originates from a variety of sources, including vehicles. Air pollutants have a lot of adverse effects like they contribute to the acidification and global climate change, which have impacts on crop productivity, forest growth, biodiversity, buildings and cultural monuments. The emissions like Nox (NO<sub>x</sub>), Volatile Organic Carbon (VOCs) and Carbon Monoxide (CO) have an adverse impact on the air quality and health of human beings especially those which are directly exposed to this polluted air. The health effects associated with the most common pollutants include respiratory effects ranging from minor symptoms (cough) to more serious (chest congestion and asthma).

91. Kick off dust suspension of fine particles from the ground will be the major source of atmospheric pollutant together with smoke particles arising from wood fires used for cooking and heating. Carbon monoxide and oxides of sulfur and nitrogen will be

derived from powered vehicles and from burning domestic fuels, Asphalt Plants, etc. (See Table – 4.3 for Ambient Air Quality).

- Carbon Monoxide (CO)
- Carbon Dioxide (CO<sub>2</sub>)
- Sulfur Dioxide (SO<sub>2</sub>)
- Nitrogen Dioxide (NO<sub>2</sub>)
- Oxygen (O<sub>2</sub>)
- Respirable Particulate Matter (PM<sub>10</sub>)
- Noise Level

**Table – 4.3: Summary of Ambient Air Quality & Noise Level**

Sr. No.	Locations (GPS Reading)	CO	CO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	O <sub>2</sub>	PM <sub>10</sub>	Noise Level
		ppm	ppm	µg/m <sup>3</sup>	µg/m <sup>3</sup>	%	µg/m <sup>3</sup>	dB(A)
1	Near existing bridge towards Chakdara (N 34° 39.008' E 072° 01.763')	3	381	30.3	21.4	20.8	190.4	76.1
2	Near existing bridge towards Batkhela (N 34° 38.606' E 072° 01.762')	2	379	24.6	17.5	20.8	173.6	75.2
3	At the proposed site (N 34° 38.626' E 072° 01.872')	0	372	6.5	4.2	20.8	148.7	57.2
4	Near existing bridge road Batkhela (N 34° 38.549' E 072° 01.768')	5	388	32.8	26.1	20.8	238.5	79.8

*Secondary data taken from the recent study of Chakdara bridge construction*

All determinants were within the values defined in the Pak-EPA, NEQS air quality standards.

- **Noise Level**

92. The noise level presently never exceeds 70.8 dB (A). Even after the construction of proposed project, the noise level will not exceed 80 dB (A). However during construction due to construction machinery temporarily higher noise levels shall be experience. Just for comparison safe absolute values of various noise levels are given in Table - 4.4 and base data analysis results are shown in Table - 4.3.

Table - 4.4: Some Sources and Effects of Noise

Sr. No.	Source	Sound pressure (dynes/cm <sup>2</sup> )	Decibels (db)	Power at ear	Effects
1	Shot gun blast (1m)	4000	300	10 <sup>-1</sup>	Instant damage-complete loss of hearing
2	Stereo headphone (full volume)	2000	150	10 <sup>-1</sup>	Hearing damage in 30 seconds
3	50- hp siren (at 100m)	1000	130	10 <sup>-3</sup>	Pain thresh hold
4	Jet take off (200m)	200	120	10 <sup>-4</sup>	Hearing damage in 7.5 minutes
5	Heavy metal rock band	100	110	10 <sup>-5</sup>	Hearing damage in 30 minutes
6	Bus, truck, 6-10 wheels	20	100	10 <sup>-5</sup>	Hearing damage in 2 hours
7	Railway train	20	100	10 <sup>-5</sup>	Hearing damage in 2 hours
8	Power mover, motorcycle	20	85	10 <sup>-5</sup>	Hearing damage in 2 hours
9	Heavy city traffic	20	85	10 <sup>-6</sup>	Hearing damage in 2 hours
10	Pick ups	18	80	10 <sup>-7</sup>	Hearing damage in 8 hours
11	Small cars	10	60	10 <sup>-9</sup>	Hearing damage in 8 hours
12	Lord classical music	2	60	10 <sup>-9</sup>	Hearing damage in 8 hours
13	Vacum cleaner	01	60	10 <sup>-9</sup>	Hearing damage in 8 hours
14	Normal conversation	0.02	60	10 <sup>-9</sup>	Concentration disrupted
15	Bedroom	0.02	40	10 <sup>-11</sup>	Speech disrupted
16	Library	0.01	30	10 <sup>-13</sup>	Quiet
17	Soft whisper	0.002	20	10 <sup>-14</sup>	Very Quiet
18	Leaves rustling in the wind	0.001	10	10 <sup>-15</sup>	Barely audible
19	Mosquito wing at 4m	0.0002	0	10 <sup>-15</sup>	Hearing threshold youth 1000-4000 Hz

Source: *Urbanization and Sustainable Cities 100: Environmental Science, International Science, 5<sup>th</sup> edition (1991) Cunningham Saigo.*

#### • Natural History Event

93. The area has history of no serious damages due to earthquakes but area was under the influence of flood during 2010 and infrastructure damages taken place.

#### • Floods

94. Swat valley Floods occurred in the summer of 2010 and they brought along more misery and more poverty. The area wasn't too developed as it was and the Swat Valley Flood made it even worse. Houses were lost, roads were destroyed and the

natural disaster was used by the Islamist militants to reinforce them. The damages caused by the Swat Valley Floods were beyond imagination. Even the officials admitted that they are not prepared for a Swat Valley Flood of that scale and magnitude. The civilians who remained here even after the first insurgencies are now left with nothing. The Swat Valley Floods took the shelter of many of them.

- **Archaeological Sites / Chance Finds**

95. Swat's particular geographical position, in Asia, had exposed it to foreign influences and its historical and cultural development underwent multiple changes. The interaction of different people at different periods of time in the Valley proves that Swat evolved intimate terms with many races in the course of history. The archaeological findings here suggest the spreading of cultural and probably ethnical change too. The similarity between the tools and artifacts of the two regions is not due to the same origin of these people but to the Persian cultural influence over Swat.

96. A fairly large number of Buddhist sites preserving stupas, monasteries, viharas, settlements, caves, rock-carvings and inscriptions are scattered all over the Swat Valley. This heritage of immense interest may be seen both in plains and in the hilly tracts. Over 400 Buddhist stupas and monasteries may still be seen in ruins in Swat covering an area of about 160 square km.

### **4.3 BIOLOGICAL ENVIRONMENT**

97. There are no protected areas and endangered species envisaged in the project area. However the area contains natural mountain forests.

#### **4.4.1 Ecological Resources**

98. In the lowland of Swat, the temperature is comparatively high, so the plants and trees are of broad leaves deciduous type. Poplar, Bakyan and Willow are the common non-fruit trees. The mulberry, pear, apricot, plum, damson, walnut, apple, fig, grapes, orange, jujube are fruit trees, and grow everywhere. Acacia and olive are also found in gregarious positions. The local names of some of plants and shrubs are Kharawa, Manrogaya, Kwarae, Manro, Soorazghi, Ghorashki, Khonawli, etc. The plants and shrubs cover the slopes of the hills and the foothill areas.

99. Beyond the height of 4500 ft, there are vast amounts of forests of coniferous trees that consist of Pines, Dewdar, Cedar, Byar etc. Generally, each of the variety forms its own belt. Mostly, the lower belt is of pine. The next to come is Dewdar and

Byar. The belts of these two varieties reach to the denuded mounts (Spincers). The pine and spruce are found even in Buner, where the height is not much greater. But Dewdar, and Byar, grow at sufficient height and are found at Kohistan. Among the shrub, Borajae, Bang-e-Dewana, Ghanamrangae and Shangla are grown on the slopes of the hills and mountains. Shepherds, nomads (the local name of them is Ajar) are migrating to the hills along with their flocks, where the growth of the grass is greater. These areas are considered as permanent pastures. Caraway seeds and mushrooms are also found in the same areas when snow melts away.

**Table - 4.5: Flora of Area**

Sr. No.	Scientific Name	Vernacular Name
1	Pinusroxberghii	Pine
2	Dalbergiasisso	Shisham
3	Cedrusdeodara	Deodar
4	Meleaazedarie	Bakain
5	Punicagranatum	Daroon
6	Zyziphusjajuba	Beri
7	Meliaazedarach	Bakain
8	Olea cuspidate	Kahu
9	Liriodendron tulipifera	Poplar
10	Diospyrosdigyna	Persimmon
11	Robiniapseudoacacia	Rubania
12	Malusdomestica	Apple
13	Prunuspersica	Peach
14	Pyrusboissieriana	Pear
15	Prunusarmeniaca	Apricot
16	Sect. Juglans.	Walnut
17	Acacia nilotica	Kikar
18	Malusdomestica	Apple

#### 4.4.2 Fauna of the Area

100. Most of the fauna in the Project area is local or domestic. The birds such jungle crow, kite and common sparrow, King Fisher, Monal, Little brown dove can be seen. The bird population is thin in project area. In early days when the shrubs and bushes covered slopes and foothill areas, the rabbits, porcupine, fox, jackal, wolf, pigs, and hyenas were in large number. Now the need for fuels decreased the scrubs and trees, so these animals have decreased considerably. In the forests, lions, tigers, bears, and monkeys are found.



**Fisheries**

101. There is a large fishery in Madyan. In this fishery the trout fish are being reared. In Kohistan-e-Swat there are some private fisheries too. In Buner the fish were being reared in Barandu, Dagar. Moreover the Swat River serves as a permanent fishery throughout the year while the tributaries of it are used for fishing only in spring season.

**Birds**

102. Among the birds: hawks, eagles, falcons are found in the high mountains, while pheasants, partridges, hoopoes, larks, sparrows, quails, doves, swallows, starlings, nightingales, crows, kites, vultures, owls, bates are the common birds.

**Mammals**

103. The rural cattle include those quadrupeds that are being kept by the peasants for their personal use. Bulls, buffaloes, and cows are the common among them. The sheep and goats are reared too, but not with much interest.

**Poultry**

104. In Swat, every farmer has enough hens to meet his own needs. So far as the commerce is concerned, much attention has been given to this profession. Now there are many poultry farms: About each large village have at least one poultry form. Chickens, particularly capon, are available everywhere in abundance.

**Bees**

105. The bees were kept in Swat commonly, and the pure honey of was famous all over the country. But now the moveable beehives have affected the Swat locally reared bees greatly. Now, the local good honey is found in remote areas only, while the honey of moveable hives is available everywhere in low prices.

**4.4.3 Forests and Flora**

106. The vegetation of Swat has a great value, particularly, the forests and grass. Dewdar and Byar grow in vast amount in the upper belt of forests. Wood taken from them is durable and is not rotten easily even in the water, therefore, they are used in underwater constructions and buildings. Pine is another useful wood for timber, beams, rafts, and furniture. Generally, furniture is made of Walnut, Bakayan and Poplar. Due to these forests, woodcutting is a common profession for the local people. They also get a meager amount as royalty from the government.

107. The shrub and grass provides good pastures for the cattle. Gujars and Ajars drive buffalo, cows, sheep and goats to these pastures, in summer season. The local people call these pastures Banday. Some people collect mushrooms in these forests, and sell them with high prices. Moreover, resin is also obtained from the trees of pine. The final and greater importance of all these vegetation is to protect soil erosion.

#### **4.4.4 Agriculture**

108. Swat is totally an agricultural zone, yet it's per acre output is low. Some of the detrimental factors for the high yield are the following:

##### **Fragmentation**

109. The individual holdings have been subdivided and a single owner has parts of his holdings in various places of the village. For example, a holder of an acre land has parts of that one-acre in different places, therefore, the farmers cannot serve them properly.

##### **Irregular Irrigation**

110. The next item responsible for low production is irregular irrigation system. Vast areas in Swat solely depend upon rainfalls. The peasants sow the seeds in the hope of rain, but when, unfortunately, the rain misses time, the seeds are either rotten in soil or picked up by birds, ants, and other insects. If it rains, sometimes, the rainy streams become so overflowed that the surplus water gushes into the newly sown or newly grown fields and a layer of debris is deposited over them. So both the seeds and the newly germinated plants are spoiled out.

##### **The Lake of Manure**

111. The cattle dung was used as fertilizer some years ago. Now the position has changed. Dung is no more used as manure but rather as fuel. It has also affected the production, the farmers try to get the best type of fertilizers but they are not given it easily by the government. Therefore, many of the weak farms are given seasonal or yearly rest to obtain the energy from the natural sources. Moreover, the prices of fertilizers are so high that the farmers are about to give up their use.

##### **Spring harvest**

112. This harvest is called Rabee in other parts of Pakistan, but its name in Swat is "Har". It starts from September-October, and lasts till May and June. The chief crops of this season are wheat, barley, mustard, and lentil.

**Autumnal Harvest**

113. This harvest is known as "Kharif Crops", but in Swat, it is known as "Manay". The crops of this season are sown in June-July, and harvested in September-October. The chief crops of this season are maize, rice and jute.

**Cash Crops**

114. The surplus amount of the food grains come first in this respect. However, the particular crops are tobacco, hemp, and sunflower. Tomatoes and potatoes are essential element in the commercial field of Swat.

**4.5 SOCIO-ECONOMIC AND CULTURAL ASPECTS**

115. This section provides an overview of the socioeconomic conditions and cultural mores in the project area. Socio economic conditions of the area depend upon the population, employment level, trade and businesses, customs, religion, social activities, occasions, and their social cohesion.

116. Social impacts can be defined as the consequences to people of any proposed action that changes the way they live, work, relate to one another, organize themselves and function as individuals and members of society. This definition includes social-psychological changes, for example to people's values, attitudes and perceptions of themselves and their community and environment. (Narayan 2005)

117. The Social Assessment (SA) has been conducted to evaluate the project's potential positive and adverse effects on the affected people and to examine project alternatives where adverse effects may be significant. The breadth, depth and type of analysis in the social assessment are proportional to the nature of the project and scale of its potential effects, positive or adverse, on the affected people. People of proposed project are not financially sound. Their income based on the summer season tourism. They are involved in hoteling, tourist guide, transporters and labor sectors of earning sources. People are poor enough to meet their daily life utilities. They are heavily relying on the ecosystem to meet their needs of drinking water from spring and burning wood from the forests. Despite of all these dilemmas people are innocent, hardworking, hospitable and take care of their guest up to maximum extent.

**4.5.1 Population and Community Structure**

118. According census report 1998 the population of district swat is 1257602. Average annual growth rate is 3.37 percent. Rural population in census 1998 was 86.17%

urban population 13.83%. Total Male population according census 1998 is 648008. Female population is 609594 with Male 52% and Female 48%.

119. The distribution of population depends upon relief, climate vegetation, products, and industries. The people deserts the uneven surface composed of poor soil with severe climatic conditions, and seeks abode somewhere else in the area where the facilities for decent life are available. Therefore, in the early days, the exceeding number of population of mountainous areas was coming to the villages of the valley, and worked as peasants, or as helpers of the landlords. But now, the industrial and commercial centers avail them good opportunities for lucrative jobs, and fruitful labor work. So instead of the villages, the influx of the population is toward the cities. Thus Mingora is the thickly populated area in the whole Swat. The villages of the valley have thicker population as compared to the mountainous areas.

### **Races**

120. The population of Swat consists of the following main races: Mian, Mula, Swati Dalazak, Pukhtoon, Kohistani, and Gujar. Each of them has their own genealogy, and background.

#### **4.5.2 Poverty Status**

121. About 80% of the population in the immediate as well as the project area is under poverty line for their food and basic necessities and their income is less than Rs. 3,000/- per month per family of 6-8 persons. The population below poverty line falls in various categories like drivers, labor in hotel industry, loss of tourism, small landowners etc. Poverty has increased in flood affected areas because of the loss of livelihoods misguided economic policies have widened inequalities and forced mountainous people to exploit biodiversity at rates that are no longer sustainable. As a result, processes such as deforestation, overgrazing and soil erosion have become major threats to the remaining biodiversity of high lands in Pakistan. Poverty, lack of planning and appropriate policies has contributed to disproportionate pressures on resources resulting in degradation in uplands that ultimately cause more and more degradation at lowlands.

#### **4.5.3 Land Tenure System**

122. Wesh means distribution. When the Yusufzais migrated from the neighborhood of Kabul and occupied the territories yet in their possession, their saintly leader Shaikh Mali distributed the land among the branches of the tribes. However the lands were not allotted permanently but the system of land tenure was devised which is called wesh,

because the land differed in composition, location, fertility, availability of water, accessibility and so forth.

123. Under this system the lands were redistributed every ten years between the sub-branches of each main branch. Thus every seven, nine and ten years all the landowners, which had a share in the available lands, used to move and settle in the villages allotted to them for the next period, and to divide the houses and lands of these villages between themselves for the period within the village.

#### 4.5.4 Land Value

124. Agricultural land is treated differently from a piece of land in a town city or a village. Urban land has higher value. According productivity the total land mass of a country/province is divided into 8 broad classes as shown in the following sketch:

**Table - 4.6: Land Capability Class**

I	II	III	IV	V	VI	VII	VIII
Agriculture Land				Forests	Range Lands	Stony Hills	Snow Clad Peaks

125. The lands were classified and each shareholder had to receive his share in all the categories. It is pertinent to dispel the notion that under the system the land has been redistributed among the members equally. In fact it wasn't the case and every landholder received the share he possessed previously. Even some weak people got deprived of their shares. There were lands that were under permanent ownership and were not redistributed or allotted in the wesh. These were granted to the holy families and persons by the tribe, and were called serai, while those liable for redistribution were known as Dawtar and its owner a Dawtari.

#### 4.5.5 Social Equity

126. Social equity does not exist in the area now-a-days. Old systems of equity and social security such as Jirga, Punchayat, Bradri, village community, have collapsed and the new system such as NGO's, Union councils and professional organizations have not yet fully taken roots. But with the passage of time, social norms are getting strength due to mass awareness due to education.

#### 4.5.6 Social Cohesion

127. The human society in project area is Muslim by 100 percent. The village population is mostly Pathans.

#### 4.5.7 Gender Issues and Status of Women

128. The number of women in the households is more than male members (women 40% and men 60%). Sixty five percent populations, male and female together are under 30 years of age. In rest of 35% the age groups taper off as they go towards high age. Due to ethnic and social reasons most of the times only male population appears in streets and bazars.

129. There is a tendency to marry early (men 21 – 25 years, women 18 – 21 years). There are no teen age marriages. Because of family bonds social values and caste pressures the rate of divorce is rather low.

130. The roll of women is crucial for any sustainable development process. The women situation survey shows that 32% respondent is literate while 68% respondent is illiterate. The most impressing need of the women of the area is the basic health facilities and the educational facilities for the girls of the project area. The construction of proposed project will definitely promote the above mentioned needs as easy access to their destinations and also other social development works.

131. Average age for men is 60 years, within a range of 35 – 89 years. Average are of women is 65 years within a range of 25 – 100 years. Infant mortality is 35% because of lack of gynecological and antenatal facilities in BHU's People cooperate with Polio drops campaign every year. Courses of vaccines against small pox, cholera, typhoid and hepatitis are offered but are ignored by many village households. NGO,s and other organizations are working on providing maternity facilities in the areas. BHU's are working efficiently in this context.

#### 4.5.8 Services and Facilities in the area

- **Educational level**

132. With the passage of time, education getting worth and people have shown their eager in educating their childrens. Lack of education can, no doubt, makes these areas more vulnerable to the trends of extremism and it could have degenerative effects for socio-political fiber of the region.

**Table 4.7: Education Facilities in the Area**

Gender	Primary	Middle	High	Secondary	Total
Boys	843	84	69	13	1009
Girls	491	53	22	5	571
Total	1334	137	91	18	1580

Source: [www.swateducation.com](http://www.swateducation.com)

- **Telephone and Internet**

133. Over past few years the urban as well as the rural parts of the project area have experienced a dramatic change in personal communication. No PTCL connection lies in most of the areas. All the mobile networks are working efficiently in the proposed project area. Internet facilities are available upto some extent.

- **Transportation and Accessibility**

134. The transportation in the proposed project area comprises on 4x4 jeep and vans and other vehicles. These transportation sources are frequently used in the propose project area. These transports are also used for the carriage purposes. Heavy vehicles are used to transport construction material in far going areas. Mules are also been used for carriage purposes where other transport sources do not have any access or convenience. Light weight vehicles also frequently used.

- **Electricity, Sui-Gas Supply and energy use**

135. There is no supply of SUI gas. Electricity has got the reach upto maximum area in hilly areas of proposed project. Coal and wood from the forests have been used for burning purposes. Sui Gas supply projects are in pipeline. The average house hold size for the District has increased to 8.8 persons in 1998 from 7.00 persons in 1981. The main source of lighting is electricity which is used by 61 % of households. The second main source of lighting is kerosene oil which is used by 35 % of the households. The remaining 4 % use other sources for lighting. About 90% of the households use wood for cooking.

- **Health Facilities in the Project Area**

136. The extensive destruction and damages to health facilities in Swat and Buner and resulting gaps in services need to be addressed urgently, particularly as significant numbers of IDPs are returning to Buner, Swat and Bajaur districts. According to the KP Department of Health, at least 18 of the 80 health facilities in Swat district have been destroyed and 21 partially damaged. There is one teaching hospital, one Teshil headquarters Hospital in Matta, three rural health centres, 40 basic health units and 17 civil dispensaries in Swat district. According to an April 2009 assessment, there were 33 male doctors for 125 available posts and seven female doctors for 125 posts. The Department of health of NWFP reports that 70% of the staff has returned to their posts. Medical equipment, essential medicines, supplies, ambulances and human resource, especially female medical staff, and training of healthcare providers are needed.

- **Occupations / Vocations**

- 1- Agriculture.      2- Horticulture      3- Trade.      4- Govt; Services.  
 5- Private Services      6- Hotel Services      7- Hunting.      8- Transport Services  
 9- Fishing.      10- Mining to Labor.      11- Handicraft.      12- Teaching. Etc.

- **Income**

137. Agriculture is the main sources of economy. The Valley of District Swat is very fertile for forming. Fruits are grown in all areas and are the source of income. Live Stocks, Buffalos and cows are the main source of milk. Sheeps and Goats are reared in large number in district SWAT. Forest is also the sources of income. Fruits and honey is the main product of Swat. Silk Industry is the oldest industry of this area. Hotels, Plastic & Rubber, Marble, China clay industries are also included in sources of income.

- **Vulnerable Groups**

138. The flood induced crisis has put at risk the most vulnerable groups like widows, persons with disabilities and orphans in flood affected areas. Swat Participatory Council has initiated a support program to the widows and persons with disabilities in selected UCs of Swat. Seventy widows and persons with disabilities have been provided cash grant of Rs.1000 each in UC Utror and Behrain Swat. Kalam and Matta Tehsils are planned to be provided the same support in collaboration with Bacha Khan Trust Educational Foundation in the month of Oct-Nov, 2010.

- **Indigenous Peoples Safeguards**

139. During the field survey it was especially focused to screen out Indigenous Peoples. People living in project areas belong to various caste patterns and have homogeneous culture. The population of Swat consists of the following main races: Mian, Mula, Swati Dalazak, Pukhtoon, Kohistani, and Gujar. Each of them has their own genealogy, and background. There is no community that meets the criteria of ADB definition of Indigenous People. As such the ADB policy on Indigenous peoples will not be triggered by the project.

- **Tourism and Recreational Facilities**

140. Swat Valley is an amazing place to visit, no matter what a person's interests or desires. There are art museums, beautiful architecture, and lots of other amazing things to take in about this quirky little area. Other places to visit include Utror, Usho,



Kalam, Bahrain, Madyan, Miandam, Malam Jabba, and also the Swat Museum. There's so much to see that potential tourists are encouraged to start planning their trips several weeks or months in advance. It will take at least this long to work out a sufficient schedule so that nothing about this amazing place is missed out on.

141. The valley can truly be called the Valley of Lakes, which not only feeds the emerald Green River Swat but also provides ideal camping sites for adventurous people and nature lovers. Most of these lakes are hidden from the eyes of the common people due to their far-flung locations and take three to seven hours trekking to reach from the last village on the road. Exploring these miracles of nature demand endurance, patience, and courage and above all love for natural beauty. Those who possess aesthetic sense and have thirst for natural beauty ventures to explore and unravel these extravagant bounties of nature. Lakes includes the Bashigram Lake (Danda), Daral Lake (Danda), Mahodand (Fish Lake), Saidgai Lake (Danda), Kundal Lake (Danda), Izmis Lake (Danda), Pari/Khapiro (Fairy) Lake-1, Pari/Khapiro (Fairy) Lake-2 and Spin Khwar (White Stream) Lake.

#### **4.5.9 Resettlement**

142. The project will require resettlement in small proportions and the plan would be prepared for the same.

## 5. ANALYSIS OF ALTERNATIVES

143. The key function of the analysis of options is to compare feasible alternatives to the proposed project components including the 'No project' situation. The potential environmental impacts of each alternatives and feasibility of mitigation of these impacts along with their suitability under local conditions are also compared. The following options/alternatives were analyzed for the assessment of strengths and weaknesses of the proposed project:

- i. No project option/worst scenario option
- ii. Option of rehabilitating the existing road
- iii. Option of constructing a new road

### 5.1 NO PROJECT OPTION/WORST SCENARIO OPTION

#### (a) Analysis

- **Strength and opportunities**

144. If the Project is not taken up at all, then all the efforts and investments shall be saved and these will become available for diversion on another project. Furthermore, the recurring cost of the new project and its operational expenses would be avoided.

- **Weaknesses and Threats**

145. If the project is not taken up, the route will remain tedious and will inhibit easy travel to the further north. It will also mean losing opportunity of tourism to the area of vital aesthetic beauty of Pakistan from the rest of the country (through land route). The economics of the inhabitants will never revive, which was based mainly on tourism activities.

#### (b) Conclusion

146. For this proposal, the weaknesses and threats outweigh the strengths and opportunities. Therefore, No Project option, possessing the potentials of worst scenario is not recommended.

## 5.2 OPTION OF CONSTRUCTING A TOTALLY NEW ROAD

### (a) Analysis

- **Strength and opportunities**

147. A new road construction is a very good option. It will not only provide better accessibility to commute on N-95 but will also have better engineered aspects to combat floods

- **Weaknesses and Threats**

148. Although a new road would serve very well, however more private land would have to be acquired for the access/approach roads and would have significant environment and resettlements issues. The economic viability of the project when compared with other options would become not favorable.

### (b) Conclusion

149. Although apparently appealing, construction of a new road has more weaknesses and threats than the strengths and opportunities. This option, therefore, is not recommendable.

## 5.3 OPTION OF REHABILITATION OF N-95

### (a) Analysis

- **Strength and Opportunities**

150. The existing road exists even in a weak condition having only a few parts require re-alignment. At some part the road has been completely washed out but still that problem can be overcome through slight detouring from the existing alignment. The existing alignment is the shortest possible distance having access till the end and no further disturbance (mountain and tree cutting etc.) would occur to the environment including the local communities. Realignment is required for small portions.

- **Weaknesses and Threats**

151. N-95 is subjected to the flood and land sliding and may again be swept away

**(b) Conclusion**

152. The strengths and opportunities of this option are overwhelmingly more than its weaknesses and threats.

**5.4 SUMMARY OF ALTERNATIVES**

1. No project option/worst scenario option is not recommended
2. Option of construction of a new road is not recommendable.
3. Option of rehabilitation and construction of existing road along with some new alignment being the most suitable, viable and environment friendly is recommended

## 6. PUBLIC CONSULTATION AND DISCLOSURE

153. This section describes the outcome of the public consultation sessions held with different stakeholders/groups that may be impacted by the project. The consultation process was carried out in accordance with the Asian Development Bank's Safe Guard Policy Statement (ADB'SPS) 2009. The process of the public consultation proceeded as follows: -

- Meetings with regional and local officers of NHA Government of Khyber Pakhtunkhwa.
- Semi-structured interaction held with communities on construction of new road.
- Public Hearing through EPA Khyber Pakhtunkhwa to get the maximum participating role for the members of public. (To be done at the convenience of EPA Khyber Pakhtunkhwa after submission of the drafts IEE report).

### 6.1 CONSULTATION PROCESS

154. Information disclosure and public consultation and discussion with the people of the area have been done. This process was intensified during the IEE studies, and separate rounds of public consultations were held. Before and during the project execution, this process will be continued, particularly during the implementation of the EMP implementation.

155. Surveys were carried out in order to investigate physical, biological and socio-economic resources falling within the immediate area of influence of the project. Primary data collection included:

- Land demarcation, measurement and land record collection.
- Pretesting of socioeconomic survey tools in the field.
- Physical measurement of structures falling in the ROW.

156. The semi structured meeting with community representatives held in 2011 and 2012 in and around the project have the following objectives:-

- Share information with stakeholders on New National highway N-95 Project and expected impacts on aspects of affectees of the Project.

- Understand stakeholders' concerns regarding various aspects of the Project, including the existing condition of the upgrading requirements, and the likely impact of construction related activities and operation activities;
- Provide an opportunity to the public to influence Project design in a positive manner;
- Obtain local and traditional knowledge, before decision making;
- Increase public confidence about the proponent, reviewers and decision makers;
- Reduce conflict through the early identification of controversial issues, and work through them to find acceptable solutions;
- Create a sense of ownership of the proposal in the mind of the stakeholders; and
- Develop the proposals that are truly sustainable.

## 6.2 IDENTIFICATION OF STAKEHOLDERS

157. During the field survey, significant efforts were made to identify the possible categories of stakeholders and their stakes. During the field survey different stakeholders identified were the villagers, local residents, government officials, shop owners, public representative, NGO's and general public. All those stakeholders had different types of stakes according to their professions (Annex D and E).

158. Public consultations were carried out in two steps. The first step employed for the consultations carried out during the Environmental and Social Assessment studies was the identification and categorization of the stakeholders. Two types of the stakeholders were identified: the primary stakeholders, who would be directly affected by the project; and the secondary stakeholders, who would be indirectly affected by the project (or who could indirectly affect the project).

159. Subsequent to the stakeholder identification, guidelines and questionnaires (Annex A) were prepared for conducting the focus group discussions/meetings, which were arranged through contacting the key persons from the community, such as, village heads, and patwaris.

160. After completing the preparatory steps described above, the consultations were carried out in the nearby communities. During the IEE study, stakeholder meetings and focus group discussions were held around Project area. To meaningfully include the women of the area in the consultation process, separate focus group discussions were arranged during the IEE study.

161. The consultations with the secondary stakeholders were carried out in parallel to the community meetings. These consultations were held with officials and representatives of public and private departments/institutions.

### **6.3 CONSULTATION FINDINGS**

#### **Stakeholder Concerns**

162. The major fears of the people of the project area included closure of road during the construction of the road ; reduction in number of fish at Swat river and downstream due to high level of construction activity and noise level generated during construction; chance to increase the accidents. But in spite of all these, people are in the favor of construction of new national highway N-95 road project as it will facilitate them in smooth transportation across the river.

163. All of the above concerns and expectations have been adequately incorporated in the project design in the form of the mitigation measures included in the Environmental Management Plan and the communities were so informed during the consultation meetings.

### **6.4 GENDER COMPONENT**

164. A total of 80 men from the project area were interviewed by the consultant staff, as per level of awareness on the project, most men were not aware of the construction of N-95 highway. 45% had access to school, 15% had to college level education and only 5% ladies had access to university level education. This reveals that they were free in getting education if they were willing and educational facilities were available in their main cities nearby areas. On the other hand, 30% women had access to lady health visitor, 32% consult government doctor, 15% consult private doctor and 20% consult quacks in case of sickness/ailments.

### **6.5 SOCIAL FRAMEWORK AGREEMENT**

165. It is the commitment by the project proponent and the local community to work together for the successful completion of the project. It establishes bindings for both parties to minimize possible conflicts.

166. SFA shall be considered as a “follow up” of the public consultation and public hearing and indicates that NHA and the communities are mutually facilitating the construction process of national highway N-95.

**6.5.1 Parties to Agreement**

167. SFA will be signed through mutual open consent between the local village leaders and the project proponent. At least two leaders/elders will be chosen from each of the villages situated adjacent to the area where construction activity will be based. These leaders/elders will constitute a villagers committee, which will choose a Chairman among themselves.

168. SFA shall be signed by Project Director representing the project proponent and by the Chairman of villagers' which are on the way of project area representing the local community before two month start of the construction work.

**6.5.2 Agreement Contents**

169. SFA shall be prepared in the form of a legal agreement in Urdu language on a stamp paper to be provided by authorized person at the project cost. Three copies of the agreement shall be signed by both parties. All the mitigation measures described in EMP which are relevant to SFA shall be included in the agreement. The obligations of the National Highway Authority (NHA) and those of the community shall be listed clearly. Signed copies of SFA shall be kept by both parties and the Executive Engineer in charge of the Road.

The suggested format of SFA is provided in Annex - B.



## **7. SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

170. This chapter categorizes the potential impacts of the construction of National Highway N-95 on the physical, biological and social environment of the project area.

### **7.1 METHODOLOGY**

171. In order to assess the type and intensity of impacts of the project, a check list of potential impacts was developed on basis of the literature review, field surveys, investigations, and stakeholders consultations. The matrix charts the relations between the project components, and the various aspects of the physical, biological and social environment, and on the basis of this identifies the potential impacts associated with each project activity. The check list also characterizes the impacts with respect to their severity, in addition to determining whether the potential impact can be avoided through better project design and planning, or mitigated with the help of appropriate measures to be taken during the project execution. The check list of potential impacts is presented in Table 7.1. The potential impacts thus identified are discussed in the following sections.

### **7.2 IMPACT ASSESSMENT - OVERVIEW**

172. The Initial Environmental Examination (IEE) study has disclosed that the project is not likely to have any severe negative impacts on the environment and people of the area. All the potential impacts which have been identified during the present assessment are associated with the construction stage of the project, and mild to moderate in severity; and can easily be avoided (through good design and construction planning) or mitigated (through proper implementation of the EMP as shown in Table 7.1.

173. On the other hand, the project will be beneficial; job opportunities particularly for the local population during construction stage. In addition, the social assistance activities at the road will greatly enhance the project benefits for the local communities. Significant social indicators of the project benefits are mentioned below:

- Improvement in infrastructure pertaining to the roads, bridge, communication and other social amenities.
- Significant changes in sustainable development;
- Permanent health care services;

- Improvement in educational facilities;
- Improvement in market access;
- Emergency preparedness
- Enhancement in agricultural/livestock/fisheries produce.

**Table - 7.1: Check list of potential impacts for Construction and Operational Phases**

Environmental Aspects (Construction Phase)		Impact Categorization								
		Mild			Moderate			Severe		
		*	**	***	*	**	***	*	**	***
<b>1. Land Resources</b>										
1.1	Borrow area for extraction of materials from borrowing site.								✓	
1.2	Site for disposal of waste generation and disposal of waste material					✓				
1.3	Location of labor camps, material camps, equipment yards and approach roads					✓				
1.4	Access tracks					✓				
1.6	Land contamination due to spill of lubricates, fuel, chemicals and other waste materials.								✓	
1.7	Contamination from diesel and other spills from construction machinery					✓				
1.8	Drainages paths roads crossed. Damages by moving machinery					✓				
1.9	Installation of batching plants					✓				
1.10	Waste disposal Management								✓	
1.11	Agriculture land and crop Damage						✓			
1.12	Any discharge or diversion of water to a graveyard or archaeological site		✓							
1.13	Electrical and mechanical works	✓								
1.14	Construction of road								✓	
<b>2. Hydrology and Water Resources</b>										
2.1	Impact on source of construction water					✓				

Environmental Aspects (Construction Phase)		Impact Categorization								
		Mild			Moderate			Severe		
		*	**	***	*	**	***	*	**	***
2.2	Contamination of surface water due to diesel and other fluids spilling over to river water from machinery.	✓								
2.3	Protection of construction work from floods								✓	
2.4	Obstruction of flow of water down stream								✓	
2.5	Impact of dismantling of Old road							✓		
<b>3. Air Quality and Noise Pollution</b>										
3.1	Dust and smoke and other pollutants from plants and equipment's.								✓	
3.2	Dust or other pollutant from stored materials and spoil heaps	✓								
3.3	Smoke from burning of waste materials or burning fire wood					✓				
3.4	Noise control from use of old or outdated machinery					✓				
<b>4. Biological Resource</b>										
4.1	Damage to biological resource flora, fauna, biota								✓	
4.2	Impact of construction and dismantling of coffer dam on aquatic life					✓				
<b>5. Socioeconomic and Cultural Issues</b>										
5.1	Existing services; education health, electricity, and water supply	✓								
5.2	Land ownership and land acquisition if required						✓			
5.3	Access to other construction materials					✓				
5.4	Effects on sites of archeological, historical, cultural or religious significance	✓								
5.5	Public safety at construction sites								✓	
5.6	Health and safety of labor and					✓				

Environmental Aspects (Construction Phase)		Impact Categorization								
		Mild			Moderate			Severe		
		*	**	***	*	**	***	*	**	***
	employees on construction site									
5.7	Employment				✓					
5.8	HIV/AIDS and other communicable diseases.	✓								
5.9	Aesthetic / scenic value				✓					
Key:										
		* Avoidable through design (Preventive)								
		** Mitigation through contractor's obligation or through SFA								
		*** Non-reversible permanent change.								

### 7.3 EXPLANATION OF THE IMPACT ASSESSMENT

174. Table 7.1 above provides a schematic presentation of the degree, significance and mitigability of various environmental and social factors at construction and operational phases. This section provides a brief explanation of each factor, also suggesting a line of action towards mitigation measures for the adverse impacts.

#### 7.3.1 Construction Phase

##### 7.3.1.1 Land Resources

#### I. Site for disposal for waste construction material

175. There is hardly any cutting involved. Most of the work comprised of steel and concrete materials for the construction of road. There would, therefore, shall not be much waste material for disposal or burial. If any such material does need disposal, enough land for that is available on either bank of the river Swat. The waste material disposal is moderately significant but mitigable factor.

#### Mitigation

176. To be made contractor's responsibility through contract document to dispose off the construction waste material appropriately.

## II. Location of Labour Camps, Material Depots, Equipment yards and approach roads

177. Because of availability of ample area belonging to government, location of labour camps, material depots, equipment yards and approach roads will not cause any serious problem. So this is a matter of slight significance and is easily mitigable and manageable.

### Mitigation

178. The contractor will, in consultation with project director (NHA), resolve the exact location of all these facilities within the government land.

## III. Contamination from Diesel and other oil spills from Construction machinery

179. At places it may be inevitable and may exceed the maximum permissible limit. This is mitigable through effective application of the maximum spill regulations.

“Guide Lines for Oil Spill Waste Minimization and Management issued by International Petroleum Industry Environmental Conservation Associate are as follows:-

- **Soil contaminated by minor spills/leakages** (defined as leaks from vehicles, machinery, equipment or storage containers such that the area and depth of soil contaminated is less than 10 sq ft and 3 inches respectively) is to be scraped and burnt in a burn pit.
- **Moderate spills** defined as spills of volume less than or equal to 200 liters is to be contained and controlled using shovels, sands and native soil. These equipments and materials are to be made available at camp sites during the operation. The contaminated soil is to be excavated and stored in a burn area lined with an impermeable base. Depending on the volume, the contaminated soil is either disposed-off through by specialized treatment such as bioremediation or through approved contractor.
- **Major spills** (defined as spills of volume much greater than 200 liters) require initiation of Emergency Response Procedures and Oil Spill Contingency Plan. These spills are to be handled and controlled

according to the Plan and require special treatment such as bioremediation and through approved contractors.

**Mitigation**

180. Contractor's contractual obligation to impose strict rules on his workers and labour and ensures that no spill are caused. If it the spills, do take place, it must be followed by the treatment prescribed above as per the degree of spill.

**IV. Damage to, roads, cross drainages by machinery**

181. Such a situation can arise through carelessness of the heavy machinery drivers/operators. Such carelessness can cause considerable damage to paths, roads and drainages if the drivers/operators are not made aware, trained and bound to be careful. An effective sinology can reinforce the instructions to drivers. It is a concern of moderate significance but is mitigable through care and regulation.

**Mitigation**

182. Contractor's contractual obligations to impose strict control over operators and drivers of all types of vehicles. Should the damage take place, the contractor must be bound to carry out repair immediately.

**V. Earthen Embankments or Concrete work, Edge Scouring**

183. Must be dealt at design stage. Wherever such a situation is anticipated, aprons should be provided to secure edges and specifications must be kept of high standards. Moderately significant but is a mitigable aspect.

**Mitigation**

Design stage and strict application of Operational Manual.

**VI. Discharge from unstable slope or leakage on construction**

184. Such an impact can destroy the structure leading to unprecedented damage. Though significant, it can be set aside through a careful planning of the work. If such a situation does appear, it becomes highly significant though a mitigable impact.

**Mitigation**

185. Contractor's contractual obligation to not to let such leakage develop. Should such leakage develop, the contractor must remain fully prepared to

immediately control the discharge.

**VII. Any discharge spill or dumping onto any building or houses (private land) on river bank**

186. No such situation has been noticed during surveys. Should a situation present itself during project implementation it will be a moderately significant but a mitigable problem. Should a situation to such an effect present itself during project implementation, the owner may be compensated by the contractor.

**Mitigation**

Contractor's contractual obligation to compensate such losses.

**VIII. Any discharge spill or dumping out to any graveyard or burial**

187. No such situation has been noticed during surveys. Should a situation present itself during project construction, it will be moderately significant but a mitigable problem. Should a situation to such an effect, present itself it will be a moderately significant but mitigable problem. The contractor shall be duty bound to restore the protection wall of graveyard through appropriate rip-rap work or pay damages to the community.

**Mitigation**

188. Contractor's contractual obligation to compensate the community either by getting the graveyard protection wall repaired and covered with rip rap work or paying the community an amount as compensation with which the community can get the repair done.

**IX. Impact of taking borrow material from earth borrow site**

189. Excavation and cutting activities could place adverse environmental impacts including sliding, soil erosion and drainage on the surrounding areas.

**Mitigation**

190. No private land is acquired for the borrow areas:

- The Contractor will ensure that selected borrow areas are clearly demarcated including the allowed depth of the excavation before starting excavation.
- The borrow areas will be leveled. The Contractor will not leave the borrow pits in such a condition that they are unsuitably filled with rain water and cause the problem for the community.

- If the borrow area is near to the settlements then it should be fenced completely.
- If agriculture land needs to be used as borrowing area then the Contractor will adopt the following methods during the digging process.
  - Fix the location of excavation.
  - Remove thirty centimeters of the top soil and keep it on reserved site for re-spreading in the field.
  - Excavate up to one meter depth.
  - Maintain the slope as far as possible.
  - Place the top soil back during the restoration process.
  - Pay compensation for any crop losses.

**X. Impact on roads used for transport of construction materials**

191. Main roads on either side of the river to convey men and material to the construction sites. This will cause additional wear and tear and raise considerable dust. It will be a moderately significant but mitigable impact.

**Mitigation**

192. Contractor's contractual obligation to use the roads and paths carefully and in case of any damage, repair the damaged paths. On Kacha roads water shall be sprinkled daily.

**XI. Impact of stone quarrying**

193. Stones shall be procured from nearby quarries. This will not cause any impact on the immediate project area except that the vehicles carrying the stone shall exert additional traffic load on the roads leading to the project area. By keeping the roads dust free and repaired, only a slight influence is expected on the immediate project area.

**Mitigation**

194. Contractor's contractual obligation to use the road network carefully and repair any damages immediately.

**7.3.1.2 Hydrology and Water Resources**

**I. Source of construction water**

195. Ordinarily the river water is suitable for the construction work. If obtained



from elsewhere, it must be compensated.

**Mitigation**

196. Contractor's contractual obligation to pay for water obtained from source other than the river.

**II. Source of surface water**

197. Contractor's labour will use river water, like other people living or working near the river banks, for washing etc. The contractor may however, arrange to pump water from the river and supply running tap water to his workers. The contractor shall ensure a system of pit latrines or a set of temporary flush system latrines. All sewerages to be treated through septic tanks linked with soak pits.

**Mitigation**

198. Contractor's contractual obligation to supply running tap water, pit latrines/ flush latrines in the land near the camp. All sewerages to be treated through septic tanks linked with soak pits.

**III. Source of drinking water**

199. Communities along river banks are sufficiently advanced to install tube wells and hand pumps for obtaining good quality drinking water. Similar arrangements can be made by the contractor for his labour camps. Drawing water for drinking from aquifer shall neither cause any significant change in the under water reservoir, nor the river which recharges it. This impact can be considered as slight.

**Mitigation**

200. The contractor should tap the underground reservoir and install hand pumps or tube well with overhead tank to supply drinking water to the labour and workers. The quality of drinking water should be monitored periodically.

**IV. Diesel and other fluids spilling over the River from construction machinery**

201. Contamination from Diesel and other fluids spilling from construction machinery over river waters, river bed or river banks, as per description of oil spills given under land.

**Mitigation**

202. Contractor's contractual obligation to not to let it happen. Should it cross the permissible limits, ways and mean should be adapted to effectively control it according to the standard specifications for limits on spills.

**V. Protection of construction work from floods**

203. A suitable flood warning system and full arrangements to save the New Construction from floods shall be in position. Flood impact is of high significance and is mitigable.

**Mitigation**

204. Contractor's contractual obligation to make fool proof arrangements in advance to protect the on going construction works from floods. However the construction is aimed to complete within low flow season.

**VI. Effect of surface flow conditions**

205. Must be addressed mainly at Design Stage. The impact is significant and mitigable.

**Mitigation**

206. Design Engineer to accommodate this factor in the design so as to avoid negative impacts. Contractor to follow the Design Specifications meticulously.

**7.3.1.3 Air Quality and Noise Pollution****I. Dust and smoke and other pollutants from construction machinery**

207. This impact is inevitable, moderately significant but mitigable.

**Mitigation**

208. Contractor's contractual obligation to keep the dust and smoke low by using machinery which is well maintenance and is almost noiseless. And all Kacha roads and paths are sprinkled with water many times a day.

**II. Dust or other pollutions from stored material**

209. This is also inevitable, moderately significant and mitigable.

**Mitigation**

210. Contractor's contractual obligation to keep the dust and smoke by carefully storing and distributing the construction material so as to cause minimum dust

which again will be within the acceptable limits.

### **III. Smoke from burning of waste material or burning firewood**

211. A large number of big and small fires in the labour camp can produce smoke and smog which can cut off visibility, reduce trafficability and cause suffocation alongwith causing diseases of the respiratory tract.

#### **Mitigation**

212. Contractor's contractual obligation to use clean and smoke free fuel in the labour camp. Cutting and burning trees/shrubs for fuel shall be prohibited. Instead Gas Cylinders should be used in the labour camp for cooking purposes.

### **IV. Noise from use of old or outdated machinery**

213. Old and poorly maintained machinery generates higher decibels of noise. If the machinery is new and well maintained, its noise is far too less and is within tolerable limits. Also noise controlling gadgets (ear plugs) can be used to cuts off the noise for those who work in the close vicinity of heavy machinery.

#### **Mitigation**

214. Contractor's contractual obligation to use new, well maintained and low noise machinery preferably during day time. The drivers, operators and workers working on or near the heavy machinery must be provided ear plugs.

### **V. Noise due to blasting**

215. Blasting will not be involved in N 95 Road project.

#### **Mitigation**

216. Contractor's contractual obligation not to cause blasts as envisaged in project design. But should it become necessary, it should be done with the permission of Project Director (NHA) and all measure should be adapted so as to minimize the impact of one time blast. All explosions must be performed under specialist supervision.

### **VI. Soil Compaction due to labour camps, and machinery yards**

217. The human and mechanical activity normally compacts the soil and turns it nonproductive.

**Mitigation**

218. Contractor's contractual obligation to mitigate the impact of compaction and leave the site almost in the same state in which it is occupied. Pictures of the area should be taken before handing it over to contractor which will help the Project Director (NHA) to ensure an acceptable state of soil while getting the area back from the contractor.

**7.3.1.4 Biological Resources****I. Damage to biological resources Flora, Fauna (Biota)**

219. Major change is expected in the habitat of the natural flora or fauna of river due to construction activities i.e., piling up of waste materials on natural flow of river. Aquatic life will be disturbed if Contractor deviates from following the EMP.

**Mitigation**

220. Contractor's obligation not to cause any additional destruction to Flora and Fauna of the area by respecting the limits of construction site and not to enter other territories. No unauthorized tree or bush cutting should be allowed. Should it be necessary, it should not be done without an express permission of the Project Director (NHA). Special attributes towards aquatic life persistence in the river Swat is Contractor's responsibility.

**II. Damage to Fisheries**

221. No damage to fisheries is envisaged. Construction will take place in adherence to the measures written in EMP. No waste would be allowed to disposed-off in the river.

**Mitigation**

Easily mitigable during construction phase

**III. Impact on migratory birds**

222. Swat River at the point of the project does not fall on the recognized route of globally recognized migratory water fowl or ducks. However a number of migratory birds do pass this way and stay for wintering in the project area. Since the water: land ratio is not going to change, there shall be no or slight influence of the new road on the temporary habitat of the migratory water birds.

**Mitigation**

223. Contractor's contractual responsibility to facilities a regular inspection by the Wildlife Department to ensure that the process of construction does not cause any hindrance to the migratory birds.

**7.3.1.5 Socioeconomic, Cultural and Archaeological Issues**

224. The socioeconomic cultural and archaeological impacts can be:-

- I. Disturbance to existing services: education, health, electricity, water supply or signboards.
- II. Aggravation of any disputes on land ownership.
- III. Aggravation of any tribal tensions and local rivalries on disputes on river water on aquatic life.
- IV. Adverse effects on known archaeological sites.
- V. Chance finds
- VI. Dealing with chance finds.
- VII. Dealing with graveyards or burials.
- VIII. Problems to Health and Safety of labour and employees on construction work and provision of safety equipment to workers on site.
- IX. Employment of locals on the project.
- X. Rise in prices of essential commodities.
- XI. Social reunion over the new road construction..
- XII. Gender Issues.
- XIII. Recreational facilities for public.
- XIV. Any spots of religious significance e.g. Mosques, Tombs and Shrines etc.

**Mitigation**

1. For matters pertaining to social obligation and benefits of the communities, a social Framework Agreement shall be signed by the Project Director (NHA) with communities to ensure their participation and full satisfaction in matters pertaining to them. SFA shall be signed when the construction work is about to start.
2. Grievance Redress System will facilitate any complainant
3. All matters where contractor is involved, these should be made as his contractual obligations.

## **8. ENVIRONMENTAL MANAGEMENT PLAN (EMP)**

### **8.1 BACKGROUND**

225. This chapter describes the potential impacts of the Project on the environmental and social setting of the Project area. The chapter also deals with the proposed actions for mitigation of environmental hazards and resettlement/compensation requirements of the Project.

226. Initial Environmental Examination has been carried out in line with ADB SPS 2009. The assessment has generally been based on the factual site condition in the light of experience gained from similar projects and discussions held with the local communities and knowledgeable people.

227. Impact is any change in environment whether adverse or beneficial wholly or partly resulting from an organizational activity, product or services. Environmental impact is the repercussions of an activity or specific land use on the physical/social environment as a consequence of emissions, waste disposal, water and power usage, etc.

The proposed subproject has the following two major activities:

- Construction and Rehabilitation of existing road
- Construction of a new belly bridge

The proposed project locates on Chakdara-Mingora-Manglour-Kwazakhela-Madyan-Bahrain-Kalam on N-95.

### **8.2 ENVIRONMENT MANAGEMENT PLAN (EMP)**

228. Environmental Management Plan (EMP) is aimed at mitigating the possible adverse impact of a development project and for ensuring to maintain the existing environmental quality. The EMP addresses all aspects of planning, construction and operation of project, which are relevant to environment. It is essential to implement the EMP right from the planning stage and then continuing it throughout the construction and operation stage. Therefore the main objective of the EMP is to identify the project specific activities that would have to be considered for investigation of the significant adverse impacts and the mitigation measures required. An EMP is actually that part of an overall management plan that includes policy development, organizational structure, planning activities, responsibilities, practices, procedures, processes, and resources for developing, implementing, achieving, reviewing, and maintaining the environmental program and achieving environmental goals.

229. Environmental mitigation, compensatory mitigation, or more often simply called "mitigation", are terms for systems put in place by the government whereby known impacts to a natural resource are made less severe through performing some type of environmental work. To "mitigate" means to make less harsh or hostile. It involves Environmental Management Plan. The purpose of the Environment Management Plan is to provide an environmental policy framework to achieve.

### **8.2.1 Objectives of Environmental Management Plan (EMP)**

230. The EMP will help the NHA; address the upcoming adverse environmental impacts of the proposed repairing/maintenance of Highways. It will enhance the Project's overall benefits and introduce standards of good environmental practices.

The primary objectives of the EMP are to:

- Define the responsibilities of the Project proponents (institutional and organizational arrangements) in accordance with the three Project phases (design, construction and operation);
- Facilitate the implementation of the mitigation measures by providing the technical details of each Project impact, and proposing an implementation schedule of the proposed mitigation measures;
- Define a monitoring mechanism and identify monitoring parameters to ensure that all proposed mitigation measures are completely and effectively implemented;
- Identify training requirements at various levels and provide a plan for the implementation of training sessions;
- Identify the resources required to implement the EMP and outline corresponding financing arrangements; and
- Providing a cost estimate for all proposed EMP actions.

### **8.2.2 Framework of Environmental Management Plan**

231. The Framework of Environmental Management Plan includes identifying and evaluating environmental risk, organizing and managing environmental responsibilities, evaluating the quality of the environment and determining how it is affected by the organizational mission and conducting a self-evaluation of the effectiveness of the EMP in achieving desired levels of environmental performance.

232. Depending on project/development, the scope of EMP encompasses the following areas of concern:

- Civil work for the proposed project

- Operational activities
- Discharges: Effluent and Emissions
- Personal Protective Equipment
- Waste Management
- Waste Water Management
- Biological Hazards
- Emergency Response Plans
- Conservation of Flora and Fauna
- Spill
- Noise Control
- Litter and Solid Waste Management
- House keeping
- Air Quality
- Transportation Management
- Environmental Management
- Environmental Monitoring
- Environmental Audit

### 8.3 KEY ENVIRONMENTAL AND SOCIAL COMPONENTS

233. The key environmental and social issues associated with this Project are as follows:

- Appropriately locating temporary construction camps, asphalt plants, and waste disposal sites and the environmental impact of operating these facilities;
- Minimizing discharges from construction equipment and inducing pollution abatement controls (vibration and noise etc.)
- Regulating the procurement of borrow material and topsoil erosion during construction;
- Avoiding the obstruction of drainage system during construction and operation;
- Enhancing and maintaining avenue tree plantation along the entire length of the project corridor;
- Minimizing the impact on cultural sites or structures and community-owned assets during construction and operation; and
- Ensuring pedestrian and traffic safety during construction and operation



#### **8.4. ROLE OF FUNCTIONARIES FOR IMPLEMENTATION OF EMP**

##### **8.4.1 General**

- This sub section describes the methodology required for the implementation of EMP in conjunction with the NHA, and Contractors. The executing agency of the Project will be National Highway Authority (NHA). General Manager NHA (FERP) will be the overall In charge of the Project. The GM NHA (FERP) will delegate the supervisory responsibilities of the Project to the Project Director who will have professional staff supported by a team of consultants including Environmental Monitoring Specialists/Consultants.
- Relevant provincial Environmental Protection Agency (EPA) will act as the overall regulatory body. The specific roles of key functionaries are described hereafter.

##### **8.4.2 National Highway Authority (NHA)**

- Project Director  
The Project Director (NHA) will be responsible for the successful implementation of the Project. He will be assisted by the Supervision Consultants.
- Project Director  
The project director will ensure that all the mitigation measures committed for the design phase are incorporated in the design and included in the contract documents.
- Project Director  
Project Director shall ensure that EMP be made a part of the contract agreement
- Director Environment Afforestation, Land and Social (EALS)  
The Director (EALS) will be the overall Incharge for handling the NHA's obligations with respect to the EMP. The Director (Environment, Social and Land/Resettlement) will depute one environment specialist for the Project, who will be responsible for ensuring that the provisions of the EMP are implemented. In addition, the Environment Specialist will also coordinate with the relevant EPA, provincial Agriculture, Forest and Wildlife departments, NGOs and other public private sector organizations if required.
- Environment Specialist will assist the project director for the execution of Environmental Management Plan (EMP) for each Package of the Project. In addition, the Environment Specialist will also train the stationed staff on environment related issues.

- Director (EALS) will be responsible for the land acquisition and resettlement related issues (if required).
- EIA/IEE Consultants will prepare a comprehensive EIA and EMP of the Project in compliance with Pakistan Environmental Protection Act (PEPA 1997) and ADB Guidelines (Safeguard Policy Statement 2009).
- Supervision Consultants appointed by the GM NHA (FERP) will be headed by a "Project Manager", who will be an Engineer. He along with his team will supervise the Project contractors to ensure quality of work and fulfillment of contractual obligations. The Supervision Consultants (SC) will provide one Environmental Specialist/officer who will:
  - Ensure that all the environmental and social parameters/provisions comply with the applicable standards;
  - Ensure that day-to-day construction activities are carried out in an environmentally sound and sustainable manner;
  - Organize periodic environmental training programs and workshops for the Contractors' staff and NHA site staff in consultation with the NHA; and
  - Develop "good practices" construction guidelines to assist the Contractors and NHA staff in implementing the EMP.

#### **8.4.3 Construction Contractor**

234. EMP shall be made a part of the contract agreement and the contractor will ensure that all Project activities are in compliance with the EMP and NEQS.

Construction Contractor shall ensure the following:

- Safe Working conditions; provisions of PPE's to workers
- Traffic signage and control
- Avoid conflicts with locals
- Reporting of every incident/accident to NHA
- Regular monitoring and reporting of compliance with contractual environmental mitigation measures as per EMP.

### **8.5 SPECIFIC IMPLEMENTATION RESPONSIBILITIES**

235. This section describes the implementation and supervision responsibilities for the different phases of the Project:

#### **8.5.1 Design Phase**

236. The Director (EALS), NHA and his staff with the assistance of EIA consultant/Environment Specialist are responsible for ensuring that the Project

design and specifications adequately reflect the EMP and the Resettlement Policy Framework (RPF). He will ensure the Project's compliance with environmental regulations and donor requirements; and ensure stakeholder participation in the Project design.

237. The responsibilities of Director (EALS) are described as follows:

- To coordinate with regulatory agencies including EPAs, EIA consultant, local NGOs, that could assist the NHA in independent reviews of environmental and social compliance;
- To supervise environmental and social assessment reports, and provide substantial inputs and guidance to the EIA consultants;
- To get the approval of EIA from the relevant provincial EPA; and
- To ensure that the design consultant has incorporated all the mitigation measures proposed for the design phase in the design and included in the contract documents.

#### **8.5.2 Construction Phase**

238. The NHA will appoint Supervision Consultants, who along with the Deputy Director (EALS) and Environment Specialist will oversee the working of contractor in accordance with the EMP:

- The Supervision Consultant will liaise with the Project staff to monitor environmental compliance during the construction
- He will supervise the construction and provide technical support to help ensure compliance with the EMP
- The Supervision Consultants will assess the environmental impact of road/bridge construction
- He will monitor the progress of work and adherence of the contractor to the EMP and Resettlement Action Plan and
- He will direct the Contractor to work in such a manner that all Project activities are in compliance with the EMP and NEQS.

#### **8.5.3 Operation Phase**

239. The Deputy Director (EALS) and the staff will be responsible for the following:

- Coordinating with the operational staff working under the Project Director to monitor environmental compliance during Motorway operation;
- Advising on, and monitoring tree plantations along the Highway;
- Reporting on the progress of environmental compliance to the federal and relevant provincial EPA (if required);
- Assessing the long-term environmental impacts of highway operation;

- Sustaining a working partnership among the NHA, Relevant provincial EPA, relevant Agriculture, Forest and Wildlife department, NGOs and other related public private sector organizations; and
- Reporting to Director (EALS) about progress of the work, who will report to GM NHA (FERP)

## **8.6 ENVIRONMENTAL ASPECTS**

### **8.6.1 Civil Work**

240. National Highway Authority (NHA) during civil work will ensure:

- Reconcile environmental and safety conflicts
- Communicate responsibilities to the individuals
- Communicate safety procedures to the relevant staff and contractor
- Develop mechanism of interaction between NHA managers and Contractors
- Handle all materials safely
- Enforce the use of PPEs
- Provide information related to fire extinguishers
- Provide information related to first Aid

### **8.6.2 Construction Operations**

241. The following measures should be adopted by NHA during construction operations:

- Gaseous Emission

242. The gaseous emissions from the Mixing plant, Compressors, Generators and other machinery involved in road construction will be monitored as per the legal requirement of the country and the contractor should be forced to keep the gaseous emission within the limits set by NEQS.

- Vehicle Operation

243. National Highway Authority (NHA) has to develop a procedure for the safe movement of vehicles within the site. Mostly, cars, four-wheel drive pickups, fork lifters and trucks will be used for transporting people and equipment around the proposed project area. The control measures given below will apply to the transportation:

- Limit vehicle speed to avoid accidents.

- Allow vehicles which are properly tuned and which do not emit abnormal exhausts.
- Allow vehicles with proper exhaust mufflers (silencers).
- Ensure that the vehicles are not washed or repaired at the proposed site. In case it is unavoidable, ensure that the effluents/washings are not released before treatment.
- Periodic checks for leaks under all operating vehicles; contaminated soil should be removed by proper disposal.

## **8.7 EMERGENCY PLAN**

244. National Highway Authority (NHA) will develop an Emergency Preparedness and Response Procedure to handle any emergency arising during any operational activity:

- Large scale leakage oil and any other hazardous material (over 200 liters).
- Uncontrolled fire in diesel or oil tanks etc.
- Accidents related to health; falling, cuts, broken bones etc.

## **8.8 ENVIRONMENTAL MANAGEMENT**

245. NHA shall ensure that Contractor demonstrates high environmental performance by controlling the impacts of the activities especially those affect the environment. The contractor control the hazards identified by the risk assessment in alignment with the environmental policy & objectives.

## **8.9 MONITORING**

246. The success of any environmental management plan depends upon effective monitoring. NHA will ensure strict adherence to the environmental control measures and disciplines through monitoring. Monitoring activity will also provide a record of all incidents of environmental significance and related actions and mitigation measures. In addition, it will facilitate the evaluation of effectiveness of the control measures and the identification of any additional mitigation measures needed. NHA shall also ensure that all activities are carried out in accordance with ADB's SPS 2009.

### **8.9.1 Monitoring Approach**

247. The following types of monitoring will be conducted during the construction activity by NHA:

- Confirmation through Rapid Environment Assessment (REA) Checklist and Pakistan Environmental Protection Act (PEPA) 1997, regarding the indication of the monitoring category in which the proposed construction project will fall.
- Environmental monitoring will be carried through a certified environmental laboratory as per country's requirement.
- NHA will conduct monitoring of gaseous Emission, dust and Effluents (if required) as per the regulatory requirements.

#### **8.10 ENVIRONMENTAL MITIGATION PLAN**

248. The Environmental Mitigation Plan based on the mitigation measures are presented in Table below:

Table - 8.1 Environmental Mitigation Plan (EMP)

Project Activities	Type of Impact	Potential Impacts on Environment	Where the Impact is likely to happen	When the Impact is likely to Occur	Magnitude of Impacts	Mitigation Measures	Institutional Responsibility	
							Implementation	Supervision
PRE CONSTRUCTION ACTIVITIES								
Acquisition and Disturbance to Cultural properties	Social Impacts	Impact on Mosques, madrasas, graveyards and archeological sites	To be checked all along the project corridor	At planning Stage	Low	<ul style="list-style-type: none"><li>During construction activities avoid any interference with cultural heritage sites.</li><li>In case of unavoidable interference prior notification and consultation needed for consensus on options e.g. relocation/rebuilding) or any other form of agreed compensation</li></ul>	NHA in bid documents for contractor, Design Consultant, Environment Specialist	NHA / Environment Specialist/supervision consultant
Planning Material Balance	Physical environment/ ecological	Avoidable loss of agricultural land for dump sites, borrow area Pollution of water bodies through	To be checked all along the project corridor	At planning Stage	Low	<ul style="list-style-type: none"><li>Prepare material plan</li></ul>	Design Consultant, Contractor	NHA/supervision consultant

Project Activities	Type of Impact	Potential Impacts on Environment	Where the Impact is likely to happen	When the Impact is likely to Occur	Magnitude of Impacts	Mitigation Measures	Institutional Responsibility	
							Implementation	Supervision
		dumping of spoil material						
<b>Planning site activities</b>	Physical environment	Health & Safety issues, Construction causes danger to workers, locals	To be checked all along the project corridor	At planning Stage	medium	<ul style="list-style-type: none"> <li>• Prepare health and safety plan</li> <li>• Proper hygiene to be maintained during construction activities</li> </ul>	Design Consultant	NHA/supervision consultant
<b>Restoration of Flora and Fauna</b>	Botanical / Ecological Impacts	Poaching and Hunting  Cutting of trees and shrubs of different species	Within the RoW	At planning stage	Medium	<ul style="list-style-type: none"> <li>• “No Hunting” and poaching will be allowed</li> <li>• “No Hunting” signs will be posted in adequate numbers at appropriate locations.</li> <li>• The sufficient amount of plantation will be done on the both sides. Contractor will furnish and get approval for the planting ratio.</li> <li>• If a tree of rare species is growing within the RoW and is required to be removed. It will be uprooted and transplanted in close consultation with the forest</li> </ul>	Design Consultant, Contractor	NHA/supervision consultant



Project Activities	Type of Impact	Potential Impacts on Environment	Where the Impact is likely to happen	When the Impact is likely to Occur	Magnitude of Impacts	Mitigation Measures	Institutional Responsibility	
							Implementation	Supervision
						department. • Efforts should be made to save as many trees as possible even if they are young. Proper irrigation and maintenance of plants will be done. • Awareness to be provided to workers and locals on the importance of trees		
<b>CONSTRUCTION PHASE</b>								
<b>CAMP SITE AND CONSTRUCTION WORKS</b>								
<b>Grievances</b>	Social Impact	Social Disputes	Valid for entire construction area throughout construction period	Throughout FERP	low if recommendations are followed	• Official in charge of people Grievance will be designated. • A leaflet outlining environmental protection measures and listing grievance contact points will be distributed. • Community leaders will be	PMU, Contractor	NHA, supervision consultant, Contractor, Grievance Specialist

Project Activities	Type of Impact	Potential Impacts on Environment	Where the Impact is likely to happen	When the Impact is likely to Occur	Magnitude of Impacts	Mitigation Measures	Institutional Responsibility	
							Implementation	Supervision
						<p>given detailed information on the grievance management process</p> <ul style="list-style-type: none"> <li>• NGOs will be informed in the same manner as the community leaders.</li> </ul>		
<b>Establishment of Construction Camps</b>	Physical	<p>Damage of topsoil</p> <p>Contamination related to fuel storage and fuelling operations</p> <p>Sewerage related contamination</p> <p>Waste Management</p> <p>Materials storage,</p>	Valid for entire construction area throughout construction period	Throughout FERP	Low if recommendations are followed	<ul style="list-style-type: none"> <li>• Proper construction camp management in compliance with Construction Camp Management Plan;</li> <li>• The camp should be preferably 500 meters away from the nearest population</li> <li>• The camp should be erected on the government land or on other wise compensated private land</li> <li>• Careful clearing of vegetation should take place and the top soil removed should be carefully placed to be replenished after the construction period</li> </ul>	Design Engineer, Contractor	NHA, , supervision consultant Environment Specialist, Contractor

Project Activities	Type of Impact	Potential Impacts on Environment	Where the Impact is likely to happen	When the Impact is likely to Occur	Magnitude of Impacts	Mitigation Measures	Institutional Responsibility	
							Implementation	Supervision
						<ul style="list-style-type: none"> <li>• Proper waste management in compliance with Waste Management Plan</li> <li>• Awareness/training to be provided to the worker so that to minimize creation of waste</li> <li>• All solid waste to be contained and then disposed off in a specified area, that should preferably be 500 meters away from any population</li> <li>• The solid waste area should be covered with thin layer of soil every second day</li> <li>• Proper material storage should take place only in designated places and appropriate containers. Proper spill management in compliance with Spill Management Plan;</li> <li>• Spill kit to be made</li> </ul>		

Project Activities	Type of Impact	Potential Impacts on Environment	Where the Impact is likely to happen	When the Impact is likely to Occur	Magnitude of Impacts	Mitigation Measures	Institutional Responsibility	
							Implementation	Supervision
						available at construction camp site <ul style="list-style-type: none"> <li>Any oil/chemical spill should be reported.</li> <li>All such spills should be contained in secured drums to be disposed-off through approved waste disposal contractors</li> </ul>		
<b>Human activities on site, Travel to and from construction camp</b>	Socio-cultural, Environment	Noise and additional traffic.	Several sites along roadside for construction camp sites	Throughout construction period	Low if recommendations are followed.	<ul style="list-style-type: none"> <li>Prior consultation with locals</li> <li>Contractor need to obtain NOC for sitting construction camps &amp; workshop, or agreement made with the landowner</li> <li>Camp Site construction to be supervised</li> <li>Proper storage and fencing/locking of storage rooms containing hazardous material</li> <li>Setting up of complaints office, advertising ways to</li> </ul>	Contractor	NHA, , supervision consultant Environment Specialist, Contractor

Project Activities	Type of Impact	Potential Impacts on Environment	Where the Impact is likely to happen	When the Impact is likely to Occur	Magnitude of Impacts	Mitigation Measures	Institutional Responsibility	
							Implementation	Supervision
						voice complaints		
<b>Burning of wastes at or near camp sites</b>	Physical environment	Air pollution associated with burning garbage. Solid liquid waste generated	Along campsites	throughout construction	Medium	<ul style="list-style-type: none"> <li>Sitting for work camp, including waste dump sites, in distance closer than 500 meters to any inhabited areas</li> <li>Prepare plan for safe handling, storage and disposal of harmful/hazardous materials</li> <li>Burning of waste will be disallowed</li> </ul>	Contractor	NHA, , supervision consultant Environment Specialist, Contractor
<b>Construction Activities and Accident Risks through transportation of material</b>	Health & Safety	Minor And major injuries, can even lead to fatalities in case of ignoring safety practices	Various construction sites throughout project corridor	During construction	High	<ul style="list-style-type: none"> <li>Safety signs will be installed on all temporary routes during construction.</li> <li>Strict enforcement of traffic rules and regulations.</li> <li>Workers will be provided safety equipment such as safety shoes, helmets, masks, and safety goggles.</li> </ul>	Contractor	NHA, , supervision consultant Environment Specialist, Contractor

Project Activities	Type of Impact	Potential Impacts on Environment	Where the Impact is likely to happen	When the Impact is likely to Occur	Magnitude of Impacts	Mitigation Measures	Institutional Responsibility	
							Implementation	Supervision
						<ul style="list-style-type: none"> <li>First aid facilities will be available at construction and camp sites</li> <li>Training on First Aid to be given to the workers</li> <li>Contact details of nearest hospital, ambulance service will be displayed on all construction sites</li> <li>Road safety education will be imparted to drivers of construction vehicles.</li> <li>Traffic management will be ensured during Construction periods.</li> </ul>		
<b>Loss of Access</b>	Traffic congestion	Air pollution & fatigue	Various construction sites throughout project corridor	During construction	Medium	Alternate/temporary routes will be provided at all interchanges, bridges, and culverts	Contractor	NHA, Environment Specialist, Contractor
<b>Health and safety at work place</b>	Bio-physical	Health risks due to unsafe working	construction area Camp sites	Throughout construction period	High	<ul style="list-style-type: none"> <li>Appropriate and safe water supply will be maintained at camps to</li> </ul>	Contractor	NHA, Environment Specialist, Contractor

Project Activities	Type of Impact	Potential Impacts on Environment	Where the Impact is likely to happen	When the Impact is likely to Occur	Magnitude of Impacts	Mitigation Measures	Institutional Responsibility	
							Implementation	Supervision
		conditions				<p>avoid water-related diseases and to secure workers' health.</p> <ul style="list-style-type: none"> <li>• Health education &amp; preventive medical care will be provided to workers</li> <li>• Routine medical checkup of workers to avoid communicable diseases</li> <li>• Provision of basic medical training to work staff, and basic medical services and supplies to workers will be ensured</li> <li>• Layout plan of camp site will be conveniently displayed indicating safety measures taken by the contractor, e.g. fire-fighting equipment, safe storage of hazardous material, first aid, security, fencing and contingency measures in case of accidents</li> <li>• Work safety measures and</li> </ul>		

Project Activities	Type of Impact	Potential Impacts on Environment	Where the Impact is likely to happen	When the Impact is likely to Occur	Magnitude of Impacts	Mitigation Measures	Institutional Responsibility	
							Implementation	Supervision
						<p>good workmanship practices to ensure no health risks to workers</p> <ul style="list-style-type: none"> <li>• Adequate and appropriate PPEs will be provided to workers</li> <li>• Proper maintenance of all facilities will be carried out and documented</li> <li>• Regular pest control measures in dormitories to be carried out</li> <li>• Awareness campaigns and training for protection from AIDS / HIV / Hepatitis to be periodically provided to all workers</li> </ul>		
<b>Excavation of earth from borrow areas, Embankment works, cutting operation, clearing of</b>	Physical environment	Change of topographic characteristic, loss of topsoil, impact on agriculture, Soil Erosion, loss of	Borrow areas at/near agriculture and irrigation area / elsewhere, At all sites where high	During construction	High	<ul style="list-style-type: none"> <li>• Agricultural areas be avoided for borrowing of materials</li> <li>• Contractor will obtain approval from NHA for excavation and for the plan of rehabilitating site after</li> </ul>	Contractor	NHA, , supervision consultant Environment Specialist, Contractor



Project Activities	Type of Impact	Potential Impacts on Environment	Where the Impact is likely to happen	When the Impact is likely to Occur	Magnitude of Impacts	Mitigation Measures	Institutional Responsibility	
							Implementation	Supervision
vegetation		vegetation and habitat	embankments are required, e.g. near bridges			excavation <ul style="list-style-type: none"> <li>• Take off top soil, &amp; reintroduce at the end of construction activities</li> <li>• Areas with strong flash flow, high embankments will be provided to minimize soil erosion.</li> <li>• As applicable and needed, plantation of grasses and shrubs will be done for slope protection</li> <li>• Soil erosion check measures such as the formation of sediment basins, slope drains, etc. would be adopted</li> <li>• Soil erosion along the road be visually checked as in EMP</li> <li>• Ensure adequate crossings</li> </ul>		
Acquisition of sub base material and	Physical environment	Cuts and scars to natural geology.	Quarry sites, Borrow site and RoW	During construction	Medium	<ul style="list-style-type: none"> <li>• Use existing quarry sites</li> <li>• Inform and obtain NOC from NHA regarding the</li> </ul>	Contractor	NHA, , supervision consultant

Project Activities	Type of Impact	Potential Impacts on Environment	Where the Impact is likely to happen	When the Impact is likely to Occur	Magnitude of Impacts	Mitigation Measures	Institutional Responsibility	
							Implementation	Supervision
procurement of construction materials; Quarrying materials etc.		Degradation of existing river beds, alternation of surface and groundwater regime, land-use conflicts, Soil erosion, change of hydraulic patterns				<ul style="list-style-type: none"> <li>selection of quarry sites</li> <li>Excavation in farmlands and at river beds will be prohibited, unless authorized by local irrigation departments responsible for river works. In such cases a prior information will be provided to NHA</li> <li>Non-productive, barren lands in broken terrain, nullahs and publically recognized waste lands should be given preference</li> </ul>		Environment Specialist, Contractor
Constructing pavements, Laying base material, course Clearing of surplus	Physical Environment	Runoff of material into river	All along road surface	During construction	Low	<ul style="list-style-type: none"> <li>Supervision of construction to ensure proper techniques</li> </ul>	Contractor	NHA,, supervision consultant Environment Specialist, Contractor
Asphalt Plant	Physical Environment	Emission of dust and fumes	Near the asphalt plants	During construction	High	<ul style="list-style-type: none"> <li>Ensure Workers use appropriate clothing</li> </ul>	Contractor	NHA, , supervision consultant

Project Activities	Type of Impact	Potential Impacts on Environment	Where the Impact is likely to happen	When the Impact is likely to Occur	Magnitude of Impacts	Mitigation Measures	Institutional Responsibility	
							Implementation	Supervision
		from asphalt plant; Runoff of hydrocarbons during "curing" period	all along the RoW			<ul style="list-style-type: none"> <li>Lay asphalt during dry periods</li> </ul>		Environment Specialist, Contractor
<b>Removal of Construction Camp</b>	Socio-cultural	Adverse effects on residents	At all the campsites	After completion of construction	Low if correct closure plan implemented	<ul style="list-style-type: none"> <li>Supervise and enforce closure plan.</li> <li>A summary report of all closure activities to be submitted to NHA</li> </ul>	Contractor	NHA, , supervision consultant Environment Specialist, Contractor
<b>Site restoration after the contract completion</b>	Bio-physical environment	Loss of topsoil  Loss of Plants  Loss of functional benefits from roadsides plants.	All along construction sites and campsites	During construction and after construction	Medium	<ul style="list-style-type: none"> <li>Manage design to minimize removal of roadside plantation</li> <li>Plan for compensatory plantation for each felled plant; 10 plants of similar / local flora species to be planted</li> <li>Contractor will provide plan for removal &amp; rehabilitation of site upon completion</li> <li>Photographical and botanical inventory of</li> </ul>	Design Consultant, Contractor	NHA, , supervision consultant Environment Specialist, Contractor

Project Activities	Type of Impact	Potential Impacts on Environment	Where the Impact is likely to happen	When the Impact is likely to Occur	Magnitude of Impacts	Mitigation Measures	Institutional Responsibility	
							Implementation	Supervision
						vegetation before clearing the site to be maintained and submitted to NHA <ul style="list-style-type: none"> <li>• Introduction of exotic species or species with known environmental setbacks (e.g. Eucalyptus etc.) will be disallowed</li> </ul>		
<b>Discharge Control</b>								
<b>Drinking water</b>	Water borne disease	Workers/labor health	labor camp	Throughout construction period	Medium	<ul style="list-style-type: none"> <li>• Contractor will ensure the Provision of safe drinking water to all the workers/ labour</li> <li>• Water quality should conform WHO standards Should be reconfirmed once during construction phase</li> </ul>	Contractor; Monitoring through Approved Labs	NHA,, supervision consultant Environment Specialist, Contractor
<b>Waste water discharges</b>	Water pollution	Contamination of water sources	Contractor Camp sites	Throughout construction period	medium	<ul style="list-style-type: none"> <li>• Suitable sanitation and waste disposal facilities will be provided at camp by means of septic tank linked with soaking pits.</li> </ul>	Contractor; Monitoring through Approved Labs	NHA, , supervision consultant Environment Specialist,

Project Activities	Type of Impact	Potential Impacts on Environment	Where the Impact is likely to happen	When the Impact is likely to Occur	Magnitude of Impacts	Mitigation Measures	Institutional Responsibility	
							Implementation	Supervision
						<ul style="list-style-type: none"> <li>All discharges should be in compliance with NEQS through a certified laboratory</li> <li>Drainage will be maintained to avoid waterlogging, which leads to mosquitoes and diseases.</li> <li>Should be verified on monthly basis</li> </ul>		Contractor
<b>Vehicular movement and operation of machineries</b>	Bio-Physical Emission from construction vehicles and machinery,	Dust and other emissions causing public health risks, nuisance and other impacts on the bio-physical environment	Contractor sites along the project	Throughout construction period	Medium	<ul style="list-style-type: none"> <li>All temporary service and access roads be regularly sprinkled to minimize the dust generation: All vehicles carrying loose friable material to be covered</li> <li>All machinery and plants will be placed at min. 500 meters at downwind direction to human settlements</li> <li>All vehicles, equipment and machinery used for</li> </ul>	Contractor; Monitoring through Approved Labs	NHA,, supervision consultant Environment Specialist, Contractor

Project Activities	Type of Impact	Potential Impacts on Environment	Where the Impact is likely to happen	When the Impact is likely to Occur	Magnitude of Impacts	Mitigation Measures	Institutional Responsibility	
							Implementation	Supervision
						<p>construction be regularly maintained to ensure that the pollution emission levels conform to the NEQS</p> <ul style="list-style-type: none"> <li>Air quality parameters be monitored at determined sites on monthly basis</li> </ul> <p>Incorporate design features enabling continuation traffic flow and traffic jams</p>		
<b>Operation of asphalt mix plants, crushers, etc.</b>	Biophysical Dust generation from construction machineries	Dust emissions from crusher and fumes from asphalt plant causing health risks to operating workers, impact on biophysical environment	At sites of plants, crushers	Throughout construction period	High	<ul style="list-style-type: none"> <li>Ensure precautions to reduce the level of dust emissions from, mixers, plants, crushers and batching plants, e.g. providing with dust extraction units. Crushers to be fitted with dust suppression equipment. Plant to have suppression equipment.</li> <li>Water will be sprayed in lime / cement and earth</li> </ul>	Contractor; Monitoring through Approved Labs	NHA, supervision consultant, Environment Specialist, Contractor

Project Activities	Type of Impact	Potential Impacts on Environment	Where the Impact is likely to happen	When the Impact is likely to Occur	Magnitude of Impacts	Mitigation Measures	Institutional Responsibility	
							Implementation	Supervision
						mixing sites <ul style="list-style-type: none"> <li>• Work safety measures like dust masks and appropriate clothing be used to ensure no health risks for operators</li> <li>• Equipment be well maintained</li> <li>• Asphalt plants be located 1 km away from populated areas (downwind) and may have wet scrubber</li> <li>• Monthly monitoring to ensure compliance with NEQS</li> </ul>		
<b>Transportation of materials, and other construction activities that create dust and emissions</b>	impacts on the bio-physical environment	Dust and emissions from machineries causing health risks to operators	Throughout Project Road Construction sites near the major settlements	During construction	Low	<ul style="list-style-type: none"> <li>• Vehicles delivering loose and fine materials like sand and fine aggregates shall be covered to reduce spills on existing road.</li> <li>• Ambient air quality monitoring will be carried out in accordance to the EMP</li> </ul>	Contractor; Monitoring through Approved Labs	NHA, supervision consultant, Environment Specialist, Contractor

Project Activities	Type of Impact	Potential Impacts on Environment	Where the Impact is likely to happen	When the Impact is likely to Occur	Magnitude of Impacts	Mitigation Measures	Institutional Responsibility	
							Implementation	Supervision
						<ul style="list-style-type: none"> <li>If monitored parameters are above the prescribed NEQS-limits suitable control measures must be taken</li> </ul>		
<b>Disposal of waste from bridge construction</b>	Physical, Environmental & Socio cultural	Lowering of soil and water quality.	At camps	After completion of construction	Low if correct closure plan implemented	<ul style="list-style-type: none"> <li>All construction waste collected</li> <li>Site kept tidy and no waste allowed building up in yard.</li> <li>Disposal sites to be kept away from the localities (preferably 500 meters/at least 100 meters)</li> <li>No waste shall be thrown into the river</li> </ul>	Contractor	NHA, , supervision consultant Environment Specialist, Contractor
<b>Flora and Fauna</b>	Physical and biological	Poaching on wildlife plants, disturbance of river habitats Disturbance to ecological sensitive area	All along the construction corridor	construction period	High	<ul style="list-style-type: none"> <li>The use of fire wood for cooking and execution of works will be prohibited</li> <li>No open fires will be allowed</li> <li>Restoration of vegetated areas</li> </ul>	Contractor	NHA, supervision consultant, Environment Specialist, Contractor



Project Activities	Type of Impact	Potential Impacts on Environment	Where the Impact is likely to happen	When the Impact is likely to Occur	Magnitude of Impacts	Mitigation Measures	Institutional Responsibility	
							Implementation	Supervision
		adjacent or near the road				<ul style="list-style-type: none"> <li>Signage for wildlife crossing to raise attention</li> <li>Assist in public awareness programs</li> <li>Patrolling and enforcement</li> </ul>		
<b>Use of local resource and products</b>	Socio-economic	Competition for natural resources for range land & water	Camp sites and construction sites	Throughout construction period	Medium	<ul style="list-style-type: none"> <li>Contractors should primarily seek its own sources of water</li> <li>Ensure labor do not exploit adjacent forest resources.</li> <li>There should be ban on tree cutting or use of any resource from any private land. In case it is unavoidable, permission from owner would be obtained and documented. All such permissions would be furnished to NHA before start of activity</li> </ul>	Contractor	NHA, Environment Specialist, Contractor
<b>Archeological Sites</b>								
<b>Encountering archaeological</b>	Socio-economic and	Impacts on historically	Throughout entire project	Throughout construction	Low	<ul style="list-style-type: none"> <li>Carrying archaeological inspection during</li> </ul>	Contractor	NHA, supervision consultant,

Project Activities	Type of Impact	Potential Impacts on Environment	Where the Impact is likely to happen	When the Impact is likely to Occur	Magnitude of Impacts	Mitigation Measures	Institutional Responsibility	
							Implementation	Supervision
sites during earth works and construction	cultural	important sites and damage to fossils, artifacts, tombs, structure etc., as defined in 1975 Antiques Act.	area, including borrow sites	period		<p>construction, identifying all sensitive areas prior to construction.</p> <ul style="list-style-type: none"> <li>In case of finding any archaeological artifact, structure, tomb etc. the Contractor needs to halt all works at once and contact Archaeological Department and inform NHA.</li> <li>Contractor has the duty to secure the sites against any intrusion until the archeological experts have decided upon further actions</li> </ul>		Environment Specialist, Contractor

*Contractor shall submit a site specific EMP for approval, 15 Days before mobilizing*

**Table - 8.2 Cost Estimates for Environmental Management**

Sr. #	Item	(Bridges Rs.)	(Rehabilitation Rs.)	(New Alignment Rs.)
1	Water sampling & testing	65000.00	50000.00	100000.00
2	Vehicular Emission testing	65000.00	50000.00	145000.00
3	Air Quality Monitoring	150000.00	100000.00	400000.00
4	Purchase of PPEs	100000.00	100000.00	350000.00
5	Maintenance of equipment	200000.00	100000.00	200000.00
6	Traffic Management	200000.00	250000.00	200000.00
7	Water Sprinkling	150000.00	50000.00	250000.00
8	Waste Disposal	500000.00	300000.00	500000.00
9	Waste Water Treatment	100000.00	50000.00	300000.00
10	Restoration Work	70000.00	25000.00	100000.00
11	EHS Training	25000.00	25000.00	25000.00
<b>Sub TOTAL</b>		<b>1625000.00</b>	<b>1125000.00</b>	<b>2570000.00</b>
<b>Grand Total (Bridges + Rehabilitation + New Alignment)</b>		<b>= 5320000.00</b>		

## **9. GRIEVANCE REDRESSAL SYSTEM**

### **9.1 INTRODUCTION**

- ADB maintains Social Safeguard Standards in its all funded projects.
- NHA will maintain these Safe Guard Standards at FERP works.
- The Grievance Redressal Unit is set up to assist members of the community, contractors, vulnerable groups and especially women seeking to redress their grievances, if any.
- The grievances redressal process is outlined in the Grievance Redressal System. GRS serves as a systematic mechanism to address grievances and provides an investigatory function for complaints that may arise during development work.

### **9.2 GRIEVANCE REDRESSAL UNIT**

249. The GRUs will examine complaints received from community, vulnerable groups & women against grievances caused due to project work.

#### **9.2.1 Expected types of Complaints:**

250. Scope of the grievances handled through GRU is not limited to but includes the following

- Damage to environment,
- Damage/access to natural reservoirs,
- Impact on livelihoods,
- Violation of rights,
- Damage to property,
- Any other inconvenience caused by project work.

#### **9.2.2 Types of Complaints which cannot be addressed.**

- Grievances clearly not related to the project
- Complaints constituting criminal activity & violence
- Labor related issues
- Issues related to governmental policy & governmental institutions

### 9.3 GRIEVANCES REDRESSAL PROCESS

#### 9.3.1 What can be a grievance?

251. A grievance as concern or complaint can be raised by an individual or a group within communities affected by project work. Concerns and complaints result from either real or perceived impacts of project work, these may be raised in the same manner.

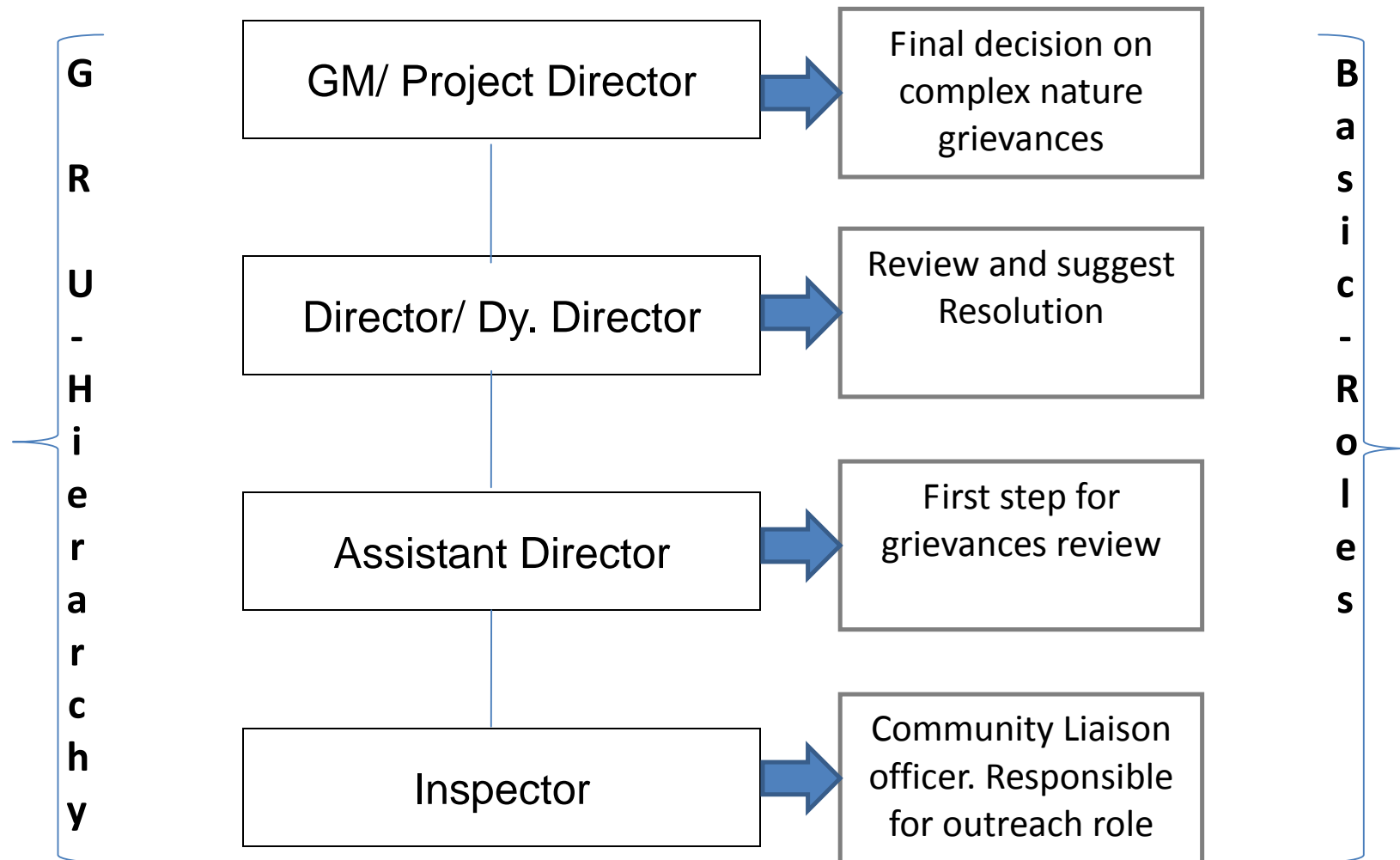
#### 9.3.2 Grievance Resolution Process (Figure 1, 2 & 3)

- Receive & register the complaint, take contact details of the complainant
- Issue acknowledgment receipt
- Thereafter call for the opinion of concerned “Dy. Director in consultation of Director”. Raise complex issues to the level of GM/ Project Director
- After receiving comments, Asst. Director briefs the complainant about solution to the problem and communicates timelines

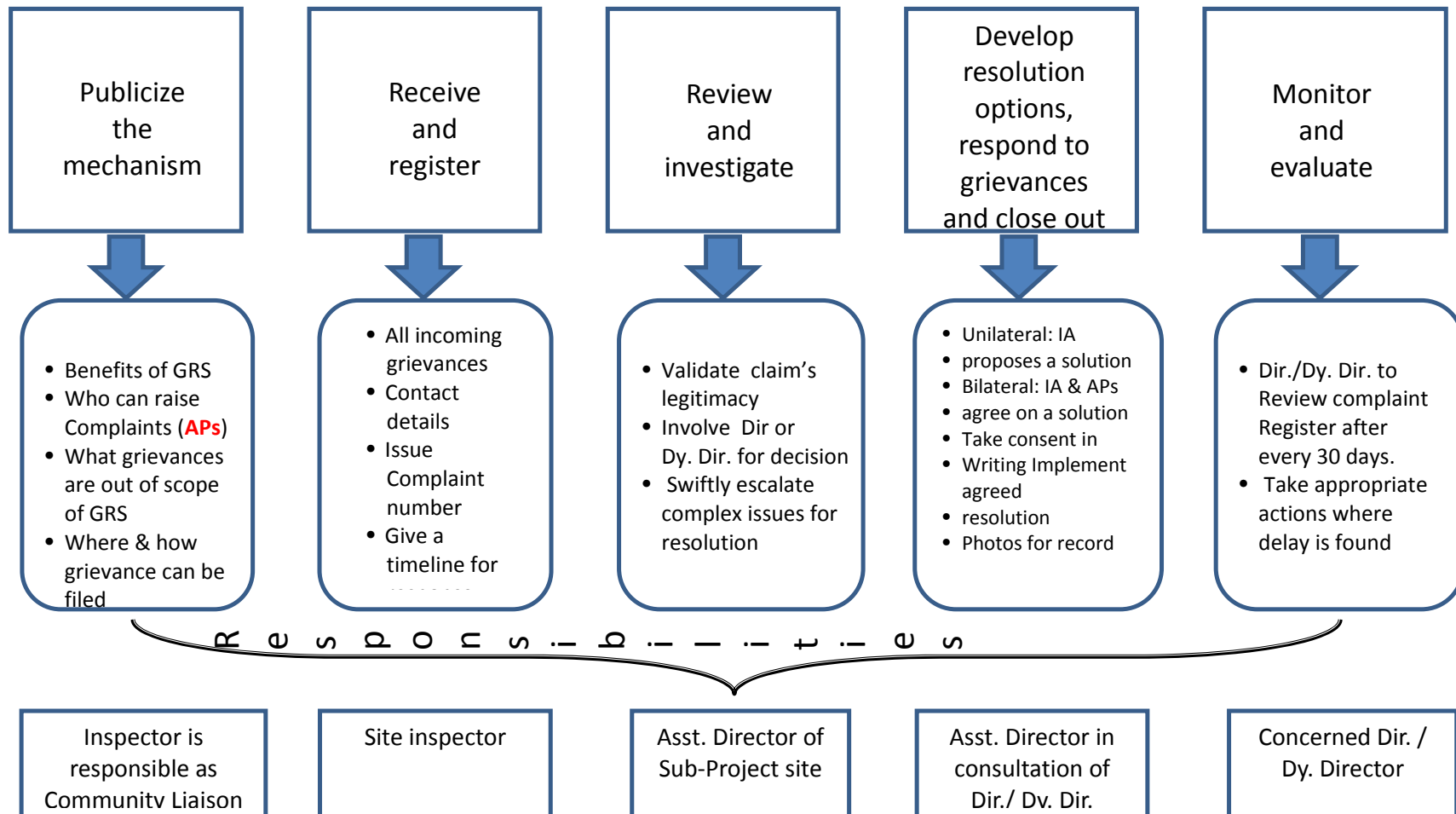
#### 9.3.3 Timelines

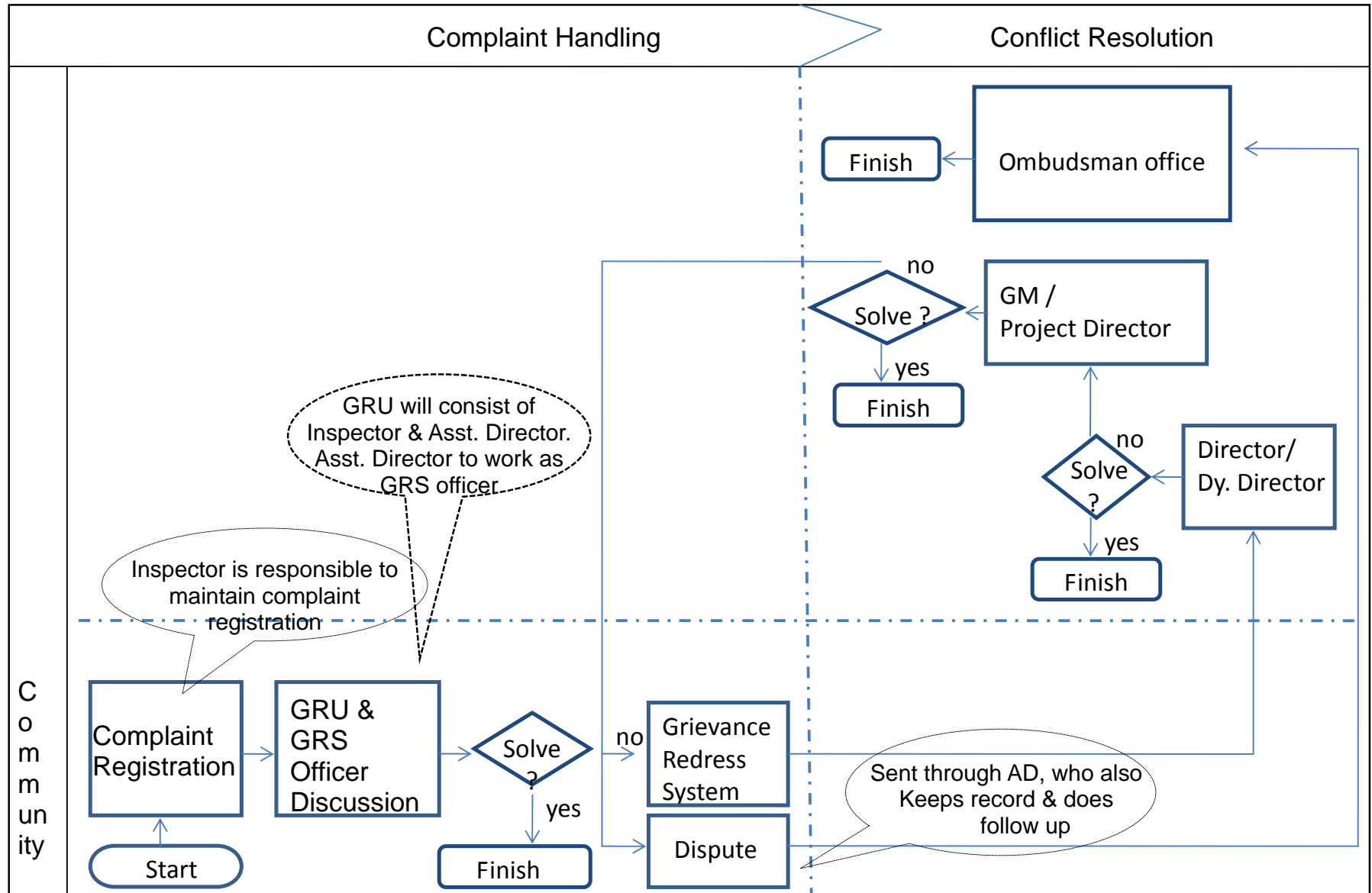
Day One	Day 1 -4	Day 5	Day 7
Grievance Registration	Consultation with Director / Dy. Director	Solution to grievance	Communicate solution to grievance with final date for resolution.

## GRIEVANCE REDRESSAL UNIT COMPOSITION



## FIVE PROCESS STEPS OF GRIEVANCE MECHANISM







### 9.3.4 Other options for Grievance Redressal

- Even if a grievance redressal system is offered, affected communities may still choose to opt for other dispute resolution mechanism.
- GRS will not negatively impact opportunities for complainants to seek any other source.
- In case of disagreement with NHA on grievance resolution, the affected person/community will be informed about the functions of Ombudsman office and how a grievance can be lodged.

## 9.5 REDRESSAL SYSTEM FOR CONTRACTORS

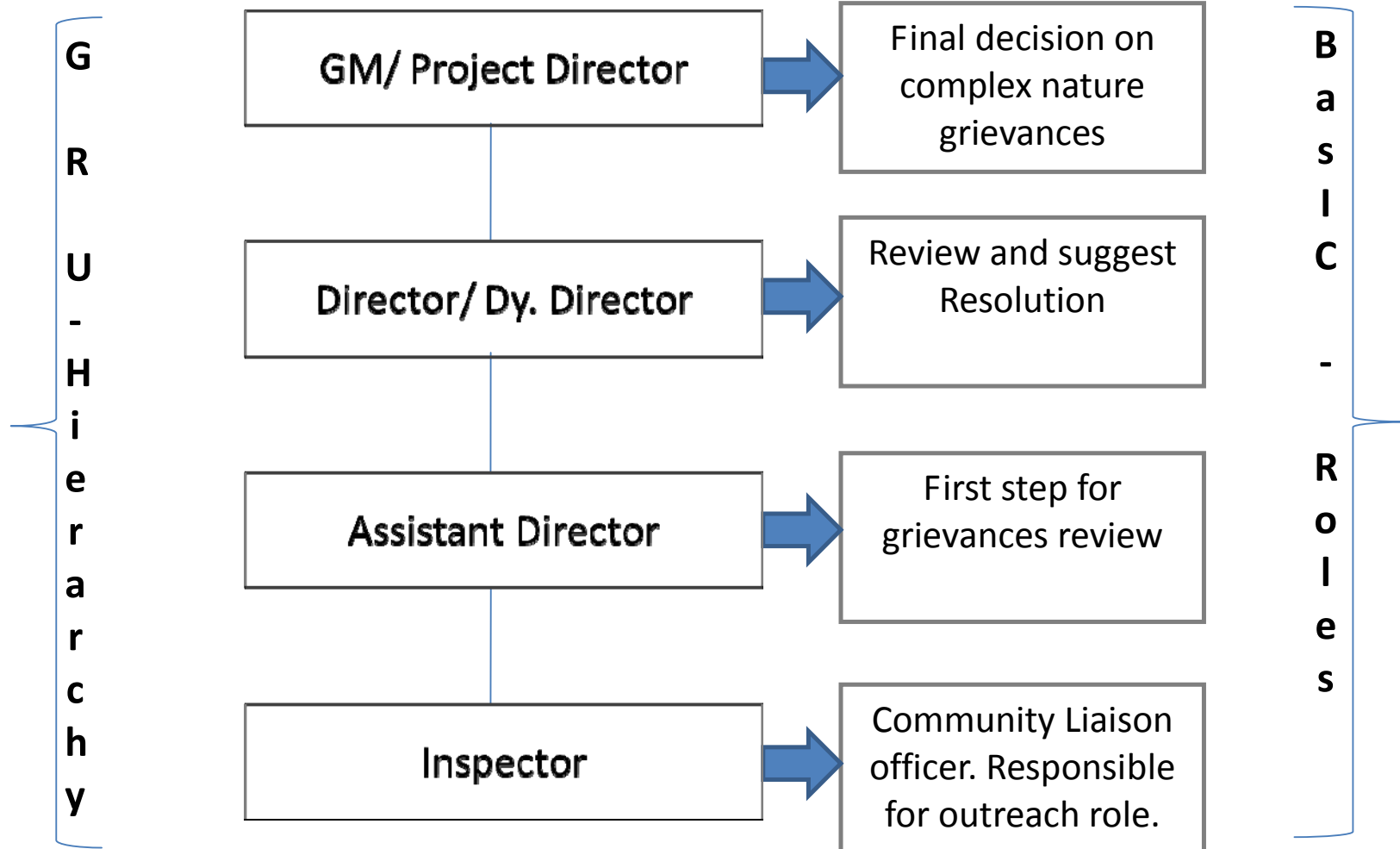
### 9.5.1 Features of the GRS

252. Implementation of GRS at sub-project level will offer locally tailored solutions and will cater to local needs and incorporate provisions to accommodate different groups within communities – especially the disadvantaged i.e. minorities, marginalized groups & especially women.

253. Following will be the features of GRS to make it effective and useful.

- Responsive to their customary ways of resolving grievances
- Simple & understandable
- Culturally appropriate
- Accessible
- No cost involved
- Transparent
  - They will know who in NHA is responsible for handling complaints
  - They will Possess sufficient information on how to access it
  - They will be informed about timelines & expected date of resolution

## GRIEVANCE REDRESSAL FOR CONTRACTORS



## **10. ENVIRONMENTAL FINDINGS, RECOMMENDATIONS AND CONCLUSION**

### **10.1 ENVIRONMENTAL FINDINGS AND RECOMMENDATIONS**

254. Most of the adverse environmental and social impacts of the Project will be associated with the construction phase. Except for resettlement issues which would need to be addressed carefully, the remaining impacts associated with the construction phase will be temporary, reversible, phased over a period of time, localized and manageable.

255. The air quality was analysed and found reasonably clean and no any obvious source of air pollution was located in the vicinity of the project area of influence. However there are kacha paths and may cause dust pollution during traffic movement. Air quality shall be controlled by regular spraying of water on kacha paths. All vehicles, machinery, equipment and generators used during construction activities will be kept in good working conditions to minimize the exhaust emissions. Cutting & burning trees and shrubs as a fuel shall be prohibited and clean source of energy should be provided at the contractor's camp e.g. gas cylinders etc. Noise, air quality and water sources shall be monitored periodically, as specified in IEE report. All the work activities should be restricted within the allowed working hours.

256. There is not any designated environmentally protected, archaeological site or cultural heritage site falling within the direct project area of influence. The Project will not have any significant impacts on fish, fishermen communities, wildlife and wildlife habitat. However, monitoring measures have been recommended to ensure that any unforeseen impacts can be identified, compared with baseline and mitigated during the implementation stage. All forest, wildlife and fisheries laws should be fully respected and abided by the contractor and his work force.

257. During construction, the Contactor's work force is expected to be largely available from the local population, which will enhance the economic opportunities for the locals of working age group. Socioeconomic conditions of the project area will generally have positive impacts due to the project implementation i.e. availability of jobs during construction phase.

258. The Project will also improve some of the social infrastructure as part of the repair, rehabilitation & new construction. The representation of women and other vulnerable groups will be ensured in the Project benefits.

259. It is very important to protect the water sources during the construction phase from accidental spills of diesel or any chemical, as any spill could percolate to the groundwater through the sandy stratum at site. All the solid waste and wastewater generated from the project activities and contractor camp shall be disposed-off according to the waste disposal plan, which would be a component of the EMP.

260. The proposed project will bring about a net-positive benefit in terms of improvement of the area. Continuous environmental monitoring will be carried out for the entire construction phase, to ensure due diligence of environmental performance. The EMP will also ensure reporting of all non-conformances and their rectification within a specified period of time along with safety, health and environment (SHE) audits.

## **10.2 CONCLUSION**

**261. It is anticipated that all environmental and social issues involved during the construction and operational phase of the project are manageable, therefore it is concluded that the project is environmentally friendly, financially viable, economically sustainable, generally neutral and pro-poverty alleviation.**

**ANNEX A: FORMS AND QUESTIONNAIRES**

Name of Interviewer: -----

Date: -----

(a) Settlement: -----

(b) Union Council: -----

(c) Tehsil: -----

(d) District: -----

1. Name of Respondent -----?

2. What is your father's name -----?

3. What is your age?

Age years    15 – 25    -----

25 – 35    -----

35 – 45    -----

Above 45    -----

4. Marital Status.

1. Married

2. Unmarried

5. What is your caste /ethnic group-----?

6. What is your language-----?

7. What is your educational qualification?

1. Illiterate

2. Primary

3. Middle

4. Metric

5. Intermediate

6. Above

8. What is your profession-----?

9. What is your average monthly income?

Income Rs.	Less than 5,000	-----
	5,000 – 10,000	-----
	10000 – 15000	-----
	15,000 – 20,000	-----
	Above 20,000	-----

10. What is type of your family system?

1. Joint                      2. Nuclear

11. Do you marry outside your tribe?

1. Yes (Exogamy)              2. No (Endogamy)

12 What is employment status of your family members

1. Govt. Employee	2. Private Employee
3. Self Employed	4. Unemployed
5. Household	

13 What are your major sources of income

1. Agriculture	2. Cattle (meat, hides & wool)
3. Trade /Business	4. Poultry

- |    |               |    |                    |
|----|---------------|----|--------------------|
| 5. | General Labor | 6. | Milk /Ghee Selling |
| 7. | Service       | 8. | Any other          |

14 How much is your average monthly expenditure

Expenditure Rs.	Less than 5000	-----
	5,000 – 10,000	-----
	10,000 – 15,000	-----
	Above 15,000	-----

15 What is type of ownership of your house

- |    |                           |    |                       |
|----|---------------------------|----|-----------------------|
| 1. | Self Owned                | 2. | Rented                |
| 3. | Free on Landlord property | 4. | Relative House (Free) |

16 What is nature of construction of your house

- |    |       |    |       |    |            |
|----|-------|----|-------|----|------------|
| 1. | Kacha | 2. | Pacca | 3. | Semi-pacca |
|----|-------|----|-------|----|------------|

17 Which of the following facilities are available in your house

- |    |             |    |              |
|----|-------------|----|--------------|
| 1. | Electricity | 2. | Water Supply |
| 3. | Gas         | 4. | Telephone    |
| 5. | Sewerage    |    |              |

18 What are the sources of water for your domestic use

- |    |                     |    |            |
|----|---------------------|----|------------|
| 1. | Public Water Supply | 2. | Hand Pumps |
| 3. | Channel             | 4. | Any other  |

19 What are the sources of water for your agriculture use

- |              |                        |
|--------------|------------------------|
| 1. Canals    | 2. Public Water Supply |
| 3. Channels  | 4. Rain                |
| 5. Any other |                        |

20 What is your Landholding

- |                      |       |
|----------------------|-------|
| 1. Cultivated Land   | ----- |
| 2. Uncultivated Land | ----- |
| 3. Cultivable Waste  | ----- |
| 4. Orchards          | ----- |

21 What is status of ownership of your land

- |           |                     |
|-----------|---------------------|
| 1. Owner  | 2. Owner-cum-tenant |
| 3. Tenant |                     |

22 What do you grow mostly in your agriculture land

- |                    |              |              |
|--------------------|--------------|--------------|
| 1. Wheat           | 2. Cotton    | 3. Sugarcane |
| 4. Fodder          | 5. Vegetable | 6. Maize     |
| 7. Fruits Orchards | 8. Any other |              |

23 In your opinion, should this Project be implemented here

- |        |       |
|--------|-------|
| 1. Yes | 2. No |
|--------|-------|

If yes, then reasons

-----  
-----  
-----

If no, then reasons

-----  
-----  
-----



24 In your opinion, what will be possible impacts of this road

During Construction

-----  
-----  
-----

After Construction

-----  
-----  
-----

25 What protective measures do you suggest to safeguard your interests

-----  
-----  
-----  
-----

**ANNEX - B****FORMAT OF SFA**

1. This is a Social Frame Work Agreement between Project Director (PD) N95 Road Construction Project representing the National Highway Authority (NHA), Government of Pakistan and the villagers' committee of N 95 Area, whose names have been inscribed below in their presence and full consent.

Sr. No.	Village	Name	Father's Name
1	Chakdara		
2	Batkhela		
3	Allahabad		
4	Shamozoo		
5	Sakhakot		
6	Shamlai		

2. We, the committee of village leader/elders of N 95 area have agreed unanimously to nominate \_\_\_\_\_ as our chairman and authorize him to enter into a Social Framework Agreement with the N 95 Rehabilitation and Construction Project on our behalf and on his own behalf. We understand and pledge that this Social Framework Agreement will be a binding on us and the PD throughout the currency of the construction work as well as the operational phase.

3.

Signatures or	Village	Signature/Left	Signature/Left
1			
2			
3			
4			
5			
6			
7			

Signatures or	Village	Signature/Left	Signature/Left
8			
9			
10			

4. By mutual consent it is agreed the National Highway Authority
- Shall not occupy any agricultural land or acquire any other land during the construction of this project.
  - Shall not cause any damage or reduction in the water supply in the canals during the construction period of the project, except in case of force majeure e.g. high floods, strong storms or any other act of God.
  - Shall not cause any disturbance to any public archaeological heritage or a place of worship.
  - Shall not interfere in the social political or tribal balance of the area.
  - Shall/wherever possible leave local physical infrastructure in no worse condition than it was at the start of the project
5. Also, by mutual consent it is agreed that all the villagers residing in the area in the vicinity of the project named in Clause 1 collectively and severally
- Shall not interfere in the location of labor camps, material depots, equipment yards and all the approach roads to be used during project construction phase, all of which will be located on the land of National Highway Authority.
  - Shall not receive any discharge of water, wastewater, wastewater sludge or oil spills to any graveyard or archaeological site
  - Shall not cause any damage to wildlife or trees and no villagers will be involved in killing, poaching or hunting of any animal or birds.
  - Shall not allow reduction or official interference in existing services and facilities e.g. education, health, electricity, drinking water supplies, religious and social congregations.
  - Shall not allow any interference in our tribal, commercial or social norms, and we understand that no land acquisition or involuntary resettlement is involved under the project.
  - Agree to respect and observe the cautions on the sign boards displayed by project authorities and shall not remove or cause to be removed any signboards or installations put up by the Project Director.
  - This SFA has been signed this < date > < month > <year > at \_\_\_\_\_

Signatures

Signatures

Project Director	Chairman Villagers' Committee
Full name and address	Name and Address
<b>Counter signed</b>	
Executive Engineer( N 95)	
Full name and address	

## ANNEX - C

## NATIONAL ENVIRONMENTAL QUALITY STANDARDS (NEQS)

Table - 1: Effluent Discharge Standards (NEQS 2000) Applicable to the Works

Sr. No.	Determinant	NEQS
1	Temperature	40 °C $\leq$ 3 deg.
2	pH	6 – 9
3	BOD5	80 mg/l
4	Chemical Oxygen Demand (COD)	150 mg/l
5	Total Suspended Solid (TSS)	200 mg/l
6	Total Dissolved Solids	3500 mg/l
7	Grease and Oil	10 mg/l
8	Phenolic compounds (as phenol)	0.1 mg/l
9	Ammonia	40 mg/l
10	Chlorine	1.0 mg/l
11	Chloride	1000.0 mg/l
12	Sulphate	600 mg/l
13	Manganese	1.5 mg/l
14	Fluoride	10 mg/l
15	Cyanide (as CN') total	1.0 mg/l
16	An-ionic detergents (as MB As)	20 mg/l
17	Sulphide (S-2)	1.0 mg/l
18	Pesticides	0.15 mg/l
19	Cadmium	0.1 mg/l
20	Chromium trivalent and hexavalent	1.0 mg/l
21	Copper	1.0 mg/l
22	Lead	0.5 mg/l
23	Mercury	0.01 mg/l
24	Selenium	0.5 mg/l
25	Nickel	1.0 mg/l
26	Silver	1.0 mg/l
27	Total Toxic metals	2.0 mg/l
28	Zinc	5.0 mg/l
29	Arsenic	1.0 mg/l
30	Barium	1.5 mg/l
31	Iron	8.0 mg/l
32	Boron	6.0 mg/l

**Table – 2: National Environmental Quality Standards for Gaseous Emission (mg/Nm<sup>3</sup>, Unless Otherwise Defined)**

Sr. No.	Parameter	Source of Emission	Existing Standards	Revised Standards
1	2	3	4	5
1.	Smoke	Smoke Opacity not to exceed	40% or 2 Ringlemann Scale	40% or 2 Ringlemann Scale or equivalent smoke number
2.	Particulate Matter (I)	(a) Boilers and Furnaces (i) Oil fired (ii) Coal fired (iii) Cement Kilns  (b) Grinding, crushing, clinker coolers and Related processes, Metallurgical Processes, converter, blast furnaces and cupolas.	300 500 200  500	300 500 200  500
3.	Hydrogen Chloride	Any	400	400
4.	Chlorine	Any	150	150
5.	Hydrogen Fluoride	Any	150	150
6.	Hydrogen Sulphide	Any	10	10
7.	Sulphur Oxide (2) (3)	Sulfuric acid/ Sulphonic acid plants  Other plants except power plants operating on oil and coal	400	1700
8.	Carbon Monoxide	Any	800	800
9.	Lead	Any	50	50
10.	Mercury	Any	10	10
11.	Cadmium	Any	20	20

12.	Arsenic	Any	20	20
13.	Copper	Any	50	50
14.	Antimony	Any	20	20
15.	Zinc	Any	200	200
16.	Oxides of Nitrogen  (3)	Nitric acid manufacturing unit.  Other plants except power plants operating on oil or coal:  Gas fired Oil fired Coal fired	   400 - -	   400 600 1200

**Explanations:-**

1. Based on the assumption that the size of the particulate is 10 micron or more.
2. Based on 1 percent sulphur content in fuel. Higher content of Sulphur will case standards to be pro-rated.
3. In respect of emissions of sulphur dioxide Nitrogen oxides, the power plants operating on oil and coal as fuel shall in addition to National Environmental Quality Standards (NEQS) specified above, comply with the following standards.

Table - 3: NEQS, 2009 for Vehicular Emission

Sr. No.	Parameter	Standard (Maximum permissible Limit)	Measuring Method	Applicability
1	Smoke	40% or 2 on the Ringlemann Scale during engine acceleration mode.	To be compared with Ringlemann Chart at a distance of 6 meters or more	Immediate effect
2	Carbon Monoxide (CO)	6%	Under idling condition: Non-dispersive infrared detection through gas analyzer.	
3	Noise	85 dB(A)	Sound Meter at 7.5 meters from the source	

Table - 4: National Environmental Quality Standards (NEQS, 2010) for Noise

Sr. No.	Category of Area / Zone	Effective from 1 <sup>st</sup> July, 2010		Effective from 1 <sup>st</sup> July, 2013	
		Limit in dB (A) Leq*			
		Daytime	Night-time	Daytime	Night-time
1	Residential Area (A)	65	50	55	45
2	Commercial Area (B)	70	60	65	55
3	Industrial Area (C)	80	75	75	65
4	Silence Zone (D)	55	45	50	45

**Note:**

1. Daytime hours: 6:00 a.m. to 10:00 p.m.
2. Night-time hours: 10:00 p.m. to 6:00 a.m.
3. Silence Zone: Zones which are declared as such by the competent authority. An area comprising not less than 100 meters round hospitals, educational institutions and courts.
4. Mixed categories of areas may be decided as one of the four above mentioned categories by the competent authority.



\*dB (A) Leq: Time weighted average of the level of sound in scale “A” which is relatable to human hearing.

**Table – 5: National Environmental Quality Standards (NEQS, 2010) for Drinking Water**

Sr. No.	Properties/Parameters	Standard Values for Pakistan	WHO Standards	Remarks
<b>BACTERIAL</b>				
1	All water is intended for drinking (E.Coli or Thermotolerant Coliform bacteria)	Must not be detectable in any 100ml sample	Must not be detectable in any 100ml sample	Most Asian Countries also follow WHO Standards
2	Treated water entering the distribution system (E.Coli or Thermotolerant Coliform and total Coliform bacteria)	Must not be detectable in any 100ml sample	Must not be detectable in any 100ml sample	Most Asian Countries also follow WHO Standards
3	Treated water entering the distribution system (E.Coli or Thermotolerant Coliform and total Coliform bacteria)	Must not be detectable in any 100ml sample. In case of large supplies, where sufficient samples are examined, must not be present in 95% of the samples taken throughout any 12-month period.	Must not be detectable in any 100ml sample. In case of large supplies, where sufficient samples are examined, must not be present in 95% of the samples taken throughout any 12-month period.	Most Asian Countries also follow WHO Standards
<b>PHYSICAL</b>				
4	Colour	≤15 TCU	≤15 TCU	
5	Taste	Non Objectionable/ Acceptable	Non Objectionable/ Acceptable	
6	Odour	Non Objectionable/ Acceptable	Non Objectionable/ Acceptable	
7	Turbidity	<5 NTU	<5 NTU	
8	Total hardness as CaCO <sub>3</sub>	<500mg/l	---	
9	TDS	<1000	<1000	

Sr. No.	Properties/Parameters	Standard Values for Pakistan	WHO Standards	Remarks
10	pH	6.5-8.5	6.5-8.5	
<b>RADIOACTIVE</b>				
11	Alpha Emitters bq/L or pCi	0.1	0.1	
12	Beta Emitters	01	01	
<b>CHEMICAL</b>				
<b>Essential Inorganics</b>		<b>mg/litre</b>	<b>mg/litre</b>	
13	Aluminum (Al) mg/l	≤0.2	0.02	
14	Antimony (Sb)	≤0.005	0.02	
15	Arsenic (As)	≤0.05	0.01	Standard for Pakistan similar to most Asian developing Countries
16	Barium (Ba)	0.7	0.7	
17	Boron (B)	0.3	0.3	
18	Cadmium (Cd)	0.01	0.003	Standard for Pakistan similar to most Asian developing Countries
19	Chloride (Cl)	<250	250	
20	Chromium (Cr)	≤0.05	0.05	
21	Copper (Cu)	2	2	
<b>Toxic Inorganics</b>		<b>mg/litre</b>	<b>mg/litre</b>	
22	Cyanide (CN)	≤0.05	0.07	Standard for Pakistan similar to most Asian developing Countries
23	Fluoride (F)	≤1.5	1.5	
24	Lead (Pb)	≤0.05	0.01	Standard for Pakistan similar to most Asian developing Countries
25	Manganese (Mn)	≤0.5	0.5	
26	Mercury (Hg)	≤0.001	0.001	
27	Nickel (Ni)	≤0.02	0.02	
28	Nitrate (NO <sub>3</sub> )	≤50	50	
29	Nitrite (NO <sub>2</sub> )	≤3	3	
30	Selenium (Se)	0.01	0.01	
31	Residual Chlorine	0.2-0.5 at consumer end 0.5-1.5 at source	---	
32	Zinc (Zn)	5.0	3	Standard for Pakistan

Sr. No.	Properties/Parameters	Standard Values for Pakistan	WHO Standards	Remarks
				similar to most Asian developing Countries
<b>Organics</b>				
33	Pesticides mg/L	---	PSQCA No. 4629-2004, Page No.4, Table No. 3, Serial No. 20-58 may be consulted	Annex-II
34	Phenolic Compounds (as Phenols) mg/L	---	≤0.002	
35	Poly nuclear aromatic hydrocarbons (as PAH) g/L		0.01 (By GC/MS method)	

\*\*\*PSQCA: Pakistan Standards Quality Control Authority

**Table – 6: National Environmental Quality Standards (NEQS, 2010) for Ambient Air**

Pollutants	Time-weighted average	Concentration in Ambient Air		Method of Measurement
		Effective from 1st July 2010	Effective from 1 <sup>st</sup> January 2013	
Sulphur Dioxide (SO <sub>2</sub> )	Annual Average*	80µg/m <sup>3</sup>	80µg/m <sup>3</sup>	Ultraviolet Fluorescence Method
	24 hours**	120µg/m <sup>3</sup>	120µg/m <sup>3</sup>	
Oxides of Nitrogen as (NO)	Annual Average*	40µg/m <sup>3</sup>	40µg/m <sup>3</sup>	Gas Phase Chemiluminescence
	24 hours**	40µg/m <sup>3</sup>	40µg/m <sup>3</sup>	
Oxides of Nitrogen as (NO <sub>2</sub> )	Annual Average*	40µg/m <sup>3</sup>	40µg/m <sup>3</sup>	Gas Phase Chemiluminescence
	24 hours**	80µg/m <sup>3</sup>	80µg/m <sup>3</sup>	
Ozone (O <sub>3</sub> )	1 hour	180µg/m <sup>3</sup>	130µg/m <sup>3</sup>	Non disperse UV absorption method
Suspended Particulate Matter (SPM)	Annual Average*	400µg/m <sup>3</sup>	360µg/m <sup>3</sup>	High Volume Sampling, (Average flow rate not less than 1.1m <sup>3</sup> /minute)
	24 hours**	550µg/m <sup>3</sup>	500µg/m <sup>3</sup>	

Respire able Particulate Matter (PM <sub>10</sub> )	Annual Average*	200µg/m <sup>3</sup>	120µg/m <sup>3</sup>	β-Ray      Absorption Method
	24 hours**	250µg/m <sup>3</sup>	150µg/m <sup>3</sup>	
Respire able Particulate Matter (PM <sub>25</sub> )	Annual Average*	25µg/m <sup>3</sup>	15µg/m <sup>3</sup>	β-Ray      Absorption Method
	24 hours**	40µg/m <sup>3</sup>	35µg/m <sup>3</sup>	
	1 hour	25µg/m <sup>3</sup>	15µg/m <sup>3</sup>	
Lead (Pb)	Annual Average*	1.5µg/m <sup>3</sup>	1µg/m <sup>3</sup>	AAS      Method      after sampling using EPM 2000 or equivalent Filter paper
	24 hours**	2µg/m <sup>3</sup>	1.5µg/m <sup>3</sup>	
Carbon Monoxide (CO)	8 hours**	5µg/m <sup>3</sup>	5µg/m <sup>3</sup>	Non      Dispersive Infrared      (NDIR) method
	1 hour	10µg/m <sup>3</sup>	10µg/m <sup>3</sup>	
*Annual arithmetic mean of minimum 104 measurements in a year taken twice a week 24 hourly at uniform intervals.				
**24 hourly/8 hourly values should be met 98% in a year. 2% of the time, it may exceed but not on two consecutive days.				

## ANNEX – D

**PUBLIC CONSULTATION SUMMARY**  
**Consultation with local community members and other stakeholders**

Name	Address	Education Level	Occupations	Comments & Recommendations
Khursheed Alam	Fatehpur	Illiterate	Business	Road construction is necessary for the improvement of tourism industry
Parvez	Fatehpur	Matric	Business	Project will improve the local community i.e. transportation facilities, tourism, etc.
Muhammad Rasheed	Kwazakhela	Illiterate	Agriculture	Easy access to hospitals i.e. improvement of health facilities
Akhter Waseem	Fatehpur	Matric	Student	Reduce travel time & dust emissions & will improve the environment
Manzoor Ali	Mangora	Primary	Business	Beneficial for local community
Muhammad Siddique	Madyan Satal	Illiterate	Worker	No comments
Amiz Akhter	Badian, Shahgram	Post Graduate	Govt. Employee	Better for the improvement of environment in terms of dust reduction
Hujam Khan	Madyan	Primary	-----	-----
Ali Ahmad	Madyan	Primary	Worker	-----

Name	Address	Education Level	Occupations	Comments & Recommendations
Fazal Tawab	Madyan	Illiterate	Business	Improvement of tourism industry
Umar Zeb	Madyan	Primary	Private Employee	-----
Saif Ur Rehman	Cham Garai	Primary	Business	-----
Khalid Khan	Cham Garai	Higher Secondary	Govt. Employee	Tourism Industry, economic development, agriculture products easy access to market
Muhammad Rasheed	Bahrain	Secondary	Business	Reduction of traffic problem, time saving & tourism development
Fazal Kareem	Turwal	Middle	Imam Masjid	Dust pollution reduction, Fare reduction
Akhter Ali	Bahrain	Post Graduate	Business	Tourism improvement, easy connivance availability
Muhammad Iqbal Fareed	Bahrain	Illiterate	Business	-----
Umar Rehman	Bahrain	Higher secondary	Business	Economic development with the improvement of tourism industry
Haji Amir Zeb	Bahrain	Secondary	Business	-----
Muhammad Iqbal	Bahrain	Illiterate	-----	-----

Name	Address	Education Level	Occupations	Comments & Recommendations
Amin Khan	Cham Garai	Illiterate	Business	No comments
Malik Muhammad Afzal	Cham Garai	Middle	Agriculture	Economic development, easy access to trade market for agricultural product
Jahanzeb	Mankiyal	Secondary	Business	Economic development
Nisar Ahmad	Khulali, Mankyal	Middle	Worker	Tourist & medical approach
Imran	Zarnial Tinka	Illiterate	Agriculture	Economic development & transportation facilities
Noor ul Hadi	Lai Kot, Cham Garai	Deni Uloom	Teacher & Imam Masjid	Transportation & economic benefits
Nadeem	Tauheedabad, Lai Kot	Middle	Private Employee	-----
Fazal Rabi	Pishmal, Bahrain	Secondary	Business	Economic development & tourism industry
Saeed Muhammad	Pishmal	Illiterate	Business	-----
Haroon Rasheed	Kalam	Higher Secondary	Business	Time saving project
Inam Ullah	Kalam	Illiterate	Business	Business development
Malik Ghazan Khan	Kalam	Illiterate	Agriculture	Business & Tourism industry improvement

Name	Address	Education Level	Occupations	Comments & Recommendations
Fazal Raziq	Shahgram	Secondary	Business	Traveling facilities
Afzal Muhammad	Chikari, Kwazakhela	Illiterate	Business	Vehicle damaging reduction, aesthetic value improvement
Liaqat Alia	Fatehpur	Primary	Business	Tourism improvement

#### Consultation with different Departments / Organizations & NGO's

Sr. No.	Organizations & NGO's
1	UNDP Pakistan: Recovery Assistance to flood affected communities of Swat (Fatehpur)
2	Fatehpur Union Council Khwazakhela Tehsil
3	Khyber Pakhtunkhwa Wildlife Department
4	Innovations for Developmental Empowerment and Accessible Services
5	Union Council Madyan
6	Environmental Protection Society in collaboration with CONCERN World Wide
7	Army Development Projects union Council Madyan
8	Initiative for the Development and Empowerment Axis
9	Hujra Village Support Organization



10	United Nation High Commission for Refugees (UNHCR), implemented by Sarhad Rural Support Programme
11	Pakistan Red Crescent, Swat
12	Environmental Protection Society (EPS)
13	Civil Dispensary Cham Garai
14	Union Council Mankayal
15	Union Council Kalam District Swat

## ANNEX - E

## PUBLIC CONSULTATION PHOTOGRAPHIC PROFILE



Fig-1: Socio-Economic survey from local shopkeeper (Tailor) in Fatehpur.



Fig-2: Social issues consultation from the local resident of Fatehpur.



Fig-3: Interview from the project area community members.



Fig- 4: Interview from the project area inhabitant in Fatehpur bazar.



Fig-5: Interview from the local resident of project area.



Fig- 6: Interview from the project area inhabitant of Fatehpur.





Fig-7: Socio-Economic survey from local resident of Kwazakhela.

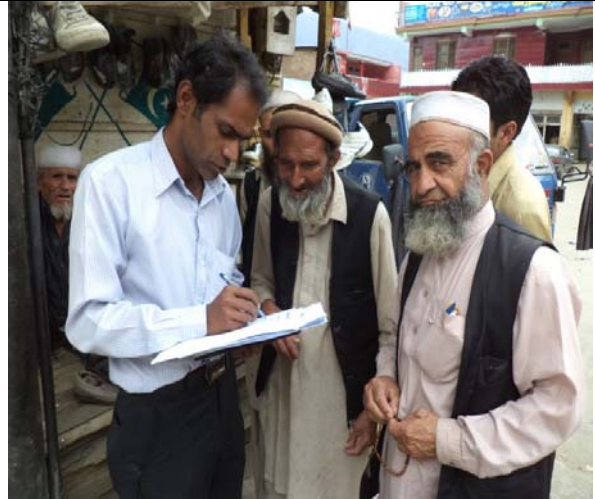


Fig-8: Social issues consultation with community members of Madyan.



Fig-9: Interview from the Naib Chairman of Madyan Market.



Fig-10: Interview from the project area inhabitant (Shopkeeper), Madyan.



Fig-11: Interview from the local community members from Madyan.



Fig-12: Interview from the project area inhabitant (Hotel Owner) in Bahrain Market.





Fig-13: Interview from the project area inhabitant (Superstore Owner) in Bahrain bazar.



Fig-14: Interview from the project area inhabitant (Police Man) Cham Garai.



Fig-15: Interview from the project area inhabitant in Mankayal.



Fig-16: Interview from the project area inhabitant in Tauheedabad (Laikot).



Fig-17: Interview from the project area inhabitant in Pishmaal.



Fig-18: Interview from the project area inhabitant (Shopkeeper) in Kalam main bazar.