NATIONAL HIGHWAY AUTHORITY

PESHAWAR SOUTHERN LINK ROAD (SLR)
KHYBER PASS ECONOMIC CORRIDOR (KPEC)
PROJECT

ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) REPORT

Volume-1

January 2024

CONSULTANTS:

ACRONYMS

AOI	Area of Impact
AP	Affected Person
ADT	Average Daily Traffic
BHU	Basic Health Unit
BOT	Built Operate Transfer
C	Common
CCs	Construction Camps
CESAP	Construction Environment & Social Action Plan
CFP	Chance Find Procedure
CITES	Convention on International Trade in Endangered Species
COD	Chemical Oxygen Demand
COI	Corridor of Impact
CSC	Construction Supervision Consultant
DHQ	District Headquarters
DFO	District Forest Officer
DS	Dump Sites
E & R	Environment & Resettlement
ECA	Employment of Child Act
ECR	Environmental Complaint Register
ESIA	Environmental & Social Impact Assessments
ESMP	Environmental and Social Management Plan
EMP	Environmental Management Plan
ESCP	Environmental and Social Code of Practices
GEA	General Environmental Assessment
GIS	Geographical Information System
GOP	Government. of Pakistan
GRM	Grievance Redress Mechanism
HMI	Human Machine Interface
HSE	Health, Safety & Environment
IEE	Initial Environmental Examinations
ILO	International Labor Organization
ITS	Intelligent Transportation Systems
JHA	Job Hazard Analysis
KP	Khyber Pakhtunkhwa
KPBOS	KP Bureau of Statistics
KPEC	Khyber Pass Economic Corridor
LAA	Land Acquisition Act
LAC	Land Acquisition Collector
LARP	Land Acquisition and Resettlement Plan
MB	Migratory Birds
NCS	National Conservation Strategy
NEP	National Environmental Policy
NEQS	National Environmental Quality Standards

NFP	National Forest Policy 2010
NHA	National Highway Authority
NRP	National Resettlement Policy
NWP	National Water Policy 2002
NFP	National Forest Policy
NJB	New Jersey Barrier
OWS	Oil-Water Separators
OPL	Official Poverty Line
PBC-2007	Pakistan Building Code
PEPA	Pakistan Environmental Protection Act
PGA	Peak Ground Acceleration
PM	Particulate Matter
PPE	Personal Protective Equipment
PPP	Public Private Partnership
PAPs	Project Affected Persons
RE	Resident Engineer
RD	Reduced Distance
RHC	Regional Health Centre
ROW	Right of Way
STEPS	Sustainability Through Environmental Professional Services
IE	Independent Engineer
QA/QC	Quality Assurance and Quality Control Consultant
PKHA	Pakhtunkhwa Highway Authority
PPP	Public Private Partnership
PI	Performance Indicators
PTEX	Peshawar Torkham Expressway
PEPA	Pakistan Environmental Protection Act 1997
RHC	Rehman Habib Consultant
CSC	Construction Supervision Consultant
SST	Special Scientific Trust
TDS	Total Dissolved Solids
THQ	Tehsil Headquarters
TSS	Total Suspended Solids
VOC	Volatile Organic Compounds
WAP	Worker Accommodation Plan
WIM	Weight in Motion
WB	World Bank
WHO	World Health Organization
WB EHSGs	World Bank Environmental Health & Safety Guidelines

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EXECUTIVE SUMMARY

1. Introduction

The Government of Pakistan (GOP) received financing from the World Bank (WB) to develop the Khyber Pass Economic Corridor (KPEC) (the "Project"). The primary objective of the KPEC is to expand economic activity between Pakistan and Afghanistan by improving regional connectivity. National Highway Authority (NHA) as the executing agency has to construct Peshawar - Torkham Expressway (PTEX) and Peshawar Southern Link Road (SLR) under KPEC. NHA has already carried out detailed Environment and Social Impact Assessment (ESIA) of PTEX in April-2018 through its design consultant.

The proposed project is categorized as a category "A" hence requiring a detailed ESIA as per Khyber Pakhtunkhwa-Environment Protection Agency (KP-EPA) and the WB environmental and social policy requirements. The ESIA is specific to the project's current alignment and covers an in-depth analysis of alternatives routes of SLR and highlights the anticipated environmental and social impacts during the construction and operation phase of SLR. Based upon the ESIA findings a comprehensive Environment and Social Management Plan (ESMP) is designed to emphasize best environmental management practices. The ESIA includes a separate Volume 2 of annexures comprised of different management plans like Air, Noise, Waste, Health & Safety, Traffic safety & diversions, Camp site, Construction site and Emergency Response Plan. Institutional arrangements, human resource requirements, detailed environmental budgeting and cost estimation are covered under ESMP.

2. Project Description

The National Highway Authority (NHA) plans to construct SLR, a 42.53 km controlled-access expressway, from Sathi Khel near Torkham (District Khyber) to Dheri (Nowshera District). The 4-lane expressway will be constructed through a Design Build modality. The SLR alignment falls in three Districts of Khyber Pakhtunkhwa (KP), namely Nowshera (1.34 Km), Peshawar (32 Km), and Khyber Tribal District (9.19 Km) which is a newly merged district. The middle section of the proposed project falls under the administrative jurisdiction of District Peshawar and ends at N-5 at Dheri, District Nowshera.

The project includes four planned interchanges at strategic points: Sathi Khel, Bara Road, Kohat Road N 55, and Grand Trunk (GT) Road. These interchanges aim to facilitate access to local communities. The proposed route covers various villages such as Nogazi, Sangu, Masho Khel, and Jabba. Materials for SLR construction, including aggregates, asphalt, and cement, will be sourced locally. The project, estimated at PKR 27.26 billion, involves earthworks, pavement works, structures, drainage, and an Intelligent Transportation System (ITS). The construction period is expected to be around 33 months, with flexibility based on ground conditions.

3. Policies, Legal Framework and Relevant Laws

The project falls under Category "A" as per World Bank OP 4.01 and Schedule II of Pakistan Environmental Protection Agency (Review of IEE/EIA Regulations), 2000, requiring both an Environmental and Social Impact Assessment (ESIA) and an Environmental Impact Assessment (EIA).

Pakistan's environmental management framework has evolved since the late 1970s, leading to the establishment of Pakistan Environmental Protection Agency (Pak–EPA) in 1984. The 18th Amendment to Pakistan's Constitution in 2010 decentralized environmental management to provincial governments, with all provinces enacting their own environmental protection laws.

The legal framework includes provisions for the right to a clean environment, and the project must adhere to national policies, including the Pakistan National Conservation Strategy, National Environmental Policy, KP River Protection Ordinance, National Water Policy, National Forest Policy, National Climate Change Policy, and labor laws. The Land Acquisition Act of 1894 and KP Land Acquisition (Amendment) Act 2020 provide guidelines for land acquisition, focusing on communal and tribally owned land in Newly Merged Areas.

The section also highlights the role of the Ministry of Climate Change, involvement of various provincial departments, ratification of International Labor Organization (ILO) conventions, and the applicability of World Bank safeguards policies and guidelines, emphasizing the importance of public consultation and disclosure requirements for Category A and B projects.

4. Stakeholders and Public Consultation

Effective consultation throughout the entire project lifecycle and information disclosure are crucial elements for the success and sustainability of any project, particularly when dealing with PAPs and institutional stakeholders. Stakeholders in this project encompass a diverse range of locally affected communities, government authorities, civil society organizations, academic entities, and business owners.

The primary objectives of consultations are to collect stakeholder views, identify measures for project design, and minimize negative impacts. The geographical scope of these consultations covers 12 villages across the districts of Nowshera, Peshawar, and Khyber districts during specific periods in August, September 2022, and May 2023. The engagement strategy involved individual meetings and focus group discussions with primary (directly affected) and secondary (indirectly affected) to understand and address their concerns.

The findings from these consultations led to a modification in the SLR route to avoid impacting community assets and properties such as graveyards, mosques, schools, and water supply schemes. Initially, many people disagreed with the proposed alignment. However, during the consultation process they were informed that a compensation package would be fair and transparent, based on replacement cost criteria, and would address different types of losses. Additionally, the local community would be kept informed and involved including through a Grievance Redress Mechanism (GRM) at the onset of the project to address any complaints and to enhance the project's transparency and accountability.

Discussions with government departments addressed concerns related to agricultural land, crop damage, urbanization, and environmental and social issues. The assurance provided by the project team that ongoing departmental projects would not be impacted reinforces the collaborative nature of the project. The complete photolog of consultations with PAPs and government departments, attached as **Annexure XII**, serves as a valuable record of these engagements.

The following different types of meetings, consultations and focused group discussions were held with the communities and PAPs, facing different types of project impacts. These meetings and consultation were conducted at different times and locations with different number of participants.

Table 1: Types of Meetings/Consultations

Sr#	Types of Meeting/Consultations	No. of Participants
1.	PAPs (male) of residential structure	199
2.	PAPs (male) of commercial structure	08
3.	Focus Group Discussions (male & female separately)	131
4.	PAPs female	71
5.	Village profiling	124

5. Analysis of Alternatives

The Analysis of Alternatives for the proposed SLR evaluated three options: a) the 'Zero' or 'No Project' alternative, b) Widening of Existing Roads, and c) Construction of SLR. The 'No Project' option is deemed unfavorable as it hinders socio-economic development. Widening existing roads is considered less advantageous as it will cause environmental impacts without significant improvement, and also considerable impact on residents both in terms of land acquisition and livelihood without the additional socio-economic gains. The Construction of SLR under the proposed alignment is seen as imperative to address heavy traffic on N-55 by diverting it to SLR and support increased movement of vehicles especially those involved in goods carriage. The selected alignment avoids many public & private structures like electricity poles, graveyards, mosques, water supply structures, farmhouse, petrol pump and police station, etc. It also shortens the route by about 10 km causing a reduction in land acquisition thereby reducing social disturbance significantly.

This aligns with the strategic importance of regional economic cooperation programs like Central Asia Regional Economic Cooperation (CAREC) and China-Pakistan Economic Corridor (CPEC). The proposed SLR is deemed environmentally sound and economically feasible based on design, environmental, social, and ecological considerations. Further refinement will occur during the contractor's final alignment, with updates to the ESIA and corresponding ESMP by the design review consultant.

In conclusion, the analysis of alternatives indicates that the construction of the SLR is not only environmentally sound and economically feasible compared to the other alignments proposed by design consultants but also addresses the culturally sensitive issue of graveyards through alignment alterations, reinforcing its suitability for implementation. The proposed SLR, as a safer and faster route, is expected to enhance connectivity to promote Pak-Afghan trade, complementing the existing road network and highways currently utilized for various purposes.

6. Description of Baseline Environment

The environmental and social baseline information for the SLR alignment was systematically gathered through fieldwork in August, September 2022, and May 2023, supplemented by high-resolution satellite data. The baseline study classified data into primary (directly obtained from communities and affected households) and secondary (compiled from census reports, research publications, and other relevant sources). The project's direct area of influence, involving land clearance from any encumbrance and acquisition, and the indirect area affected by issues like noise and air pollution were delineated. The ESIA overview encompassed physical, biological, and socioeconomic environments. Physical parameters revealed details on land resources, topography, climate, geology, soils, and water resources. Biodiversity was limited due to water scarcity and excessive exploitation, with no indication of endangered vegetation species. Socioeconomic conditions in the *Mouza* (villages) along the Right of Way

(RoW) were explored, covering demographics, culture, settlement patterns, leadership, land management, income sources, irrigation, migration trends, and local decision-making processes.

A gender assessment was undertaken as part of the ESIA and consultations were held with women in villages falling along the alignment. Overall, some women respondents expressed serious concerns about displacement due to the civil works and related security concerns, especially for their daughters. They also worried about the social disconnect and the time-consuming process of establishing new social relations. Women, due to their restricted mobility and cultural norms, do not readily socialize with new people. Consequently, some women requested changes in the alignment to spare their newly constructed houses.

7. Grievance Redress Mechanism (GRM)

The Grievance Redress Mechanism (GRM) outlines the policy and procedure for documenting, addressing, responding and employing methods to resolve project grievances (and complaints) that may be raised by Project Affected Persons (PAPs) or community members arising from environmental and social performance, the consultation process, land acquisition and resettlement and/or unanticipated environmental or social impacts resulting from project activities. The purpose of the GRM is to receive, review and resolve grievances from affected persons and ensure smooth and fair implementation of subproject activities. The GRM will function during the implementation period of the sub-project until all resettlement related activities and all construction activities are concluded to the satisfaction of the proponent and financier.

The Grievance Redress Committee (GRC) and all GRM intake systems will be established and functional before the start of civil works. Outreach and participation/membership of women will be ensured through community based/culturally sensitive means, and may include intake through in-person interactions, phone calls, SMS, written communication, social media, etc. Training will be provided to PMU staff responsible for the GRM and GRC members so that they can ensure effective functioning of the GRM. The budget for the GRM establishment and implementation will be met from the contingency budget of the project as per its PC 1 while on other hand it will be included in the budget of ECP contractor. The training cost for GRM is already included in the ESMMP budget.

8. Potential Significant Impacts & Mitigation and Preventive Measures

The project key environmental and social aspects identify significant potential adverse impacts and hazard risks that may be caused by the project activities and require appropriate mitigation and preventive measures to address these risks and impacts.

Potential environmental and social issues in construction and operation of the proposed project have been estimated based on field visits and surveys, baseline environmental and social conditions, and stakeholder consultations. Most of the environmental and social issues that will arise will be from construction activities and land acquisition. General mitigation measures and best management practices to address these construction-related impacts are given in **Annex I:** Environmental & Social Codes of Practices (ESCPs), which are prepared based on the WB General EHS guidelines and experiences from other projects in Pakistan.

By the inclusion of these ESCPs in the general specifications of contractors bidding documents and ensuring their implementation, most of the construction-related impacts can be mitigated. General environmental issues associated with the operation of the construction machinery such as air, water and noise pollution, and wastewater can be mitigated through adequate engineering designs and sound construction practices. A Hazard Risk Assessment (HRA) is a critical examination of health and safety hazards at a construction site and

Operation and Maintenance (O/M) work. Performing regular hazard risk assessments can help construction and O/M comply with occupational health and safety (OHS) regulations. Hazard risks assessments can help OHS teams to implement corrective measures to protect workers from health and safety threats during construction and operation stages.

The likelihood and consequences of the potential Impacts of the project are summarized in **Table 2** in term of activity, likelihood and impact consequence in Table as assessed and categorized.

Table 2: Activity, Likelihood and Impact consequence

Activity		Likelihood	Consequence	Impact (Consequence x likelihood)	Residual Impact
Design Phase					
Technical Design and Layout Planning		Likely	Major	Medium	Low
Land Acquisition		Certain	Major	High	Medium
Poor structure/design		Likely	Major	High	Low
Seismicity		Likely	Major	Medium	Low
Flora		Likely	Major	Medium	Low
Community Sensitive Sites/structures		Certain	Major	High	Low
Public Utilities		Certain	Major	High	Low
Construction Phase					
Soil Erosion and Contamination		Likely	Moderate	Medium	Low
Borrow Area		Likely	Major	Medium	Low
Batching Plant & asphalt plant		Likely	Major	Medium	Low
Construction Camps/Camp site		Certain	Major	High	Medium
Wastewater Generation at Construction Camp		Likely	Moderate	Medium	Low
Solid Waste (Construction, Municipal and Hazardous Waste)		Likely	Major	Medium	Low
Ambient Air Quality		Certain	Major	High	Low
Noise		Likely	Major	Medium	Low
Water Resources		Likely	Major	Medium	Low
Flora and Fauna		Certain	Major	High	Low
Traffic		Certain	Moderate	Medium	Low
Occupational Health and Safety		Certain	Major	High	Low
Community safety		Likely	Major	Medium	Low
Nuisance/ Disturbance to Social Sensitive Areas		Likely	Moderate	Medium	Low
Influx of Labor		Certain	Major	High	Low
Communicable Diseases		Likely	Major	Medium	Low
Gender Based Violence		Likely	Moderate	Medium	Low
Operation Phase					
Air Pollution		Likely	Moderate	Medium	Low
Noise Quality		Likely	Moderate	Medium	Low
Drainage Pattern		Likely	Moderate	Medium	Low
Flora		Likely	Major	Medium	Low
Fauna		Likely	Moderate	Medium	Low
Pedestrian and Commuter Safety		Likely	Moderate	Medium	Low
Wastes /Hazardous Wastes		Likely	Moderate	Medium	Low
Cumulative and Induced Impact		-	-	-	Positive Impact

9. Environmental and Social Management and Monitoring Plan

An Environmental and Social Management and Monitoring Plan (ESMMP) has been prepared as part of the present ESIA in order to define the implementation mechanism for the mitigation measures. The ESMMP includes a description of institutional arrangements, a mitigation plan, a monitoring plan, a training and capacity building plan, reporting requirements; implementation cost and a Grievance Redress Mechanism (GRM).

The Project Management Unit (PMU) of NHA is mandated to manage the design, procurement, and construction activities of the SLR. The PMU is also responsible for ensuring compliance with the national as well as WB environmental and social safeguard requirements including the preparation of environmental and social assessment documents including the present ESIA. The PMU will also ensure implementation of the ESIA in line with the national as well as WB safeguard policy requirements. The PMU is headed by the Project Director (PD), and comprises of Environment, Social and Gender Specialists (3 positions).

The PMU will engage the contractor for the construction phase. The Contractor would also be responsible to implement the ESIA at the field level, with the support of PMU. It would be the responsibility of the Contractor to hire a team of environmental, social & HSE experts to prepare the working documents and implement the WB standards at Site.

The Project Affected Person Committee (PAPC) will also be formed at the field level with representation from each village to ensure participation of PAPs in the implementation of ESIA. A separate Female PAPC will also be constituted with one female member from each affected village.

The DPAC (District Price Assessment Committee) will be established. The composition and roles will be framed by District Revenue Officer/land collector for Acquisition of land and payment for affected structures and other losses such as structures, trees and crops etc.

Supervision Consultant (SC) through its E&S team will ensure implementation of ESMP on the site. Inspection, supervision and monitoring all the construction and allied activities related to ESMP will be SC`s responsibility. Supervision Consultant will ensure Site Specific Environmental Management Plan approval from NHA and WB one-month prior to start of construction. The team will be based at project site.

The purpose of these monitoring activities is to ensure that ESIA is implemented in a timely manner, in accordance with the procedures described in the present document, and in compliance with the national as well as WB safeguard policies.

An Environmental and Social Management budget of **PKR. 139.97 million** has been estimated for the implementation of the ESMP over a 33-month period. This budget covers expenses related to environmental monitoring, associated training programs, plantation and maintenance activities, equipment usage, and health and safety costs. Importantly, these costs will be explicitly specified in the bid documents for contractor hiring, ensuring that all E&S mitigation measures outlined in the ESMP are obligatory bid requirements.

Table 3: Summary of ESIA Budget

Sr. No.	Component	Total Cost	Total Cost (Millions)
1	Environmental Monitoring Cost	6,650,000/-	6.65
2	Plantation (includes plantation and maintenance for 3 years) for Green Belt and along route plantation	78,110,000/-	78.11
3	HSE & staffing	47,285,000/-	47.285
4	Training	2,000,000/-	2.0

5	External Monitor (2.75 years)	5,225,000/-	5.225
6	GRM Budget	700,000/-	0.7
		Total	**139.97**

10. Conclusions and Recommendation

The ESIA study for the proposed project concludes the construction phase poses the most environmental and social challenges, but these can be effectively mitigated through measures outlined in the ESMMP. Sensitive areas like National Parks are unaffected, and concerns from the local community, particularly women, include displacement, labor influx, impact on ancestral graveyards, privacy, and health issues due to construction-related dust. The proposed alignment impacts residential, commercial, and community structures, as well as agricultural and barren land in Districts Nowshera, Peshawar, and Khyber. A Grievance Redress Mechanism (GRM) will be established before civil works begin to ensure community concerns and grievances can be effectively received and resolved. Proactive communication with PAPs is of paramount importance, with special assistance for those below the Official Poverty Line. The ESMMP includes a comprehensive mitigation matrix and monitoring plans for both construction and operation phases. While negative impacts on residential and agricultural land are acknowledged, the project's long-term benefits include reduced traffic congestion, improved travel times, and enhanced trade with Afghanistan thereby contributing to both the local and national economy.

1 INTRODUCTION

The Government of Pakistan (GoP) received financing from the World Bank to develop the Khyber Pass Economic Corridor (KPEC) project. The primary objective of the KPEC Project is to expand economic activity between Pakistan and Afghanistan by improving regional connectivity. National Highway Authority (NHA) as the executing agency is tasked to construct Peshawar - Torkham Expressway (PTEX) and Peshawar Southern Link Road (SLR) under KPEC. NHA has already carried out detailed Environment and Social Impact Assessment (ESIA) of PTEX through its Design Consultant. Current ESIA study is carried out for SLR under KPEC by the consultants Rehman Habib & STEPS (JV). No prefeasibility or feasibility study has been carried out for SLR project earlier. The current ESIA study is applicable for the given alignment of the project. As SLR is a design-build contract, so the contractor can suggest changes in design and NHA will update the ESIA accordingly with approval from the World Bank before start of construction.

1.1 ENVIRONMENTAL OBJECTIVE OF ESIA

ESIA is a systemic approach essential for the planning, operation, and monitoring of developmental projects. The primary environmental objectives of ESIA are to predict and evaluate the potential environmental and social consequences associated with a proposed project. Conducted prior to project implementation, ESIA serves to:

i. Avoid, minimize and mitigate adverse environmental and social effects before they occur.
ii. Integrate environmental and social concerns into decision-making.
iii. Ensure stakeholders participation from planning to operation stage of proposed project activities.
iv. Offer sustainable solutions and promoting sustainable development.
v. Provide a systemic evaluation of almost all significant environmental consequences of a developmental project.
vi. Meet the national and international safeguards requirements.

1.2 BACKGROUND OF THE PROJECT

The KPEC consists of two main components which are as follows:

Component I: Construction of Peshawar Torkham Expressway (PTEX) and Southern Link Road (SLR) connecting Motorway (M1) to Badaber (N-55) intersecting N-5 between Sathi Khel and Dheri (42.53 km) in length.

Component II: Economic Development & Uplift of Areas adjacent to PTEX.

NHA is the executing agency for Component I. This project aims to expand economic activity between Pakistan and Afghanistan by improving regional connectivity. Original PC-I of KPEC includes only PTEX, however, it was revised after inclusion of SLR connecting the PTEX to N-55 at Badaber and further linking at N-5 between Sathi Khel near Torkham towards N-55 Dheri. NHA is taking financial assistance from WB for the construction of the proposed alignment of the link road. Alignment is provided below as **Figure 1.1**

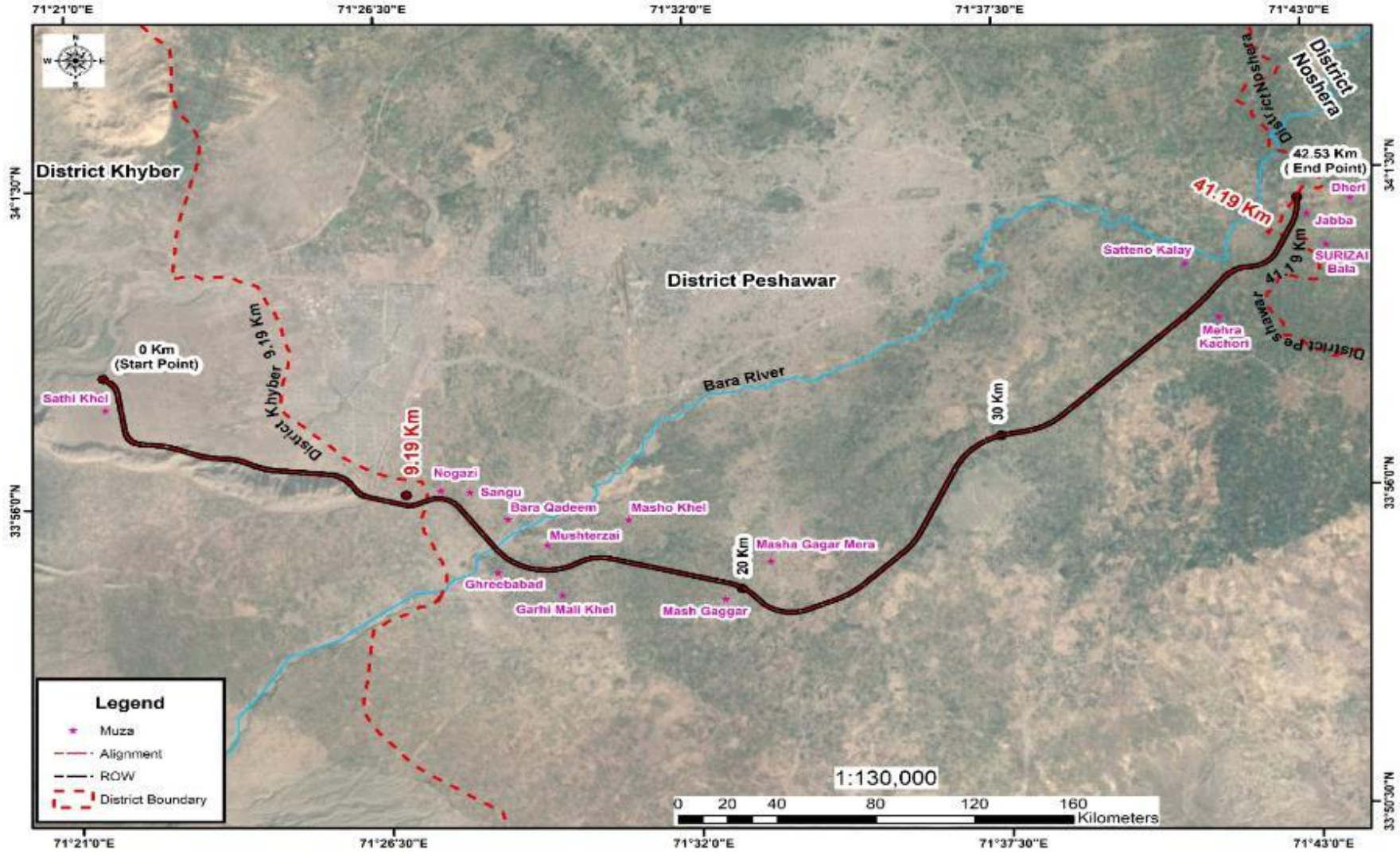


Figure 1-1: Proposed Alignment of SLR

1.3 NEED OF ESIA STUDY

This ESIA has been conducted to meet the regulatory requirements set out by the KP-EPA 2014, and Khyber Pakhtunkhwa Environmental Assessment Rules, 2021 rules and regulations and to comply with the WB safeguards policies.

The present ESIA presents the environment and socio-economic baseline conditions of the project area. Report identifies potential impacts of the project on the environment and people. It also proposes appropriate mitigation measures to address the identified potential impacts and highlights details of consultations. An ESMP is also included in this ESIA to address potential impacts as well as to enhance the environment and social benefits of the project. In addition, Resettlement Action Plan (RAP) is also under preparation separately as a standalone document to address the land acquisition and resettlement related social impacts of the project.

1.3.1 Study Objective

The main objectives of carrying out ESIA is to comply with the legal requirements of the Government of Pakistan and WB and obtaining environmental clearance from the regulatory agencies. This will be accomplished through the following:

- Carry out field surveys in detail, glean and collate data from the secondary sources, laboratory test analyses of noise, air and water quality for preparation of ESIA & RAP studies;
- Ensure that the quality of data and investigations will enable the client and NHA to make informed decisions about project implementation;
- Provide information for decision-making on the environmental and social consequences of proposed project interventions;
- Determine potential environmental and social impacts and assess these in terms of severity, magnitude and timescale;
- Promote sustainable development through identification of appropriate enhancement and mitigation measures;
- Conduct public consultation and ensure information disclosure, including amongst the local community.

1.3.2 ESIA Methodology

ESIA commenced with the review of technical details and preceding environmental assessment reports conducted for this road project. This was followed by a reconnaissance site visit and discussion with the executing agency to reconfirm the technical details of the project road improvement work. This helped to identify those environmental attributes which may get altered with the passage of time as well as to incorporate additional information to the baseline environmental scenario/environmental setting of the project. Further steps followed for ESIA preparation has been concisely described in the following paragraphs.

ESIA extent has been decided considering all likely impacts and risks analyzed in the context of the project's area of influence encompassing (i) the project site(s) and related required facilities like site clearance, utility shifting etc. (ii) project associated tasks viz., borrowing, quarrying, disposal of debris, construction camp etc. (iii) Areas and communities potentially affected by cumulative impacts and (iv) potential impacts from unplanned but predictable developments caused by the project that may occur at later stage or at a different location.

Nevertheless, the study area is extended up to 0.5 km on both side from the center of the road alignment to facilitate a more comprehensive analysis of land use and other environmental features.

Review of Country's Legal Framework: Prior to initiation of the civil work, it was deemed necessary to analyze the various permitting/clearances requirements form regulatory authorities for the project.

Primary Data Collection: An extensive environmental and social resource inventory has compiled, covering various environmental and social features such as terrain, land use, waterways/water bodies, roadside vegetation, sensitive receptors, common property resources, utilities, drainage, flooding/water logging, industries, accident prone areas and relevant social data within the area of interest/core zone. This comprehensive dataset was gathered by trained individuals under the supervision of an expert team. Additionally, a biodiversity survey was carried out at special locations, adhering to the standards set by the of WB and GOP.

Secondary Data Collection: Utilizing a diverse source of secondary sources, this study incorporates information from published government reports, environmental impact assessments conducted in the similar regions, official government websites, recognized institutions and relevant government departments (including forest, irrigation, pollution control, fisheries, statistics and the Meteorological Department). Additionally, recent Google images have been captured to provide a visual perspective on environmental features at a regional scale.

Public Consultation: Meaningful consultations were conducted with key stakeholders, and the local population to know the level of project acceptability and to address their concerns. The gathered information covered various aspects of the existing baseline environmental conditions, including ambient levels in the surrounding air, water, or soil and its effects on health, water resources, water logging/flooding, flora and fauna, socio-economic standing of local people, impact due to the loss of land and other assets, and common property resources. Additionally, the potential accident risk during both the construction and operation stages as well as perceived benefits and losses. Information thus gathered was used to integrate them in the project design and to formulate mitigation measures and environmental management plan.

Other Tools, Surveys and Studies: Assessment of land use of larger area beyond the project site has been conducted for better planning and decision-making. A rapid biodiversity assessment was carried out to generate baseline on floral and faunal elements in the project area. The survey also helped in assessing impact on any rare threatened or endangered species of floral species in the project area. Extensive air, noise, water quality monitoring and analysis has been carried out in the project Area of influence (AoI).

Assessment of Potential Impacts: The assessment covers an analysis of the project's direct, indirect, cumulative, and induced impacts on the physical, biological, and socio-economic aspects to ascertain the project's overall environmental and social sustainability. The impacts have been categorized based on their nature such as significant, insignificant, and their duration, whether short-term, long-term, reversible, or irreversible. Subsequently, appropriate mitigation measures have been proposed in response to the identified impacts, ensuring a proactive approach to address and minimize potential adverse effects.

Preparation of the Environment and Social Management Plan: The project specific ESMP) was formulated with an aim to avoid, reduce, mitigate, or compensate for adverse environmental impacts/risks and propose enhancement measures. This includes:

- Mitigation of potentially adverse impacts
- Monitoring of impacts and mitigation measures during project implementation and operation
- Institutional capacity building and training
- Compliance to statutory requirements
- Integration of ESMP with Project planning, design, construction and operation.

Environment and Social Monitoring Plan: Monitoring and evaluation are crucial for project implementation, involving regular checks to ensure adherence to plans and timely achievements of objectives. The reporting system emphasizes accountability, ensuring the implementation of environmental mitigation measures. The environmental monitoring plan is designed to guarantee the realization of intended environmental and social mitigations, delivering benefits to the target population while minimizing environmental and social impacts.

The broad objectives are:

- To evaluate the adequacy of environmental and social assessment.
- To evaluate the performance of mitigation measures proposed in the ESMP.
- To enhance environmental and social quality through proper implementation of mitigation measures.
- To suggest ongoing improvements in management plan based on the monitoring.
- To meet existing environmental regulatory framework and community obligations.

Performance Indicators: The overall Performance Indicators (PIs) for assessing environmental and social impacts include significant physical, biological and social aspects in critical locations. Specifically, key environmental and social parameters are selected for monitoring due to their regulatory importance. These parameters are quantitatively measurables and comparable over time, benefiting from standardized procedures and available expertise in both environmental and social domains:

- Air quality with respect to $PM_{2.5}$, PM_{10}, NO_x and SO_2 at selected locations
- Water quality as per National Quality Standards
- Noise levels as per National Quality Standards
- Survival rates of trees planted as compensatory plantation
- Number of consultations held with number of men and women at key locations
- Number and percentage of PAPs timely compensated
- Number of grievances registered by both men and women and timely resolved

The ESIA methodology chart is presented in **Figure 1-2.**

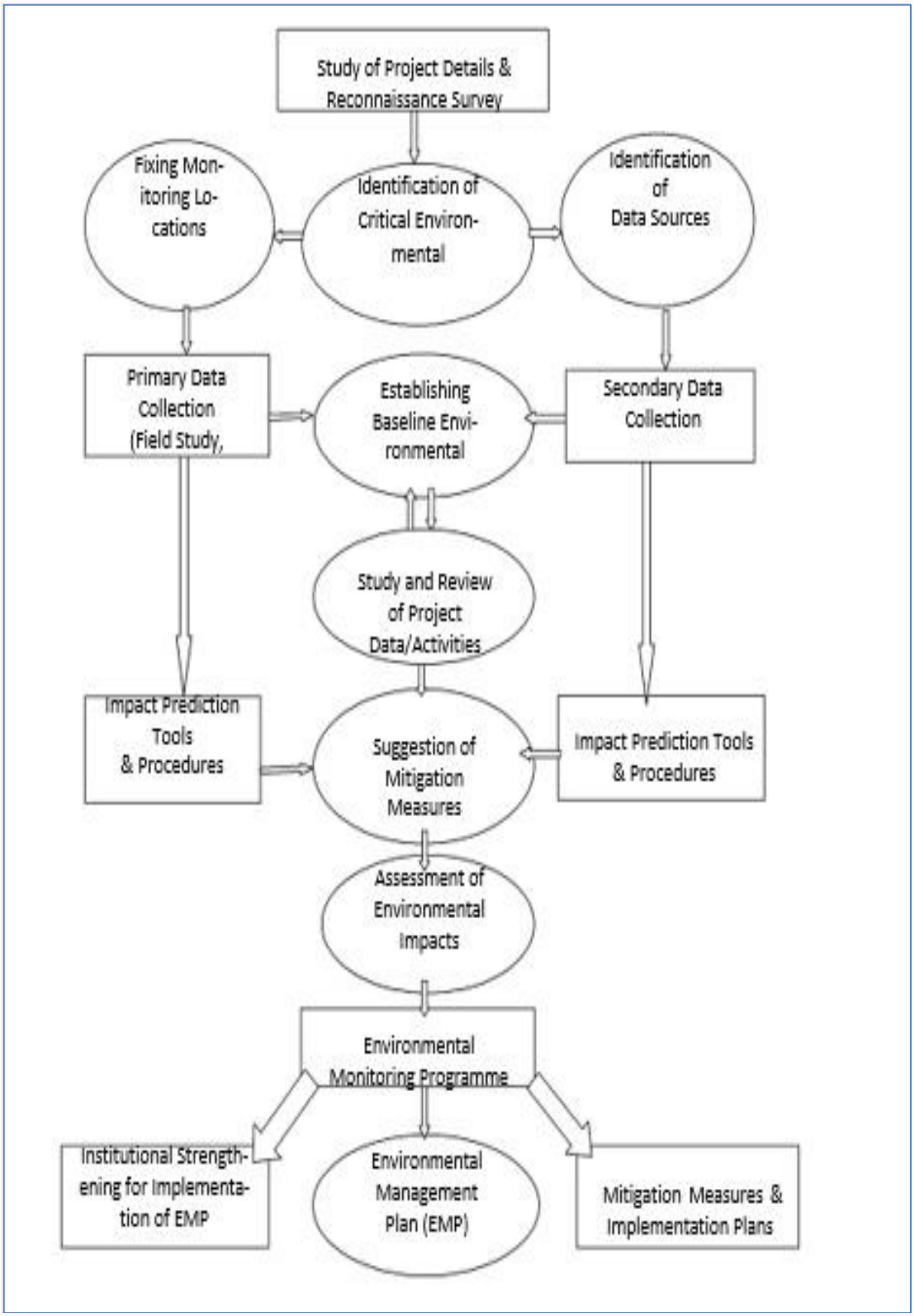


Figure 1-2: EIA Methodology Chart

1.3.3 ESIA Process

The first step in ESIA process involved assessing the proposed route and interchanges. This assessment considered technical, environmental, socioeconomic and cultural heritage criteria to identify a technically feasible option with minimal impacts in these areas. Following the selection of alternatives, the scoping process began to define the necessary scope of the ESIA. This report presents the findings of this activity. The schematic process of ESIA is shown in **Figure 1.3.**

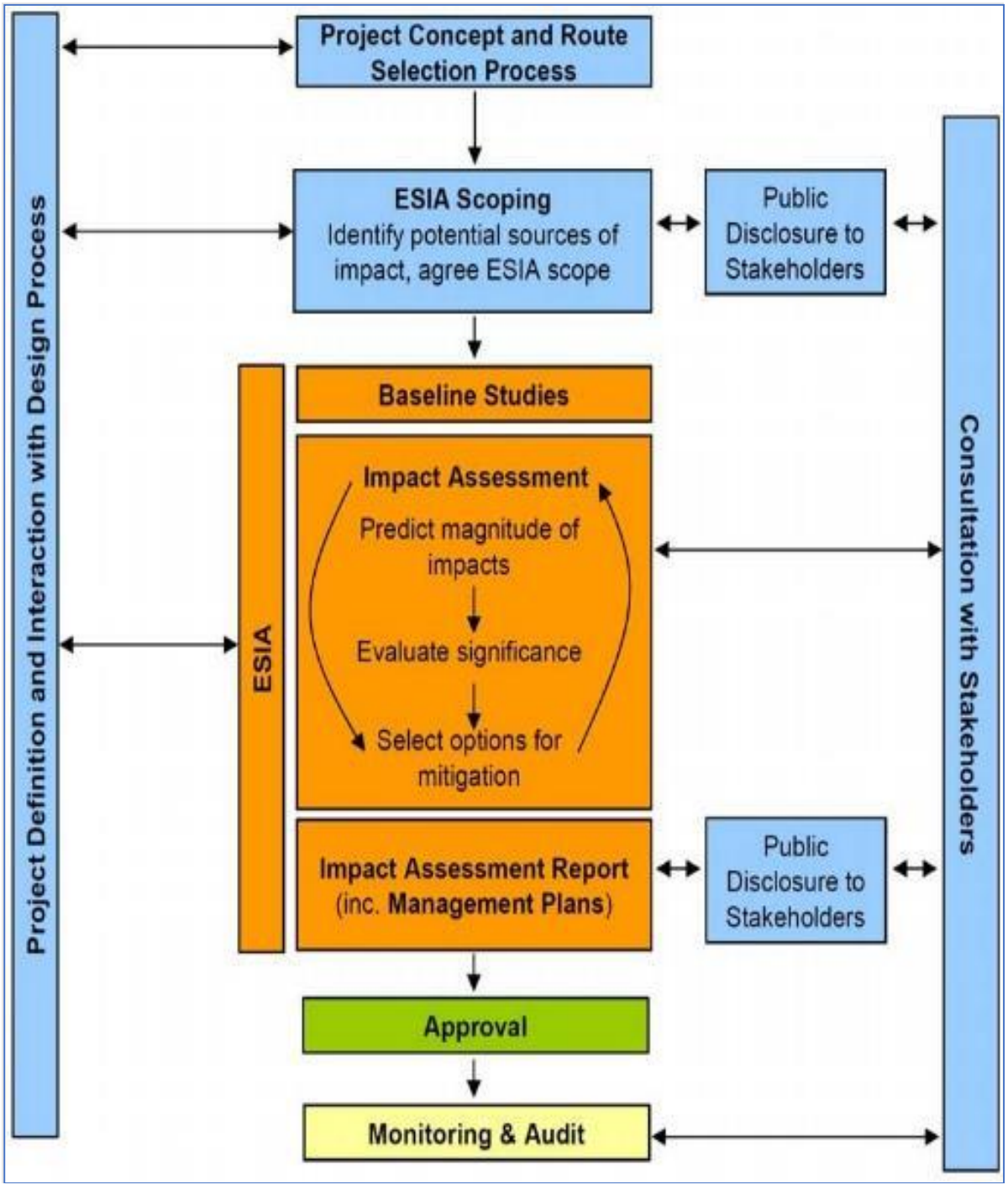


Figure 1-3: Schematics Process of ESIA

Scoping: Scoping is a crucial phase that identifies the key issues to be addressed in the ESIA. This report outlines the scoping process, ensuring a concentrated focus on potentially significant environmental and social impacts associated with the project. It incorporates insights from prior project consultations. Ultimately, scoping defines the scope of the ESIA work, including stakeholder engagement.

Baseline Studies: For the key issues identified in scoping, available information on the existing environmental and social conditions (also referred to as baseline conditions) have been gathered. This has been supplemented by field studies and surveys where necessary. The future development of the baseline conditions in the absence of the project have also been considered.

1.4 SUBMISSION OF REPORTS/DELIVERABLES

List of Consultancy deliverables are given below:

1. Inception Report
2. Labour Influx Management Plan
3. Environmental Screening findings
4. Draft ESIA & RAP Reports
5. Draft final ESIA Report

1.5 CONSULTANCY SERVICES

The Consultancy Agreement for the subject Services duly signed on 25th April, 2022 between National Highway Authority and the Consultants "M/s Rehman Habib Consultants (Pvt.) Ltd., in a Joint Venture with M/s Sustainability through Environmental Professional Services STEPS Pakistan in the office of NHA Islamabad.

The current ESIA study is carried out by a team of specialists including Environment management specialist, Ecologist, Botanist, Sociologist and Gender specialist. The ESIA full team composition is provided below.

Sr. No.	Name	Position
1.	Saeed Hussain	Team Leader
2.	Dr. Ayesha Naveed ul Haq	Technical Lead/ Project Manager
3.	Shabir Ahmed Khan	Environmental Specialist-I
4.	Sibghatullah Khan	Environmental Specialist-II
5.	Dr Akhtar Iqbal	Environmental Safeguards Specialist
6.	Malik Pervaiz Akhtar	Social Development & Resettlement Specialist
7.	Rana Abdur Rehman	Resettlement Expert
8.	Ms. Shazia Zubair	Gender Specialist
9.	Dr Waseem Ahmad Khan	Wildlife Ecologist
10.	Dr Syed Saeed Pirzada	Plant Taxonomist
11.	Muhammad Idrees Khan	Field Assistant
12.	Muhammad Arshad	Field Assistant & Local Guide
13.	Arshad Rafiq	Communication Expert
14.	Umer Raza	GIS Specialist

1.6 REPORT STRUCTURE

This report includes following Chapters/Sections:

Section 1: Introduction: Provides a Background of the Project and Rationale for Carrying Out the Study.

Section 2: Project Description: Describes the main components of the project and the main construction, pre-commissioning, operation and decommissioning activities.

Section 3: Review of Policy, Legal and Institutional Framework: Provides a brief overview of the relevant EPA and International ESIA Regulatory Framework and International Best Practice.

Section 4: Public Consultation and Disclosure: Presents the proposals for consultation with identified external stakeholders, including affected communities, who may have an interest in the project during scoping. The section also summarizes the consultation activities undertaken earlier in the ESIA process.

Section 5: Analyses of Alternatives: Analyzes the different options for the project, alternatives with respect to technical, socio-economic and environmental viability.

Section 6: Baseline Environment: Provides an overview of the baseline environmental condition, i.e., physical, biological and socioeconomic and cultural heritage characteristics of the study area;

Section 7: Grievance Redress Mechanism: this chapter explains the Project GRM and how it will receive and resolve project related complaints from stakeholders.

Section 8: Potential Environmental & Social Impacts and Mitigation Measures: Summarizes potential significant environmental, socioeconomic and cultural heritage Impacts;

Section 9: Environmental and Social Management Plan (ESMP): Presents the ESMP and monitoring indicators during pre-construction, construction and operational stages.

Section 10: Conclusion

2 THE PROJECT DESCRIPTION

2.1 PROJECT OVERVIEW

The proposed SLR traverses rolling terrain in the southern outskirts of Peshawar Urban Area, spanning 42.53 Km from PTEX (near Sathi Khel) to N-55 at Badaber, terminating at Dheri N-5/GT Road as shown in **Figure 2.1**. This link road connects key national routes (N-5 and N-55) which in turn connect the Sea Ports in the south (Karachi) to Torkham, a pivotal international border city between Pakistan and Afghanistan. Torkham is a vital border crossing facilitating significant transportation. The Islamabad Peshawar Motorway (M-l), part of the China Pakistan Economic Corridor (CPEC) Eastern Alignment, intersects with N-5 near Chamkani. The construction of the link road as a part of the PTEX project, will seamlessly connect these crucial cross-country national routes to PTEX, facilitating smooth traffic flow from the south to the northern border region.

2.2 PROJECT LOCATION MAP AND INTERCHANGES ENROUTES

The GOP through NHA intends to undertake the construction of SLR, approximately 42.53 km in length. The SLR from Dheri to Sathi Khel will be a controlled access facility, planned as a 4-lane (2+2). The project has been conceived to be implemented on Design Build basis under the supervision of NHA.

The following (04) Interchanges are planned along the route:

1) At Sathi Khel (connecting to PTEX) Interchange
2) Near Bara Road Interchange
3) Frontier Road Interchange
4) GT Road (Dheri) Interchange

The four (04) Interchanges are to be constructed to facilitate access to local communities, towns and villages along the alignment. The map of interchanges is presented as **Figure 2.1.**

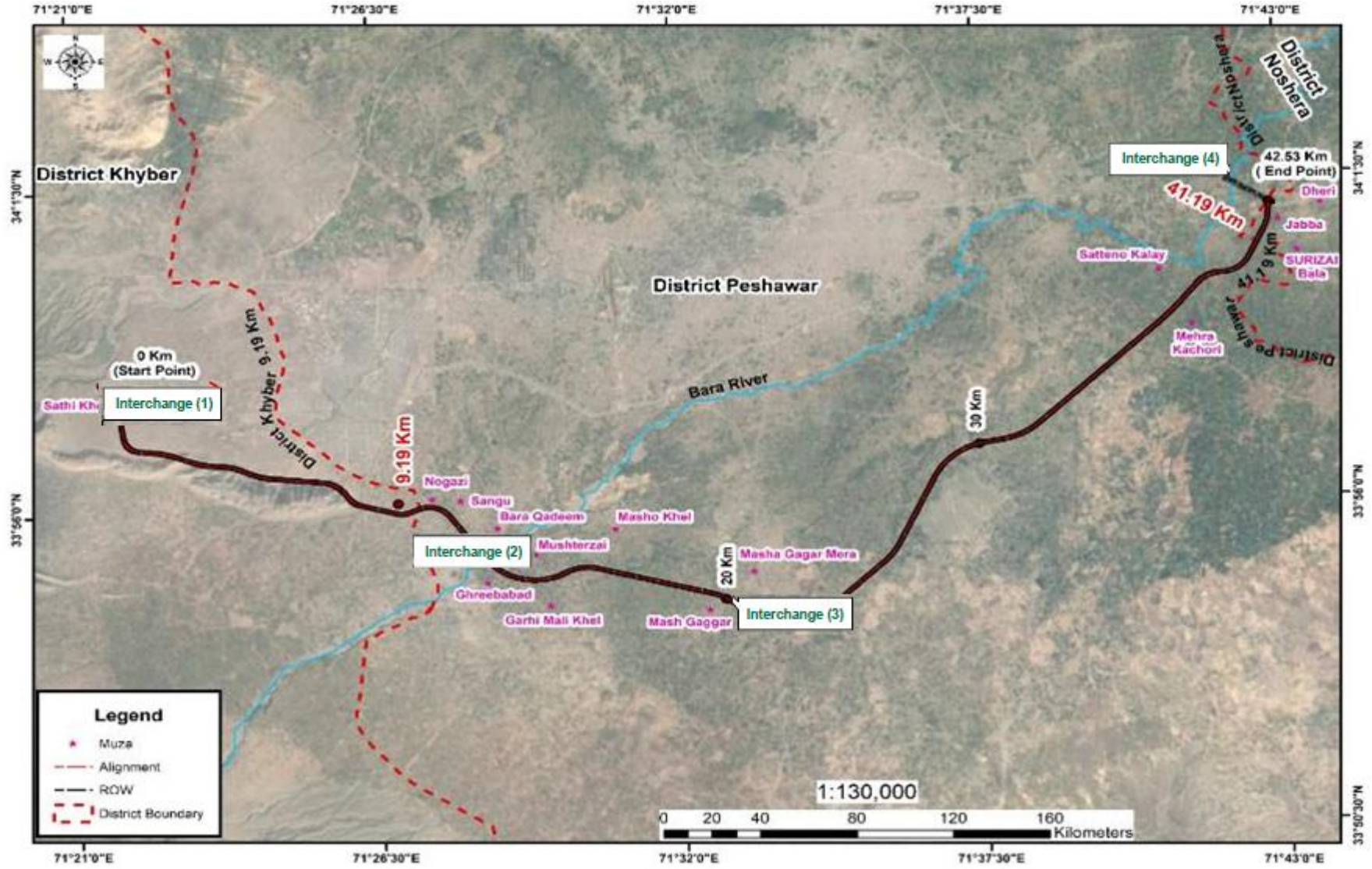


Figure 2-1: Map showing the Project Interchanges

2.3 SCOPE OF WORK

The Project envisages construction of an approximately 42.53 Km long 4-lane link road between Sathi Khel and Dheri. The project includes all earthworks, pavement works, structures including culverts and bridges, Interchanges with Toll Plaza and building works, drainage, ancillary works and Intelligent Transportation System (ITS). The specific features of the scope of the Project shall be as follows:

- Construction of a 4-lane link road divided controlled access/exit with standard New Jersey Barrier (NJB) as median and fences with a ROW of 100m.
- The Detailed Design shall be done as per the minimum requirement of Design Criteria.
- Cattle creeps (at least 3.0-meter clearance) and pedestrian bridges (with ramp facility for motorcyclists) at appropriate locations, after the finalization of design on ground.
- Service Areas (with minimal facilities including Mosque, Restaurants cum Tuck Shops, Parking facilities, and Toilets) on the locations determined in accordance with the terms of this Agreement.
- Provisions shall be made to mitigate disruptions due to link road caused to existing irrigation channels, uplift irrigation canals and water courses crossings (lined and unlined) used for agriculture throughout the road alignment;
- State of the art and fully automated Toll Plazas shall be established equipped with Advance Electronic Toll Collection system.
- Permanent Weigh Stations or full featured High-Speed Weigh-in-motion (WIM) stations shall be established at appropriate locations (at entry slips of all interchanges) for axle load control.
- Anti-glare PVC adjustable shield at required locations where safety demands, but not limited to, at sharp curves shall be provided;
    - Angle reflectors shall be provided at new Jersey barrier (NJB) as per the highway safety standards.
    - LED/latest technology lighting shall be provided at the Interchanges, the Toll Plazas and tunnel(s).

2.4 SALIENT FEATURES

Salient features of the Project are as under:

Table 2.1: Salient Features

ITEM	DESCRIPTION
Alignment	New
ROW	100 Meter
Length	42+53 km
Main Interchanges	04 Nos.
No. of Lanes	04 (four)
No of Box Culverts	175
Pre-Stressed Bridge	18
Subways	39
Flyovers	05
Median	New Jersey Barrier
Re-Settlement Involved	Yes
Land Acquisition	Public & Private land

ITEM	DESCRIPTION
Serviceability to Region	Very High
Cattle creeps	(at least 3.0-meter clearance)
Pedestrian bridges (with ramp facility for motorcyclists)	At appropriate locations, where needed
ITS including surveillance, monitoring, electronic tolling, weigh bridge (SSWIM & WIM) and communication	Where required
Greening and Environmental Protection Works	Interchanges, Main Toll Plazas, Service Areas
Construction Period	33 months

Typical Cross section of Bridges and Typical X-Section of Roadway have been provided in **Figure 2-2** and **Figure 2-3** respectively.

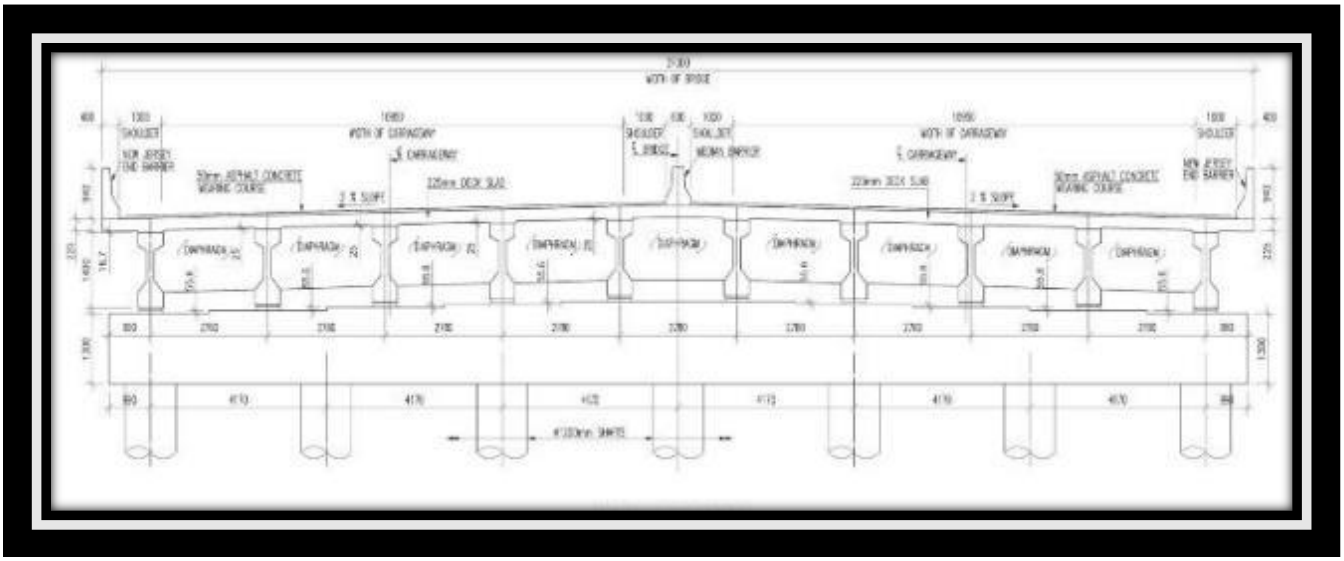


Figure 2-2: Typical Cross Section of Bridges

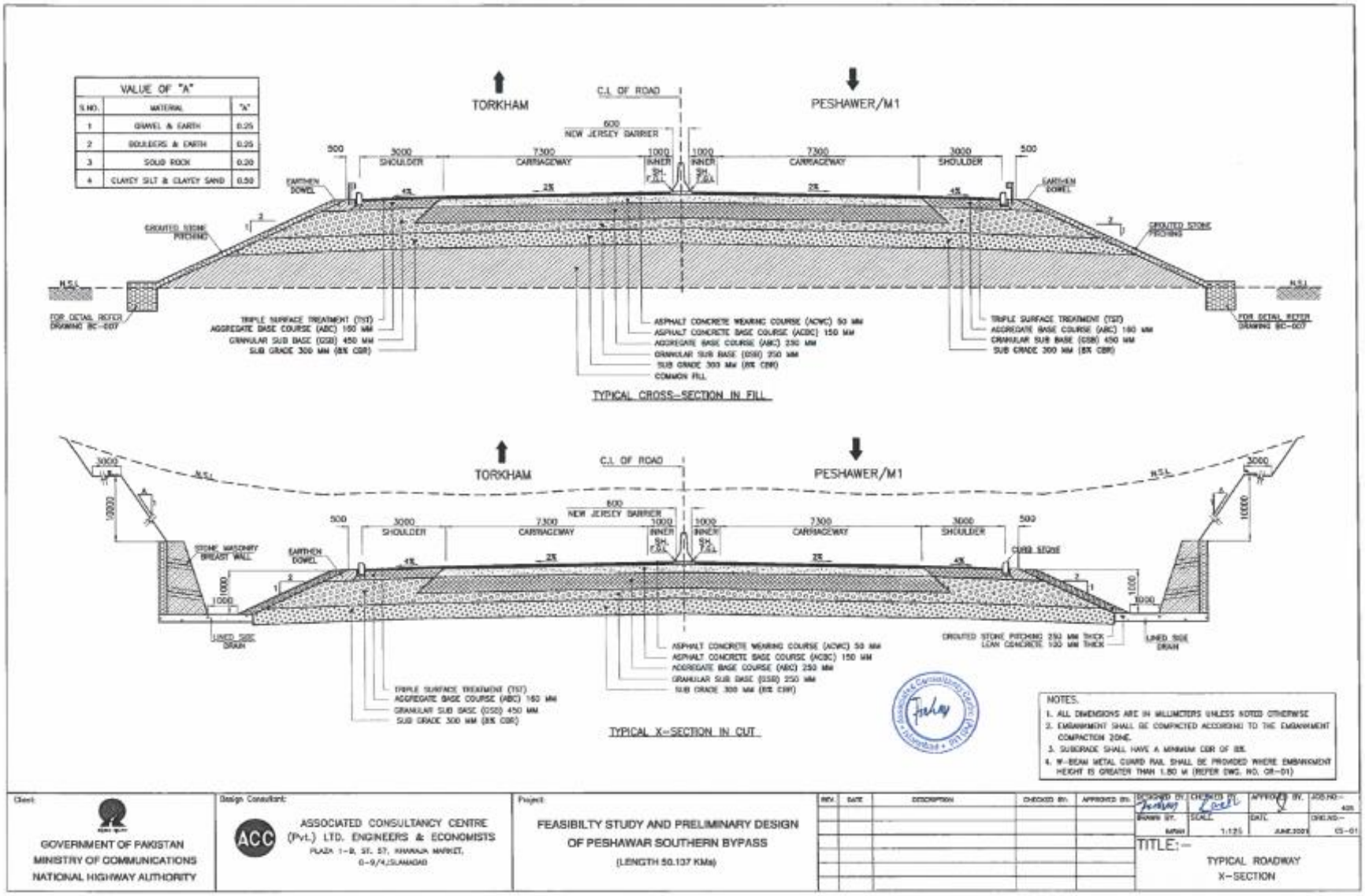


Figure 2-3: Typical Roadway X-Section

2.5 CONSTRUCTION MATERIALS

The materials to be used in the construction of SLR would include coarse aggregates (crush), fine aggregates (sand), soil, water, asphalt, reinforcement, cement etc. Almost all these raw materials are mostly locally available along the alignment. Huge magnitude of construction material for proposed SLR will be procured from approved quarries and most probably, the new quarries will not be required, as sufficient material is available in the designated nearby quarries. However, if new quarries are required, then these will undergo separate E&S impact assessment to be included in the CESMP by the contractor during the construction stage. Details of the construction material for the proposed link road are discussed in the sections below.

2.5.1 Borrowing of Material for Sub Base

The topography of the proposed SLR project area is variable: including rolling to the flat and mountainous terrain. A suitable material for sub-base is available along the alignment at pertinent locations and hence is economical. The available material may consist of pit run or rock-cut gravels, sand-gravels mix or soil aggregates. Gravels, boulders mixed with sandy soil are available along the link road. Seasonal river (nullahs) beds in various locations in the alignment have potential to provide an adequate quantity for sub-base and these extractions are approved by the local authorities. Whereas sand with different gradations can be adopted with mix modifications or the material will have to be imported from near around coarser quarries for the sub-base purpose. The following **Figure 2.4** provides tentative location of the borrow areas. It is to be noted that not all the identified locations will be used during the construction. The exact number and location of borrow areas will depend on the final design and also only the financial viability for the contractor to use a certain borrow area. Any borrow area to be used will be approved by the Supervision Consultant and required E&S documentation prepared before commencing its use.

Figure 2-4: Proposed Borrow Areas

i. Crushed Aggregate

Alignment encounters hilly areas at Sathi Khel and the last 2-3 km patch of the road towards N-5. Blasting remnants of the road track will also be used as raw material for crushing which will be locally crushed to yield aggregate for road pavement and structures. Crushed stones will be tested by the Design Consultant and will be used if found suitable.

ii. Fine Aggregate (Sand)

Samples of sand available from local Nullah have to be tested by the design consultant for their graduation after removing coarse fractions. Also, the sand available from the bed of river Kabul & Bara Rivers has to be brought under analysis and gradation for the fulfillment of specifications before using for construction. Sand is going to be extracted with the help of cranes and transported by trucks.

iii. Sub-grade Material

A large quantity of sub-grade (soil) will be required for sub-grade filling of 4-lane link road construction having 42.53 km length. Borrow pits will be developed at locations within reasonable reach which have the provision of suitable borrow material. To stop borrow pits from becoming the breeding ground for disease vectors will have to rehabilitated by leveling them to avoid filling of drainage water.

The materials used in construction of this link road would include coarse aggregates (crush), fine aggregates (sand), soil, water, asphalt, reinforcement, cement etc. Almost all these raw materials are locally available in the area. The exact quantity of sub grade material would be estimated by contractor for the construction of link road.

2.5.2 Water Requirement

Assuming that the general water requirement for construction of a link road amount to around 2% of the volume of the concrete mix required for the road, the amount of water required for construction is calculated below:

Water required for construction = 2% x (Embankment height) x (Length of the Road Stretch)
X (Width of dual carriage-way)
= 2% x (4.5 m) x (47000 m) x (100 m)
= 42, 3000 m^3

Average Daily Per Capita Water Consumption (50 gallons/day) the water consumption is estimated to be 7,500-8,000 gallons per day for 150-160 construction workers. Additionally, it is anticipated that about 2 tankers (approx. 30,000 liters) shall be required during construction phase of the proposed project for sprinkling to subdue the dust which may arise as a result of construction activities.

2.5.3 Solid Waste Generation

It is estimated that about 150-160 labor will work on the project (depending upon the requirements) which will generate 75-80kg solid waste. Additionally, liquid waste will also be generated on daily basis by the labor through different activities. Contractor will manage the collection and disposal of waste when the project starts it's working on the ground. This has already been reflected in the LIMP and to be also covered in CESMP.

2.5.4 Asphalt, Reinforcement, and Cement

Two asphalt plants and two concrete batching plants will be required, in view of the quantum of construction works involved. Each such plant would require around 10 kanal area. Capacity of the asphalt plant will be 120 t/hr., while that of concrete batching plant will be 30 cum/hr.

The exact sites of these plants will be managed by the Contractor temporarily on rent basis and depends on the land availability and the stretches of the road where work starts earliest, as concrete and asphalt has the limited time to transport, after which it is no longer usable. Estimated usable time for asphalt is 5 hrs. while that for concrete is 2-3 hours.

However, it could be safely assumed that one asphalt plant and one concrete plant could be located at the start point of the proposed road near Frontier Road, while the other one would be somewhere close to Sathi Khel near N-5. If any of these two materials are not used within the specified time, they become waste that will be difficult to handle. Therefore, the Contractor should prepare environmental management plan for these plants.

2.6 TEMPORARY FACILITIES

Temporary facilities like construction yards, construction camp, workshops, and stores will have to be constructed and area will be designated as temporary. The project will also have quarries and excavation areas. The facilities will be rented as per requirement and in consultation with the R.E/SC. This arrangement will be designated in CESMP (to be prepared by the contractor).

2.6.1 Construction/Labor Camps

Camp site will be selected keeping in view the availability of adequate area for establishing camp sites, including parking areas for machinery, stores and workshops, access to local markets, and an appropriate distance from sensitive areas and settlements in the vicinity. It is anticipated that around 150-160 labor will be required for the completion of this project.

The area required for construction camps will depend upon the deployed manpower and the type and quantity of machinery mobilized however estimated area required is 1000-1500 square yard for each camp site. In view of the area required, two probable sites have been identified and locations shown in **Figure 2.5.** However, CESMP[1] (CESMP will be prepared by the contractor before the start of construction) and other local considerations will be considered before the final selection of camp sites.

[1] CESMP (Construction Environment Site Management Plan) to be prepared by the Contractor and to be approved the Supervision Consultant and Client.

Figure 2-5: Proposed Camp Sites

2.6.2 Manpower Requirements

The Contractor will mobilize staff depending on the stretch of the site to be constructed and package length awarded to the contractor. The manpower required during the construction phase of the proposed link road is presented in **Table 2.2** given below.

The manpower for construction phase is further divided into office staff and field staff. The field staff would comprise of 20% skilled and 80% unskilled staff. Most of the unskilled workforce for construction of road will be acquired from local resources. In case of skilled workforce also, the locals will be given preference.

Table 2.2: Distribution of Labor

Type of Labor	Local	Non-Local	Total
Skilled	20%	80%	100%
Semi-skilled	60%	40%	100%
Unskilled	100%	0	100%

2.6.3 Construction Machinery and Equipment

The list of machinery and the equipment required but not limited to for the proposed project is as per the contact period for completion of the project and is enlisted in **Table 2.3.**

Table 2.3: List of Proposed Machinery

S. No.	Machinery
1	Excavators
2	Front End Loader
3	Grader
4	Cranes
5	Third Wheel Rollers
6	Dump Truck
7	Aggregate Spreaders
8	Dozer
9	Asphalt Plant
10	Asphalt Distributor
11	Batching Plant/Crusher
12	Water Tankers
13	Concrete Transit Truck
14	Concrete Pump
15	Water Pumps
16	Vibratory Roller
17	Vibrators
18	Generators

2.7 TRAFFIC STUDY

Traffic Data Collection and projections thereof of traffic volumes are basic requirements for planning of road development and management schemes. Traffic volume studies are conducted to determine the number, movements, and classifications of roadway vehicles at a given location. This data can help identify critical flow time periods, determine the influence of large vehicles on vehicular traffic flow, vehicle hourly patterns, document traffic volume trends

and annual traffic estimates. The length of the sampling period depends on the type of count being taken and the intended use of the data recorded.

The subject Traffic study Report is intended to provide necessary input data for determination the magnitude and pattern of the traffic load for the project road. This involves collection, verification and analysis of the traffic data. From the collected data, the projected traffic for the design life is calculated and converted into Equivalent Standard Axle Loads (ESAL) for the structural design of pavement. ACC conducted a detailed traffic survey on National Highways N - 5 close to Killa Jamrud during September 2021.

The primary objective for this traffic survey is to determine the current traffic plying on N –5 at Killa Jamrud (towards Peshawar and towards Torkham) to evaluate the existing traffic pattern, and an estimate of future traffic statistics including calculation of traffic ESALs.

- The traffic study comprises of following main tasks:
- Classified Traffic counts
- Estimation of Growth Factors
- Estimation of Projected Volumes
- Calculation of ESALs

2.7.1 Traffic Counts Plan

Traffic Counts have been carried out manually using traffic enumerators. Detailed forms were provided to the enumerators along with site training was provided. Chief enumerator was stationed to overall review the quality of the traffic surveys.

Detailed traffic survey has been carried out at following locations during September 2021[2].

Sr.#	Location	Period
1	On N – 5 @ Killa Jamrud	8 Days (24 Hrs.) Traffic Count i/c OD Survey

The traffic survey was stratified by the vehicle type. **Table 2.4** lists the vehicle types counted during traffic study:

Table 2.4: Traffic Survey Vehicle Types

Fast Moving Vehicles			
Sr.#	Vehicle Type	Sr.#	Vehicle Type
1	Motor Cycle	7	Truck 2. Axle
2	Rickshaw	8	Truck 3. Axle
3	Car/ Taxi / jeep	9	Truck 4. Axle
4	Mini Bus	10	Truck 5. 6 Axle & Above
5	Large Bus	11	Tractor Trolley
6	Pickup / Van		

Traffic counts have been carried out on N - 5 at Killa Jamrud for 8 days (24 Hrs.) in order to cover peak and lowest traffic during September 2021.

[2] Conducted by Associated Consultancy Centre (Pvt.) Ltd. (ACC)

Figure 2-6: Traffic Count Location (Killa Jamrud)

Following **Tables 2.5** provide the ADT for September 2021 on N – 5 @ Killa Jamrud. Traffic counts were conducted direction wise in the field, while they were combined for the calculation of Average Daily Traffic (ADT).

Table 2.5: Summary of Average Daily Traffic (ADT) at Killa Jamrud

Sr. #	Vehicle Type	ADT
1	Motor Cycle	217
2	Rickshaw	45
3	Car/ Taxi / jeep	17,652
4	Mini / Medium Bus/ Wagon	2,579
5	Large Bus	7
6	TCV/Pickup	693
7	2-Axle Truck	707
8	3-Axle Truck	524
9	4-Axle Truck	299
10	5-Axle Truck	179
11	6-Axle Truck	119
12	Agriculture Tractor	6
	Total ADT	23,028

2.8 DESIGN SPEED

The project corridor passes through plain and rolling terrain. The adopted design speed is 120 kmph throughout the stretch. Design speed for various terrains given below in **Table 2.6.**

Table 2.6: Design Speed

Nature of Terrain	Road Gradient of Ground	Design Speed (Kmph)
		Ruling
Plain & Rolling	3% to 5%	120

2.9 ADMINISTRATIVE JURISDICTION OF THE PROJECT

The project area falls in three Districts of Khyber Pakhtunkhwa (KP), namely Nowshera (1.34 KM), Peshawar (32 KM), and Khyber (9.19 Km). The middle section of the proposed project falls under the administrative jurisdiction of District Peshawar and ends at N-5 at Dheri, District Nowshera.

2.10 TRAFFIC CONTROL DEVICES & ROAD SAFETY DEVICES

Traffic control devices and road safety devices shall comprise of road signs, road markings, object markers, hazard markers, studs, delineators, attenuators, safety barriers, boundary fences, boundary stones, kilometer stones, etc.

2.11 PROJECT DURATION

The construction works will take around 33 months and it may take more time depending on the ground situation.

3 POLICY, ADMINISTRATIVE AND LEGAL FRAMEWORK

Upon a careful perusal of these legal frameworks, the project has been categorized under Category "A" of World Bank OP 4.01 (Environmental Assessment) and Schedule II of Pakistan Environmental Protection Agency (Review of IEE/EIA Regulations), 2000. Thus, the project requires ESIA and EIA respectively.

3.1 HISTORICAL AND CONSTITUTIONAL CONTEXT

The development of statutory and other instruments for environmental management has steadily gained priority in Pakistan since the late 1970s. The Pakistan Environmental Protection Ordinance, 1983 was the first piece of legislation designed specifically for the protection of the environment. The promulgation of this ordinance was followed, in 1984, by the establishment of the Pakistan Environmental Protection Agency (Pak–EPA), the primary government institution at that time dealing with environmental issues.

Significant work on developing environmental policy was carried out in the late 1980s, which culminated in the drafting of the Pakistan National Conservation Strategy (NCS). Provincial environmental protection agencies were also established at about the same time. The National NEQS were established in 1993. In 1997, the PEPA 1997 was enacted to replace the 1930 Ordinance. PEPA conferred broad–based enforcement powers to the environmental protection agencies. This was followed by the publication of the PEPA (Review of IEE/EIA Regulations) 2000 which provided the necessary details on the preparation, submission, and review of IEE and EIA.

Prior to the 18th Amendment to the Constitution of Pakistan in 2010, the legislative powers were distributed between the federal and provincial governments through two 'lists' attached to the Constitution as Schedules. The Federal list covered the subjects over which the federal government had exclusive legislative power, while the 'Concurrent List' contained subjects regarding which both the federal and provincial governments could enact laws. The subject of 'environmental pollution and ecology' was included in the Concurrent List and hence allowed both the national and provincial governments to enact laws on the subject. However, as a result of the 18th Amendment, this subject is now in the exclusive domain of the provincial government. The main consequences of this change were as follows:

The Ministry of Environment at the federal level was abolished. Its functions related to the national environmental management were transferred to the provinces. To manage the international obligations in the context of environment, a new ministry—the Ministry of Climate Change—was created at the federal level.

The PEPA 1997 is technically no longer applicable to the provinces. The provinces were required to enact their own legislation for environmental protection. However, to ensure legal continuity PEPA 1997 continued to be the legal instrument for environmental protection in the provinces till enactment of provincial laws.

All four provinces have enacted their own environmental protection laws. These provincial laws are largely based on PEPA 1997 and, hence, provide the same level of environmental protection as the parent law.

3.2 NATIONAL CONSTITUTIONAL, POLICY, AND LEGISLATIVE FRAMEWORK

Pakistan has in place relatively a comprehensive constitutional, policy, and legislative framework for the protection of the environment and people. This section is structured around the constitutional foundation and legislative hierarchy. An overview of relevant national policies is presented, followed by separate discussion of national and provincial environmental and social legislation applicable to the Project and supporting guidance documents. National and provincial regulatory authorities with mandate to oversee implementation of and compliance with, environmental and social legislation are introduced at the end of the section.

3.2.1 Constitution

Whilst the constitution of the Islamic Republic of Pakistan is silent on the topic of environmental protection as such, however the Constitution does ensure the “right to life” and the “right to dignity” under Articles 9 and 14 of the Constitution. According to these Articles, the right to clean environment is a fundamental right of all citizens of Pakistan, as defined by the Supreme Court of Pakistan. In addition, the Constitution also supports the “promotion of social justice and eradication of social evils” (paragraph 37) and requires that the state makes “provision for securing just and humane conditions of work, ensuring that children’s and women are not employed in vocations unsuited to their age or sex, and for maternity benefits for women in employment” (Paragraph 37(e)).

3.2.2 Environmental & Social Policy Framework

The environmental and social policies guiding the legislative framework in Pakistan are summarized in **Table 3.1.**

Table 3.1: National Policies Relevant to the Project

Policy	Content Summary	Relevance to the Project
NCS (1992)	The Pakistan NCS is the principal policy document for environmental issues in the country and was developed and approved by the Government of Pakistan on March 01, 1992. The NCS deals with 14 core areas: • Maintaining soils in cropland • Increasing irrigation efficiency • Protecting watersheds • Supporting forestry and plantations • Restoring rangelands and improving livestock • Protecting water bodies and sustaining fisheries • Conserving biodiversity • Increasing energy efficiency • Developing and deploying material for renewable energy • Preventing/abating pollution • Managing urban wastes • Supporting institutions for common resources • Integrating population and environmental programs • Preserving cultural heritage.	This ESIA considers impacts on all relevant environmental issues specified in this Strategy.
National Environmental Policy (NEP) (2005)	The NEP was implemented in 2005 to provide an overarching framework for addressing Pakistan’s environmental issues. It provides directions for addressing sectorial issues and provides a means for promoting	The present ESIA has been prepared in consistence with this Policy

Policy	Content Summary	Relevance to the Project
	conservation and environmental protection in water, air and waste management, forestry, and transport. The NEP aims to promote protection of the environment, the honouring of international obligations, sustainable management of resources and economic growth.	
KP River Protection Ordinance 2002 and River Protection Act (Amendment), 2014	The act states that "Any organization or individual, who intends to construct bridge, culverts, crossing structure and flood protection works on rivers, streams, nullahs, drains and water channels shall obtain an NOC, before the commencement of works."	The present ESIA has been prepared in consistence with this Act.
National Water Policy 2018 (NWP)	Objectives of the NWP include, amongst others, efficient management and conservation of existing water resources, optimal development of potential water resources and improved flood control and protective measures.	Protection of water resources has been considered in this EIA.
National Forest Policy 2010 (NFP)	The NFP establishes the policy framework for the restoration, development, conservation and sustainable management of forests and allied natural resources. It seeks to ensure the sustainability of ecosystem functions, services and benefits for present and future generations.	Protection of forest resources has been considered in this ESIA.
National Climate Change Policy, 2012	In September, 2012, the GoP launched its National Climate Change Policy. Environmental assessment is integrated in the preamble of the policy. The policy commits for taking appropriate measures for mitigation and adaptation to climate change through tools of environmental assessment.	The present ESIA has been prepared in consistence with this Policy

3.3 ENVIRONMENTAL AND SOCIAL LEGISLATIONS

3.3.1 Pakistan Environmental Protection Act, 1997

PEPA 1997 is the basic legislative tool empowering the government to frame regulations for the protection of the environment. The act is applicable to a broad range of issues and extends to air, water, industrial liquid effluent, soil, marine, and noise pollution, as well as to the handling of hazardous wastes. As defined in the Act "environment" means: “(a) air, water and land; (b) all layers of the atmosphere; (c) all organic and inorganic matter and living organisms; (d) the ecosystem and ecological relationships; (e) buildings, structures, roads, facilities and works; (f) all social and economic conditions affecting community life; and (g) the inter-relationships between any of the factors in sub-clauses (a) to (f).

3.3.2 Pak-EPA (Review of IEE and EIA) Regulations, 2000

The IEE/EIA Regulations 2000 establish the framework for the preparation, submission, and review of the IEE and EIA. The Regulations categorize development projects for IEE and EIA into two schedules (Schedules I and II). Schedule I includes projects where the range of environmental issues is comparatively narrow, and the issues can be understood and managed through less extensive analysis. Schedule II covers major projects that have the potential to affect a large number of people in addition to generating potentially significant adverse environmental impacts. Preparation of a complete EIA is required for Schedule II projects. Under the IEE/EIA Regulations 2000, Construction of Federal, Provincial Highways likely to cause adverse environmental effect. The proposed project is therefore classified as a Schedule II project and hence an EIA is required to be carried out. After the 18th amendment, Pakistani constitution decentralized environmental management responsibilities, according to

KP IEE/EIA Regulations, the project also falls in schedule-II and requires and ESIA, However, according to KP Environmental Assessment Rules (2021), Federal, Provincial Highways require a full fledge ESIA.

National guidelines for undertaking ESIA in accordance with the IEE/EIA Regulations 2000 include the Policy and Procedures for Filing, Review and Approval of Environmental Assessments, 1997 and Guidelines for the Preparation and Review of Environmental Reports, 1997. The ESIA approval process in Pakistan as described in these Guidelines is illustrated in **Figure 3.1.**

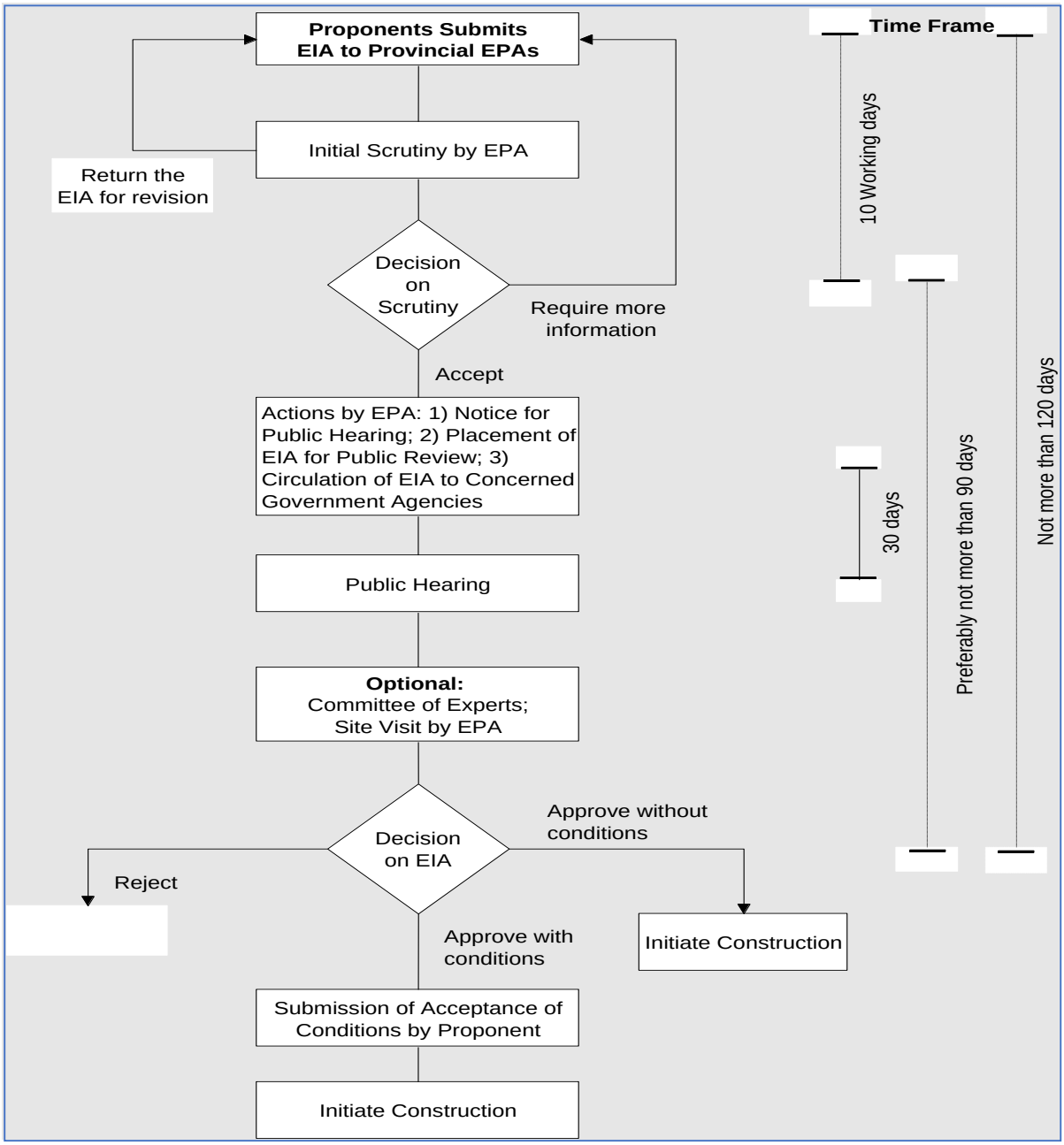


Figure 3-1: ESIA Approval Process in Pakistan

3.3.3 KP-EPA 2014 & KP Environmental Assessment Rules, 2021

The KP-EPA, 2014 and Khyber Pakhtunkhwa Environmental Assessment Rules, 2021, are the provincial versions of the PEPA 1997 relevant to the proposed project. Responsibility for

PEPA was transferred from the federal government to the provincial governments by an amendment to the Constitution of Pakistan in 2012. The provincial versions continue to remain materially the same as the PEPA except where governmental bodies are referred. The following key features of the provincial Acts have a direct bearing on the proposed project:

Section 11 (Prohibition of Certain Discharges or Emissions) states that "Subject to the provisions of this Act and the rules and regulations made there under, no person shall discharge or emit, or allow the discharge or emission of, any effluent or waste or air pollutant or noise in an amount, concentration or level which is in excess of the Environmental Quality Standards".

Section 12-I: IEE and EIA require that "No proponent of a project shall commence construction or operation unless he has filed with the EPA an IEE or, where the project is likely to cause an adverse environmental effect, an EIA, and has obtained from the Federal Agency approval in respect thereof."

Section 12-2b (Review of IEE and EIA): The Environmental Protection Agency shall review the EIA report and accord its approval subject to such conditions as it may deem fit to impose, or require that the EIA be re-submitted after such modifications as may be stipulated or rejected, the project as being contrary to environmental objectives.

Section 14 (Handling of Hazardous Substances) requires that "Subject to the provisions of this Act, no person shall generate, collect, consign, transport, treat, dispose of, store, handle, or import any hazardous substance except (a) under a license issued by the EPA and in such manner as may be prescribed; or (b) in accordance with the provisions of any other law for the time being in force, or of any international treaty, convention, protocol, code, standard, agreement, or other Instrument to which Pakistan is a party." Enforcement of this clause requires the EPA to issue regulations regarding licensing procedures and to define 'hazardous substance.'

Section 15 (Regulation of Motor Vehicles): Subject to provision of this clause of the Act and the rules and regulations made there under, no person shall operate a motor vehicle from which air pollutants or noise are being emitted in an amount, concentration or level which is in excess of the EQS, or where the applicable standards established under clause (g) of subsection (1) of Section-6 of the Act.

Section 17 (Penalties): Whoever contravenes or fails to comply with the provisions of section 11, 12, 13, or section 16 or any order issued there under shall be punishable with fine which may extend to one million rupees, and in the case of a continuing contravention or failure, with an additional fine which may extend to one hundred thousand rupees for every day during which such contravention or failure continues: Provided that if contravention of the provisions of section 11 also constitutes contravention of the provisions of section 15, such contravention shall be punishable under sub-section (2) only.

Section 18 (Offences by Bodies Corporate): Where any contravention of this Act has been committed by a body corporate, and it is proved that such offence has been committed with the consent or connivance or, is attributed to any negligence on the part of, any director, partner, manager, secretary or other officer of the body corporate, such director, partner, manager, secretary or other officer of the body corporate, shall be deemed guilty of such contravention along with the body corporate and shall be punished accordingly.

According to the KP Environmental Assessment Rules, 2021:

- **Application for screening and scoping of project:** The proponent shall file an application with the Agency, having project description or activities

on attached Performa as specified in **Schedule-I** to get clear directives for screening and scoping of the project, as per rule 4.

- **Projects requiring an EIA or IEE or GEA:** Where the project falls with the categories mentioned in Schedules-II, III and IV, the proponent shall file EIA or IEE or GEA respectively, with the Agency.

3.3.4 KP River Protection Ordinance 2002 and River Protection Act (Amendment), 2014

The act states that "Any organization or individual, who intends to construct bridge, culverts, crossing structure and flood protection works on rivers, streams, nullahs, drains and water channels shall obtain approval with conditions, before the commencement of works."

General Prohibition

No person shall:

- Construct, or undertake any related physical works of any commercial building or non-commercial building, or undertake any other developmental work, within two hundred feet to be measured along the slope (lay off land) beyond high water limit on either side of the rivers or their tributaries or on a space within the limits between the banks of a river;
- Place or deposit or release, directly or indirectly, any substance into the river or their tributaries, in excess of the NEQS notified by Government from time to time;
- Dispose, directly or indirectly, any solid waste or hazardous waste or other additional substances specified and notified by Government into rivers or their tributaries.
- Government may increase the limits on either side of a river or its tributaries within which construction of buildings or other developments may be prohibited or regulated under this Ordinance.

3.3.5 National Water Policy 2018

Water resources are inextricably linked with climate and the impending climate change scenario has serious implications for Pakistan's water resources. The changing and unpredictable precipitation patterns may have serious consequences, including flash floods in the north and increasingly prolonged droughts in the south.

As the glaciers retreat, more glacial lakes will form, increasing the risk of Glacial Lake Outburst Floods (GLOF), which are already becoming increasingly common and hazardous in the Northern parts of the country. Only by devising and implementing appropriate adaptation measures will it be possible to ensure water, food and energy security for the country as well as minimize the impact of natural disasters.

The objective of the National Water Policy is to take cognizance of the emerging water crisis and provide an overall policy framework and guidelines for a comprehensive plan of action. Pakistan has a federal system of government and the provinces enjoy a considerable degree of autonomy under the 18thAmendment to the Constitution. Thus, this policy is a national framework within which the provinces can develop their master plans for sustainable development and management of water resources.

The water resource is a national responsibility but irrigation and agriculture, as well as rural and urban water supply, environment and other water related sub-sectors are provincial subjects. The National Water Policy 2018 will be followed during the construction of the link road.

3.3.6 Labor Laws

Labor laws in Pakistan are governed by many legislative tools. Principal labor rights are provided by the constitution of Pakistan. In addition to constitutional rights, acts and ordinances have been enforced time to time for limiting working hours, minimum working age, and conditions of employment.

Of the 24 labor-related laws that existed in 2014 in Pakistan, those set out in **Table 2.2** relate directly to the International Labor Organization's (ILO's) core labor standards and will broadly be applicable to the proposed project.

Pakistan has ratified the ILO conventions for the core labor standards including:

- Freedom of association and collective bargaining (conventions 87 and 98)
- Elimination of forced and compulsory Labor (conventions 29 and 105)
- Elimination of discrimination in respect of employment and occupation (conventions 100 and 111)
- Abolition of child Labor (conventions 138 and 182).

Pakistan has also ratified the United Nations (UN) Convention on the Rights of the Child in 1990 but is not yet subscribed to the UN Convention of the Protection of the Rights of all Migrant Workers and Members of their Families. The related ILO law is shown in **Table 2.2.**

Table 3.2: Laws Related Directly to the ILO Core Labor Standards

Legislation / Guidelines	Brief Description
Employment of Children Act (1991)	Article 11(3) of the Constitution of Pakistan prohibits employment of children below the age of 14 years in any factory, mines or any other hazardous employment. In accordance with this Article, the Employment of Child Act (ECA) 1991 disallows child Labor in the country. The ECA defines a child to mean a person who has not completed his/her fourteenth years of age. The ECA states that no child shall be employed or permitted to work in any occupation set forth in the ECA (such as transport sector, railways, construction, and ports) or in any workshop wherein any of the processes defined in the Act is carried out. The processes defined in the Act include carpet weaving, *beeri* (type of cigarette) making, cement manufacturing, textile, construction and others).
KP Bonded Labor System (Abolition) Act (1995)	The Act seeks to eradicate bonded Labor practices prevailing in the respective provinces. The Acts define the `Bonded Labor System' as a system of forced, or partly forced, Labor under which a debtor enters, or is presumed to have entered into an agreement with the creditor to the effect that: In consideration of an advance obtained by him or by any of the members of his family (whether or not such advance is evidenced by any document) and in consideration of the interest, if any, due on such advance, or ursuance of any customary or social obligation, or For any economic consideration received by him or by any member of his family.
KP Minimum Wages for Unskilled Workers Ordinances (1969)	The ordinances state that every employer shall be responsible for the payment of minimum wages required to be paid under the ordinances to all unskilled workers employed, either directly or through a Contractor, in his commercial or industrial establishment: Provided that where an employer provides housing accommodation to a worker, he may deduct from the wages of such a worker, an amount not exceeding that in the ordinance;

Legislation / Guidelines	Brief Description
	Where the employer provides a worker with transport to and from the place of work, he may deduct from the wages of such a worker an amount not exceeding that specified in the ordinance.
KP Industrial Relations Acts (2010)	These Acts seek to regulate formation of trade unions, regulation and improvement of relations between employers and workmen and the avoidance and settlement of any differences or disputes arising between them and ancillary matters.
Factories Act, 1934 (as amended to 1997)	The clauses relevant to the project are those which concern health, safety and welfare of workers, disposal of solid wastes and effluents, and damage to private and public property. The Factories Act also provides regulations for handling and disposal of toxic and hazardous materials. As construction activity is classified as 'industry', these regulations will be applicable to the Contractor.
The Khyber Pakhtunkhwa Labor Policy, 2018	Major areas of KP Labor Policy are ensuring provision of basic Labor rights, capacity building and institutional development, social protection & welfare and employment promotion and facilitation.
The Khyber Pakhtunkhwa Child Labor Policy, 2018	The Khyber Pakhtunkhwa Coordination Committee on Child Labor (KP CCCL) constituted under section 5 of the KP Prohibition of Employment Children Act, 2015 will be responsible to steer the KP Child Labor Policy. KPCCCL will monitor, review progress and coordinate the integration and mainstreaming of the issue of child Labor in the policies, programs and projects in the social sector.
KP Minimum Wages Act 2013 (Amendment 2022)	An Act to provide for the regulation of minimum rates of wages and various allowances for different categories of workers employed in certain industrial and commercial undertakings and establishments.
The Khyber Pakhtunkhwa Industrial and Commercial Employment (Standing Orders) Act, 2013.	An Act to provide for regulation of industrial and commercial employment in the Province of the Khyber Pakhtunkhwa.
The Khyber Pakhtunkhwa Prohibition of Employment of Children Act, 2015.	An Act to prohibit the employment of children and to regulate employment of adolescents in certain occupations and processes in the Province of Khyber Pakhtunkhwa

3.3.7 Land Acquisition Act

The Land Acquisition Act (LAA) of 1894 provides for the acquisition of private properties for public purposes including development projects in Pakistan. It comprises 55 sections dealing with area notifications, survey, acquisition, compensation, apportionment awards, disputes resolutions, penalties and exemptions. The key clauses of the Act are summarized in **Table 3.3.**

Table 3.3: Key Clauses of Land Acquisition Act

LAA Section	Description
Section 4	Publication of preliminary notification and power for conducting survey.
Section 5	Formal notification of land needed for a public purpose. Section 5a covering the need for enquiry of the concerns or grievances of the affected people related to land prices.
Section 6	The Government makes a more formal declaration of intent to acquire land.
Section 7	The Land Commissioner shall direct the Land Acquisition Collector (LAC) to take order the acquisition of the land.
Section 8	The LAC has then to direct that the land acquired to be physically marked out, measured and planned.

LAA Section	Description
Section 9	The LAC gives notice to all project-affected persons (PAPs) that the Government intends to take possession of the land and if they have any claims for compensation then these claims are to be made to him at an appointed time.
Section 10	Delegates power to the LAC to record statements of the PAPs in the area of land to be acquired or any part thereof as co-proprietor, sub-proprietor, mortgage, and tenant or otherwise.
Section 11	Enables the Collector to make enquiries into the measurements, value and claim and then to issue the final "award". The award includes the land's marked area and the valuation of compensation.
Section 11 A (applicable in KP)	Enables the Collector to acquire land through private negotiations upon request of Head of the acquiring department. Upon receipt of any such request the collector is empowered to constitute/notify a committee for assessment of market value of land and verification of title of ownership. On agreement by Head of Acquiring Department, with negotiated market value determined by the committee, the collector shall then direct parties to execute sale deed in favour of acquiring department on stamp paper.
Section 11 B (applicable in KP)	Provides time limit of six months to complete land acquisition process from the date of notification under Section-4.
Section 16	When the LAC has made an award under Section 11, he will then take possession and the land shall thereupon vest absolutely in the Government, free from all encumbrances.
Section 17	Special powers in cases of urgency.
Section 18	In case of dissatisfaction with the award, PAPs may request the LAC to refer the case onward to the court for a decision. This does not affect the Government taking possession of land.
Section 23	The award of compensation to the title holders for acquired land is determined at: i) its market value of land, ii) loss of standing crops, trees and structures, iii) any damage sustained at the time of possession, iv) injurious affect to other property (moveable or immoveable) or his earnings, v) expanses incidental to compelled relocation of the residence or business and vi diminution of the profits between the time of publication of Section 6 and the time of taking possession plus 15% premium in view of the compulsory nature of the acquisition for public purposes.
Section 28	Relates to the determination of compensation values and interest premium for land acquisition.
Section 31	Section 31 provides that the LAC can, instead of awarding cash compensation in respect of any land, make any arrangement with a person having an interest in such land, including the grant of other lands in exchange.
Section 48A (LAA-1986)	If within a period of one year from the date of publication of declaration under section 6 in respect of any land, the Collector has not made an award under section 11 in respect to such land, the owner of the land shall, unless he has been to a material extent responsible for the delay be entitled to receive compensation for the damage suffered by him in consequence of the delay.

3.3.8 KP Land Acquisition (Amendment) Act 2020

This Amendment adds Section 11-C to the LAA 1894 for acquisition in Newly Merged Areas to recognize communally and tribally owned land, and to put in place procedures for land acquisition and compensation for the newly merged districts (for example, Khyber District) where land settlement has not been done by the government and therefore land records are not available. The Amendment states that "notwithstanding anything contained in this Act or any other law for the time being in force, in the Merged Districts as defined in paragraph C of

Article 246 of the Constitution of the Islamic Republic of Pakistan, where no record of rights exists, the land acquisition and subsequent determination of price shall be made, on the bases of prevailing local customs, traditions and usages regarding determination of ownership of land its sale or purchase, including but not limited to *qaumi* commission of elders of the locality, *nikat* or private negotiation where the ownership is undisputed, in the manner as may be prescribed."

A request for land is submitted by the concerned department to the Deputy Commissioner (DC) or BOR. The land in question is notified by the Collector under Section 4 of the LAA (subject to the acquiring department having sufficient funds), land boundaries and coordinates are set using GPS.A Committee (under Rule 10) is notified chaired by the DC and including members from the DC Office, Revenue and land acquiring department3 where land acquisition process is followed as per the LAA, 1898 with successive amendments.

Section 11-C is related to merge districts (formerly FATA). After approval by the Committee, the DC notifies a Qaumi Commission composed of tribal elders and Maliks who are tasked with confirming land ownership, boundaries, setting the rate, and disbursing funds if required. All liability for the pricing of the land and ownership falls on this Commission. They are also paid a fee as per the Rules. The land acquisition and land valuation will be determined in accordance with the prevailing local customs, tradition and usages regarding ownership of land and its sale or purchase. The Collector may consider the Qaumi Commission recommendation for the list of owners and price of land.

3.3.9 KP Land Acquisition Rules 2020

The KP Land Acquisition Rules 2020 based on the LAA 1894 govern land acquisition in KP. The Amendment and subsequent Khyber Pakhtunkhwa Land Acquisition Rules (2020) are in use for land acquisition by the government in the Newly Merged Districts, as confirmed by the KP Board of Revenue and Peshawar Commissioner's Office (responsible for revenue in Mohmand and Khyber). The Rules cover compulsory acquisition by the government, acquisition through private negotiations and acquisition by companies. Part IV of the Rules cover land acquisition in Merged Areas subject to identification of land by the Collector and availability of sufficient funds for acquisition by the Acquiring Department. The salient features of the rules regarding land acquisition in Merged Areas are provided in **Annexure III.**

3.3.10 Secondary and Complimentary Environmental Legislation

An overview of secondary and complimentary legislation relevant to the environmental and social aspects of the Project is presented in **Table 3.4.**

Table 3.4: Secondary and Complimentary Social and Environmental Legislation

Legislation / Guidelines	Brief Description	Relevance to the Current Project
National Environmental Quality Standards 2012	Powers for regulating Environmental Quality Standards (EQS) transferred from the national government to the provincial governments in 2012. The EQS are materially the same as the National EQS (NEQS) that were established in 1993 and were subject to amendment in 2000, 2009 and 2010. EQS relevant to the Project include: Municipal and liquid industrial effluents (32 parameters) Industrial gaseous emissions (18 parameters)	The proposed project will comply with these standards.

[3] https://www.pakp.gov.pk/acts/the-khyber-pakhtunkhwa-land-acquisitionamendment-act2020/

Legislation / Guidelines	Brief Description	Relevance to the Current Project
	Motor vehicle exhaust and noise (used and new vehicles) Ambient air quality (9 parameters) Drinking water quality (32 parameters) Noise (four zones during day and night).	
Forest Act (1927) and Forest (Amendment) Act (2010)	The Forest Act of 1927 establishes the right of Government of Pakistan (GOP) to designate areas of reserved forest, village forest and protected forest. GOP is enabled to acquire such areas in order to prohibit or restrict the public use of such resources or other activities within them.	It has been confirmed in consultation with the Forest Department of both the provinces that no such areas are present within the Project Area of Influence (AOI).
Khyber Pakhtunkhwa Wildlife Protection, Preservation, Conservation and Management Act (1975) (the KP Wildlife Act)	The provincial Wildlife Acts have been established to provide direct protection to the provinces' wildlife resources and indirect protection to other natural resources. Wildlife is categorized by degree of protection, i.e. animals that may be hunted on a permit or special license, and species that are protected and cannot be hunted under any circumstances. Restrictions are also established for hunting and trade in animals, trophies, or meat. Categories of wildlife protected areas are also formalized and include National Parks, Wildlife Sanctuaries, and Game Reserves.	ESIA has been prepared in consistence with these Acts. The Project will need to be undertaken in accordance with these Wildlife Acts.
Protection of Trees and Brushwood Act (1949)	The Protection of Trees and Brushwood Act of 1949 prohibits the cutting or lopping of trees along roads and canals planted by the Forest Department unless prior permission of the Forest Department is obtained.	ESIA has been prepared in consistence with this Act. Contractor will have to comply with this Act.
Antiquity Act (1975)	The Antiquities Act of 1975 ensures the protection of cultural resources in Pakistan. The act is designed to protect defined "antiquities" from destruction, theft, negligence, unlawful excavation, trade and export. Antiquities have been defined in the Act as ancient products of human activity, historical sites, or sites of anthropological or cultural interest and national monuments. The law prohibits new construction in the proximity of a protected antiquity and empowers GOP to prohibit excavation in any area which may contain articles of archaeological significance. The guideline procedure for Environment Assessment recommended by the KP-EPA reads as follows: **"**If the proponent or the consultant identifies an archaeological site that appears to be of importance but the site is not listed, they should discuss the site with the relevant conservation authority**"**. **"**The relevant conservation authority should inform the Responsible Authority of their assessment of the significance of the likely impact of the proposed development early in the process, in order for the Responsible Authority to determine the level of documentation required. The KP-EPA will then be in a position to review the level of reporting required in the light of advice from the Archaeology Department**"**.	There are no known antiquities in the project area. Chance Find procedures have been included in this ESIA. Contractor will have to comply with this Act.

Legislation / Guidelines	Brief Description	Relevance to the Current Project
Motor Vehicle Ordinance (1965) and Rules (1969)	The ordinance deals with the licensing requirement for driving; powers of licensing authority, Regional Transport Authority and those of Court vis-à-vis disqualification for license and registration requirements to control road transport; compensations for the death of or injury to a passenger of public carrier; powers of Road Transport Corporation; traffic rules, power to limit speed, weight, use of vehicles; power to erect traffic signs; specific duties of drivers in case of accident and powers of police officers to check and penalize traffic offenders. All vehicles used during construction/operation of the Project, by Proponent, Consultants and the Contractor will be subject to this Motor Vehicle Ordinance 1965 and rules 1969.	The Contractor will have to comply with these Rules.
Highway Safety Ordinance (2000)	This Ordinance includes provisions for licensing and registration of vehicles and construction equipment; maintenance of road vehicles; traffic control offences, penalties and procedures; and the establishment of a police force for motorways and national highways to regulate and control the traffic as well as keep the highways clear of encroachments.	The Contractor will have to comply with this Ordinance.
Pakistan Penal Code (1860)	The Pakistan Penal Code deals with offences where public or private property and/or human lives are affected due to the intentional or accidental misconduct of an individual or body of people. In the context of the environment, the Penal Code empowers local authorities to control noise, toxic emissions and disposal of effluents.	The Contractor will have to comply with this Code.
Pakistan Explosives Act (1894)	The Pakistan Explosive Act of 1884 provides regulations for the handling, transportation and use of explosives during quarrying, blasting and other purposes. The quarrying of stone for rip rap or concrete aggregates may need blasting at the quarry site. In this event these regulations will be applicable for this project.	The Contractor will have to comply with this Act.
Regulation of Mines and Oil Fields/ Mineral Development Act (1948)	This legislation provides regulatory procedures for the quarrying and mining of construction material on public as well as private lands.	The Contractor will have to comply with this Act.

3.4 ENVIRONMENTAL GUIDELINES

A number of guidance documents have been published by GOP that set out more details on how environment policy and legislation are expected to be implemented in practice. Environmental guidance documents relevant to the Project are listed in **Table 2.5.**

Table 3.5: Environmental Guidelines

Legislation / Guidelines	Brief Description	Relevance to the current project
Policy and Procedures for the Filing, Review and Approval of Environmental	These Guidelines define the policy context and the administrative procedures that govern the environmental assessment process, from the project prefeasibility stage to the approval of the environmental report.	The ESIA has been prepared in compliance with this policy

Legislation / Guidelines	Brief Description	Relevance to the current project
Assessments (1997)	Requirements for the preparation of an Environmental Management Plan (EMP) are also covered. An EMP is defined as a "document designed to ensure that the commitments in the Environmental Report, subsequent review reports, and Environmental Approval conditions are fully implemented" and is "usually finalized during or following detailed design of the proposal, after Environmental Approval of the development application".	
Guidelines for the Preparation and Review of Environmental Reports (1997)	These guidelines address project proponents, and specify the: • Nature of the information to be included in environmental reports • Need to incorporate suitable mitigation measures into every stage of project implementation • Requirement to specify monitoring procedures • TORs for the reports to be prepared by the project proponents.	These policies are applicable for review of ESIA
Guidelines for Public Consultation (1997)	The Guidelines for Public Consultation cover approaches and techniques for effective public consultation. An effective consultation strategy is considered to be one that captures the views of all major stakeholders, allowing for the incorporation of concerns in the impact assessment.	Consultations have been carried out during ESIA preparation in accordance with these Guidelines
Guidelines for Sensitive and Critical Areas (1997)	These Guidelines establish environmental assessment procedures (including formal checklists) that are to be followed by projects that are located within or near to officially protected areas in Pakistan. Officially protected areas include those designated to protect critical ecosystems such as biosphere reserves, national parks, wildlife sanctuaries and preserves, and archaeological sites.	No protected areas are located within or in the vicinity of the Study Area (0.5 km wide corridor along the project route).

3.5 INTERNATIONAL TREATIES AND CONVENTIONS

Pakistan is a signatory to a number of international environment and social related treaties, conventions, declarations and protocols. The following are the relevant international treaties and conventions to which Pakistan is a party:

- Convention on the Conservation of Migratory Species of Wild Animals
- Convention on International Trade in Endangered Species (CITES),
- Convention on Wetlands of International Importance
- Convention on the Control of Trans-boundary Movements of Hazardous Wastes and their Disposal
- Convention concerning the Protection of World Culture and Natural Heritage
- Convention on the International Trade in Endangered Species
- International plant protection convention
- International Covenant on Economic, Social and Cultural Rights
- International Labor Organization's (ILO) Core Labor Standards on
- Freedom of association (convention 87)
- Elimination of forced and compulsory Labor (conventions 29 and 105)
- Elimination of discrimination in respect of employment and occupation (conventions 100 and 111)

- Abolition of child Labor (conventions 138 and 182)
- Kyoto Protocol to the Convention United Nations Framework on Climate Change
- Stockholm Convention on Persistent Organic Pollutants
- United Nations Convention on Biological Diversity
- United Nations Convention on the Rights of the Child
- United Nations Framework Convention on Climate Change.

3.6 ENVIRONMENTAL REGULATORY AUTHORITIES

A number of national and provincial governmental agencies perform functions relevant to the Project. These agencies and their relationship to the Project are discussed below.

3.6.1 Ministry of Climate Change

The Environment Division of the Ministry of Climate Change at federal level is the focal agency for national policy, legislation, plans, strategies and programs with regard to disaster management and climate change including environmental protection and preservation. The division also deals with other countries, international agencies and forums for coordination, monitoring and implementation of environmental agreements. Policies set by the Ministry of Climate Change will influence the design and operation of the project.

3.6.2 Other Provincial Departments

The key relevant departments and their roles are summarized below.

3.6.2.1 Department of Forest

- Preparation and implementation of policies and programs in forestry sector.
- Implementation of Forestry Laws and rules.
- Protection, conservation, development and management of renewable natural resources, particularly forests and range lands in the province.
- Sustainable management of forest for production of timber, firewood and other non-timber produce and services.
- Demarcation and protection of Forest lands against encroachment.
- Raising of nurseries and plantations.
- Provide extension services for mass awareness and conduct research and training for capacity building.

The Forest Department will be involved in case of the need to fell any trees in the government forests.

3.6.2.2 Department of Wildlife

- Protection, conservation, preservation and management of wildlife.
- Management of protected areas, wildlife parks, safaris and zoos.
- Public and private participation through trophy hunting, private breeding farms and hunting associations.

As such, no protected areas fall within or adjacent to the study area of the ESIA, however, Contractor and its staff will have to comply with the relevant wildlife protection legislation.

3.6.2.3 Department of Fisheries

- Extension services/fish farming/aquaculture development.
- Conservation, management and development of natural resources.
- Production of fish seed under controlled conditions.

- Research and training activities.
- Introduction of new technologies for enhancing fish production.

The Fisheries Department will be involved in case of any damage to any fish resources and fishponds caused by the project activities. In the proposed link road project, there will no impact on fish, link road passes above water bodies.

3.6.2.4 Revenue Department

Revenue department is responsible for the acquisition of land including assessment, valuation, disbursement of compensation, and mutation in favor of Project Proponent.

3.6.2.5 Agriculture Department

In case of impact on crops and fruit trees, the Agriculture Department is fully responsible for the assessment and valuation of losses.

3.6.2.6 Communication & Works (C&W) Department

The C&W will be involved for the assessment and valuation of losses in case of project impact on structures/ buildings and roads.

3.7 ILO CONVENTIONS

Construction and operational activities during project implementation can affect occupational health of workers. Employers are required to abide by labor laws in respect of their own employees and also to ensure that Contractors also follow the relevant labor laws and rules relating to safety of the workforce and creating a healthy working environment. The CSC consultant shall ensure that workers engaged at project site are not exposed to any danger by monitoring the Contractor's work frequently.

Pakistan is a member state of ILO and has ratified most of the important conventions as shown below in **Table 3.6**. The requirements of these conventions are mostly captured in the national laws.

Table 3.6: ILO Conventions Ratified by Pakistan

Convention		Date Ratified by Pakistan
Fundamental		
C029	Forced Labor Convention, 1930 [Convention concerning Forced or Compulsory Labor]	23 Dec 1957
C087	Freedom of Association and Protection of the Right to Organize Convention, 1948 [Convention concerning Freedom of Association and Protection of the Right to Organize]	14 Feb 1951
C098	Right to Organize and Collective Bargaining Convention, 1949 [Convention concerning the Application of the Principles of the Right to Organize and to Bargain Collectively]	26 May 1952
C100	Equal Remuneration Convention, 1951	11 Oct 2001
C105	Abolition of Forced Labor Convention, 1957 [Convention concerning the Abolition of Forced Labor]	15 Feb 1960
C111	Discrimination (Employment and Occupation) Convention, 1958 [Convention concerning Discrimination in Respect of Employment and Occupation]	24 Jan 1961
C138	Minimum Age Convention, 1973 [Convention concerning Minimum Age for Admission to Employment]	06 Jul 2006

Convention		Date Ratified by Pakistan
C182	Worst Forms of Child Labor Convention, 1999 [Convention concerning the Prohibition and Immediate Action for the Elimination of the Worst Forms of Child Labor]	11 Oct 2001
Governance		
C081	Labor Inspection Convention, 1947 [Convention concerning Labor Inspection in Industry and Commerce]	10 Oct 1953
C144	Tripartite Consultation (International Labor Standards) Convention, 1976 [Convention concerning Tripartite Consultations to Promote the Implementation of International Labor Standards]	25 Oct 1994
Technical		
C001	Hours of Work (Industry) Convention, 1919 [Convention Limiting the Hours of Work in Industrial Undertakings to Eight in the Day and Forty-eight in the Week]	14 Jul 1921
C004	Night Work (Women) Convention, 1919 [Convention concerning Employment of Women during the Night]	14 Jul 1921
C006	Night Work of Young Persons (Industry) Convention, 1919 [Convention concerning the Night Work of Young Persons Employed in Industry]	14 Jul 1921
C014	Weekly Rest (Industry) Convention, 1921 [Convention concerning the Application of the Weekly Rest in Industrial Undertakings]	11 May 1923
C018	Workmen's Compensation (Occupational Diseases) Convention, 1925 [Convention concerning Workmen's Compensation for Occupational Diseases]	30 Sep 1927
C019	Equality of Treatment (Accident Compensation) Convention, 1925 [Convention concerning Equality of Treatment for National and Foreign Workers as regards Workmen's Compensation for Accidents]	30 Sep 1927
C089	Night Work (Women) Convention (Revised), 1948 [Convention concerning Night Work of Women Employed in Industry (Revised 1948)]	14 Feb 1951
C090	Night Work of Young Persons (Industry) Convention (Revised), 1948 [Convention concerning the Night Work of Young Persons Employed in Industry]	14 Feb 1951

3.7.1 Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), Washington, 1975

The convention aims to ensure that international trade in specimens of wild animals and plants does not threaten their survival. It protects certain endangered species from over-exploitation by means of a system of import/export permits. Through its three appendices, the Convention accords varying degrees of protection to more than 30,000 plant and animal species.

3.7.2 Convention Concerning the Protection of the World Cultural and Natural Heritage, Paris, 1972

The primary mission of the World Heritage Convention (WHC) is to identify and conserve the world's cultural and natural heritage, by drawing up a list of sites whose outstanding values should be preserved for all humanity and to ensure their protection through a closer co-operation among nations.

There are no world cultural or natural heritage sites within the Project corridor.

3.8 REQUIREMENTS OF EXTERNAL SUPPORT AGENCIES

Funds in the form of loans or grants for development Projects in Pakistan are generally available from external support agencies like the World Bank / IFC and other bilateral organizations. As a policy matter, external support agencies lay emphasis on the protection of environment and resettlement of affected populations. Proponents of projects in Pakistan planning to receive financial support from such organizations must ensure that the projects are not harmful to the environment, and that appropriate mitigation measures are carried out, as necessary, in accordance with the requirements laid down by the external support agencies.

3.9 PROJECT CATEGORIZATION NOTE

As discussed earlier, according to the KP-EPA requirements, the project requires an ESIA to be submitted in relevant EPAs, which is KP in this case, as it falls under Schedule-II of KP Environmental Assessment Rules, 2021.

3.10 WORLD BANK SAFEGUARDS POLICIES/GUIDELINES

The ESIA will comply with the World Bank safeguards requirements given in the below listed SG policies triggered for KPEC.

OP/ BP4.01: Environmental Assessment

OP/ BP4.11: Physical Cultural Resources

OP/ BP4.12: Involuntary Resettlement

In addition to the above, WBG Environmental, Health and Safety Guidelines and WB ESF/Safeguards COVID-19 Guidelines for Construction Activities and Health and Safety will be followed. The ESIA will also comply with the National Environmental Requirements defined through Pakistan Environmental Protection Act of 1997 and subsequent provincial act, i.e.KP-EPA, 2014 and KP Environmental Assessment Rules 2021.

The ESIA will consider the natural environment (air, water and land); human health and safety; social aspects, trans boundary and global environmental aspects including climate change and its implications, and also induced impacts as well as the cumulative impacts of other development projects in the area. The ESIA will consider natural and social aspects in an integrated way. It will also consider the variations in project and country conditions; the findings of country environmental studies; national environmental action plans; the country's overall policy framework, national legislation and institutional capabilities related to the environment and social aspects; and obligations of the country, pertaining to project activities, under relevant international environmental treaties and agreements.

The applicability of environmental and social safeguard policies of the World Bank is summarized in **Table 3.7.**

Table 3.7: Applicability of WB Safeguard Policies

WB Operational Policies		Triggered		Justification/Action Taken or to be Taken
		Yes	No	
Environmental Assessment	OP/BP/GP 4.01	✓		The project has a potential to cause widespread and

WB Operational Policies		Triggered		Justification/Action Taken or to be Taken
		Yes	No	
				significant impacts hence this OP is triggered, and the project is assessed as category A. The present ESIA (and RAP provided under separate covers) has been prepared in response to this OP.
Natural Habitats	OP/BP 4.04		✓	This policy is not triggered since there is no sensitive habitat in the project area.
Pest Management	OP4.09		✓	The Project does not require the use of pesticides (or other agrochemicals).
Indigenous Peoples	OP 4.10		✓	There are no distinct, social and cultural groups in the project/study area which could qualify as indigenous persons under OP 4.10. The only indigenous community present in Pakistan are The Kalasha, or Kalash, who are an Indo-Aryan people residing in the Chitral District of the Khyber-Pakhtunkhwa province of Pakistan.
Physical Cultural Resources	OP4.11	✓		PCRs are known to exist in the study area. The Chance Find Procedures are included in the ESMP.
Involuntary Resettlement	OP/BP 4.12	✓		The link road construction works will result in resettlement impacts including damage to assets such as crops and structures; hence, this

WB Operational Policies		Triggered		Justification/Action Taken or to be Taken
		Yes	No	
				OP is triggered, and a RAP has been prepared (provided separately).
Forests	OP/BP 4.36		✓	There will be no disruption to forests whereas, the forest trees present in agriculture land will affects.
Projects on International Waterways	OP/BP/GP 7.50		✓	No project activities will be carried out inside or associated with any international water ways nor will the project impact any of such waterways.
Projects in Disputed Areas	OP/BP/GP 7.60		✓	The Project is not located in or near any disputed area.
Disclosure Policy	BP17.50	✓		Consultations with various stakeholders including affected communities were carried out during ESIA study. The final ESIA (and other safeguard documents) will be disclosed at NHA & WB website.
Labour Influx Guidelines 2016		✓		Influx of labour during construction phase might cause social and cultural issues. Therefore, these guidelines should be followed in true letter and spirit.

3.10.1 Environmental Assessment (OP/BP 4.01)

EA Requirement: The WB requires Environmental Assessment (EA) of projects proposed for Bank support to ensure that they are environmentally sound and sustainable, and thus to improve decision making. The Bank Policy OP/BP 4.01 considers that EA is a process whose breadth, depth, and type of analysis depend on the nature, scale, and potential environmental impact of the proposed project. EA evaluates a project's potential environmental risks and impacts in its area of influence; examines project alternatives; identifies ways of improving project selection, siting, planning, design, and implementation by preventing, minimizing, mitigating, or compensating for adverse environmental impacts and enhancing positive impacts; and includes the process of mitigating and managing adverse environmental impacts

throughout project implementation. EA considers the natural environment (air, water, and land); human health and safety; social aspects (involuntary resettlement, indigenous peoples and physical cultural resources); and trans-boundary and global environmental aspects. The Bank Policy also envisages that the borrower Government is responsible for carrying out the EA and the Bank advises the borrower on the Bank's EA requirements.

The present ESIA has been prepared in compliance with this OP/BP.

EA Classification. The WB classifies the proposed project into one of the four categories, depending on the type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental impacts. These categories are defined below.

Category A: A proposed project is classified as Category A if it is likely to have significant adverse environmental impacts that are sensitive, diverse, or unprecedented. These impacts may affect an area broader than the sites or facilities subject to physical works.

Category B: A proposed project is classified as Category B if its potential adverse environmental impacts on human populations or environmentally important areas--including wetlands, forests, grasslands, and other natural habitats--are less adverse than those of Category A projects.

Category C: A proposed project is classified as Category C if it is likely to have minimal or no adverse environmental impacts. Beyond screening, no further EA action is required for a Category C project.

Category FI: A proposed project is classified as Category FI if it involves the investment of Bank funds through a financial intermediary (FI), in subprojects that may result in adverse environmental impacts.

3.10.2 Physical Cultural Resources (OP 4.11)

This policy addresses physical cultural resources, which are defined as movable or immovable objects, sites, structures, groups of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance. Physical cultural resources may be located in urban or rural settings and may be above or below ground, or underwater. Their cultural interest may be at the local, provincial or national level, or within the international community.

The Bank assists countries to avoid or mitigate adverse impacts on physical cultural resources from development projects that it finances. The impacts on physical cultural resources resulting from project activities, including mitigating measures, may not contravene either the borrower's national legislation or its obligations under relevant international environmental treaties and agreements.

3.10.3 Involuntary Resettlement (OP/BP 4.12)

The WB's experience indicates that involuntary resettlement under development projects, if unmitigated, often gives rise to severe economic, social, and environmental risks: production systems are dismantled; people face impoverishment when their productive assets or income sources are lost; people are relocated to environments where their productive skills may be less applicable and the competition for resources greater; community institutions and social networks are weakened; kin groups are dispersed; and cultural identity, traditional authority, and the potential for mutual help are diminished or lost. This policy includes safeguards to address and mitigate these impoverishment risks.

The overall objectives of the Policy are given below.

- Involuntary resettlement should be avoided where feasible, or minimized, exploring all viable alternative project designs.
- Where it is not feasible to avoid resettlement, resettlement activities should be conceived and executed as sustainable development programs, providing sufficient investment resources to enable the persons displaced by the project to share in project benefits. Displaced persons should be meaningfully consulted and should have opportunities to participate in planning and implementing resettlement programs.
- Displaced persons should be assisted in their efforts to improve their livelihoods and standards of living or at least to restore them, in real terms, to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher.

3.10.4 Labour Influx Guidelines 2016[4]

This Note provides guidance on identifying, assessing and managing the risks of adverse social and environmental impacts that are associated with the temporary influx of labor resulting from Bank supported projects. The Note contains guiding principles and recommendations to be considered as part of the design and implementation of projects with civil works that require labor from outside the project's area of influence. This Note does not introduce new requirements, but rather seeks to provide concrete guidance on how to approach temporary labor influx within the environmental and social assessment process.

The key principles of these guidelines are as follows:

- ***Reduce labor influx by tapping into the local workforce.*** The most effective mitigation measure against labor influx is to avoid or reduce it. Depending on the size and the skill level of the local workforce, a share of the workers required for the project may be recruited locally. This is generally easier for unskilled workers, while more specialized staff (typically required in smaller numbers) frequently will be hired from elsewhere. Depending on the requirements of the project and their skill level, it may be possible to train local workers within a reasonable timeframe to meet project requirements. This may be more likely if such trained staff are needed afterwards for the operation and maintenance of the new infrastructure.

- ***Assess and manage labor influx risk based on appropriate instruments.*** The assessment and management of labor influx should be based on risks identified in the ESIA (if available), other Bank-required assessments, and the Bank's sector-specific experience in the country. Depending on the risk factors and their level, appropriate mitigation instruments need to be developed. This may range from broad requirements set out in the ESMP in a low-risk environment, to the need to develop more specialized instruments, such as a site-specific Labor Influx Management Plan and/or a Workers' Camp Management Plan[2] (or other instruments with similar purpose) in a high-risk environment. Risk factors to consider include, but are not limited to, the following: (i) weak institutional capacity of the implementing agency; (ii) predominant presence of contractors without strong worker management and health and safety policies; (iii) anticipated high volumes of labor influx; (iv) pre-existing social conflicts or tensions; (v) weak local law

[4] MANAGING THE RISKS OF ADVERSE IMPACTS ON COMMUNITIES FROM TEMPORARY PROJECT INDUCED LABOR INFLUX; Operations Policy and Country Services (OPCS), Environmental and Social Safeguards Advisory Team (ESSAT), December 2016

enforcement, and (vi) prevalence of gender-based violence[3] and social norms towards it in the community; (vii) local prevalence of child and forced labor.

- ***Incorporate social and environmental mitigation measures into the civil works contract.*** Most adverse impacts from labor influx can only be mitigated by the contractor commissioned by the Borrower to carry out the works. It is therefore paramount that the responsibilities for managing these adverse impacts are clearly reflected as a contractual obligation, with appropriate mechanisms for addressing non-compliance.

This allows the Borrower to enforce the implementation of such mitigation measures, which are required to ensure the Borrower's own compliance with Bank policy requirements. While the Bank reviews and clears project-level safeguard instruments (such as ESIA/ESMP) it is the Borrower's responsibility to: (i) ensure the safeguard instruments are reflected in the contractor's ESMP (CESMP), and (ii) ensure the project is implemented in accordance with the CESMP, safeguard instruments and other relevant contractual provisions.

3.10.5 Environment, Health and Safety Guidelines

The Environment, Health, and Safety (EHS) Guidelines contain the performance levels and measures that are generally considered to be achievable in new facilities or projects by existing technology at reasonable costs. In addition, there are also industry-specific EHS guidelines. The guidelines that are relevant to the Project are: General EHS Guidelines[5]

3.10.6 Public consultation and disclosure requirements by World Bank

The Bank reaffirms its recognition and endorsement of the fundamental importance of transparency and accountability to the development process. Accordingly, it is Bank's policy to be open about its activities and to welcome and seek out opportunities to explain its work to the widest possible audience. According to 'OP 4.01: Environmental Assessment' of the World Bank, the following conditions apply to the Project.

Consultations. For all Category A and B projects, the borrower should consult the project-affected groups and local nongovernmental organizations (NGOs) about the project's environmental aspects and takes their views into account. The borrower should initiate such consultations as early as possible. For Category A projects, the borrower should consult these groups at least twice: (a) shortly after environmental screening and before the terms of reference for the EA are finalized; and (b) once a draft EA report is prepared. In addition, the borrower should consult with such groups throughout project implementation as necessary to address EA-related issues that affect them.

Disclosure. For a Category A project, the borrower should provide relevant information on project interventions in a timely manner prior to consultation and in a form and language that is understandable and accessible to the groups being consulted. The borrower should provide a summary of the proposed project's objectives, description, and potential impacts for the initial consultation. For consultation after the draft EA report is prepared, the borrower should provide a summary of the EA's conclusions. In addition, for a Category A project, the borrower makes the draft EA report available at a public place accessible to project-affected groups and local NGOs. The borrower also ensures that EA reports for Category "A" projects are made available in a public place accessible to affected groups and local NGOs. The document needs to be translated into Urdu. Public availability of the EA report for Category A project in the borrowing country and official receipt by the Bank are prerequisites to Bank appraisal of these projects.

[5] **https://docslib.org/doc/6718232/good-practice-note-road-safety-glossary**

4 STAKEHOLDERS & PUBLIC CONSULTATION

4.1 BACKGROUND INFORMATION

Meaningful consultation and information disclosure to the PAPs and institutional stakeholders at various project stages is crucial for project sustainability. Likewise, participation of stakeholders at all stages of project preparation is essential to meet the objectives of meaningful consultation under resettlement policy. During preparation of the RAP and ESIA study, key stakeholders from diverse backgrounds were consulted to understand their concerns to guide in the adoption of suitable measures in project design and impact assessment. Public participation and consultation were done through individual, group, and community meetings.

4.2 IDENTIFICATION OF PROJECT STAKEHOLDERS

Stakeholders of the project include the PAPs, locally affected communities and their formal and informal representatives, national or local government authorities, civil society organizations, and groups with special interests, the academic community, or business owners.

Stakeholders were classified into primary stakeholders, who would be directly affected negatively or positively by the project, and secondary stakeholders who would be indirectly affected by the project (or who could indirectly affect the project). The **Table 4.1** depict the stakeholders of the project area:

Table 4.1: Identification of Stakeholders and Methods used for Consultation

Sr. No.	Stakeholder Category	Stakeholder	Consultation Method
01	Project Affected Persons (PAPs)	• People whose properties will be acquired or affected, i.e., houses, land and other assets. • People that might be indirectly affected by the project. • People who shall benefit from project activities in the form of employment or business opportunities.	• Group meetings • Individual meetings • Community meetings • Individual interviews
02	General population in the Area of Influence (AoI)	• Civil Society and Community Based Organizations, • Influential people	• Group meetings • Individual meetings • Community meetings
03	Government Institutions	• National Highway Authority (NHA) • Agriculture Department, Peshawar • Agriculture Department, Nowshera • Directorate of on-farm water management • Revenue Department • Wildlife Department • Forest Department • Local Government Department • Social Welfare Department • Communication and Works (C&W) Department. • Environment Protection Agency KP	• Formal consultative meetings •

4.3 CONSULTATION WITH STAKEHOLDERS

Consultations were conducted with all the stakeholders using various mode of engagements as identified in **Table 4.1** above. The main objectives of these consultations were to collect the views of the stakeholders regarding the proposed project and identify measures to ensure maximization of project benefits and minimization of project's negative impacts. Consultation meetings were conducted in 12 villages, in which the participants expressed their view freely. The consultation was carried out with the stakeholders during the months of August, September 2022 and May 2023. The schedule of stakeholder consultations carried is given below in Table 8.2. Photo log of consultation meetings and signed attendance sheets are attached as Annexures XII and XV respectively.

Table 4.2: Schedule of Public Consultation Meetings with Male PAPS

Sr.#	Date	Village/ Location	Alignment	District	No. of Participants	Location in Kilometre
1.	23-5-2023	Sathi Khel	New alignment	Khyber	10	5+500
2.	23-5-2023	Sathi Khel	New alignment	Peshawar	6	11+600
3.	24-5-2023	Sangu	New alignment	Peshawar	10	13+400
4.	24-5-2023	Gharibabad	old alignment	Peshawar	12	14+400
5.	25-5-2023	Mushterzai	New alignment	Peshawar	8	15+700
6.	25-5-2023	Masho Khel	Old alignment	Peshawar	15	20+400
7.	26-5-2023	Masho Gagar	New alignment	Peshawar	8	21+000
8.	01-9-2022	Masho mera	old alignment	Peshawar	18	21.5 to 29
9.	31-8-2022	Masho Khel	old alignment	Peshawar	09	29 to 34
10.	31-8-2022	Suriazai Bala	Old alignment	Peshawar	14	34 to 41.5
11.	31-8-2022	Settano	Old alignment	Nowshera	17	41 to 442+053
12.	6-9-2022	Jabba	New alignment	Peshawar	04	
Total					**131**	

4.4 INFORMATION DISSEMINATION

During the consultation meetings, following information was shared with the participants:

- Introduction of the project;
- Description of project components, its activities and impacts;
- Discuss social and environmental impacts;
- Discuss overall resettlement related impacts of the project;
- Description of criteria for determining the unit rates of the affected land, crops and trees etc.;
- Description of criteria of evaluation of buildings and other infrastructure;
- Description of criteria of evaluation of business losses;
- Basis for determining the unit rates for compensating the losses of various type of assets; and
- Needs, priorities and reactions of the affected people regarding the proposed Project.

4.5 FINDINGS OF CONSULTATION MEETINGS

The route of SLR was changed of 24+400 km resulting positive impacts on Resettlement and Environment. With new alignment, significant adverse impacts are reduced. 11 villages are excluded, and 2 villages are included due to new alignment, total 13 villages are coming in the new alignment. The Consultations were conducted in 12 villages. Additionally, consultation with women community members were held in 8 village where 71 women participated, during the month of June 2023.A brief data of villages included and excluded is being provided in **Table 4.3**.

Table 4.3: Change of alignment of SLR

S. No.	Villages excluded due to new alignment	Villages/included in the new alignment
1	Shinko(Peshawar)	Sathi Khel/Shah Kass (Khyber)
2	Qamber Khel(Peshawar)	Nogazi (Khyber)
3	Sang Daley(Peshawar)	Sangu (Peshawar)
4	Manday Khas(Peshawar)	Mushterzai (Peshawar)
5	Akka Khel(Peshawar)	Garhi Mali Khel (Peshawar)
6	Mandia(Peshawar)	Behlolzai (Peshawar)
7	Godh Malang(Peshawar)	Masho Gagar (Peshawar)
8	Aziz Market(Peshawar)	Hurizai (Peshawar)
9	Jahangirabad(Peshawar)	Maryamzai(Peshawar)
10	Mera Balarzai(Peshawar)	Surizai Payan (Peshawar)
11	Masho Mera(Peshawar)	Mera Kachori (Peshawar)
12		Tarnab (Peshawar)
13		Jabba (Nowshera)

The questions asked by the locals were very common and similar during the field survey. Thus, the answers were also common and similar.

Following are the key findings of the consultation meetings presented in **Table 4.3.**

Table 4.4: Key Stakeholder Concerns and Team Responses

Question	Answer
Participants asked for Identification of ROW.	ROW of the proposed alignment was showed from map and kmz file.

Question	Answer
Is the alignment finalized?	It is the changed alignment, tried to minimize the project impacts.
When will the project construction start?	We have only its alignment and ROW/width. Design engineers are working to prepare detailed design. After finalization of detailed design, the construction will start.
Is the project approved?	Approved and is at the feasibility stage.
What are the project impacts?	The construction of the project will have impact on residential houses, land, trees and crops etc.
What about the land compensation?	The affected landowners will be compensated on the market rates of land prevailing in the project area.
Which rates will be adopted for compensation of land, trees and structures?	Market rates will be adopted for compensation of lost assets. Land compensation by the Revenue Department, structures by the Buildings Department, trees and crops by the Agriculture/Horticulture Department, non-fruit trees will be by the Forest Department for fair compensation.
Is there possibility to change alignment to avoid residences and religious structures of mosques and sensitive sites like graveyards?	. In the start, there were 10 graveyards coming in the ROW. Issue was discussed with the NHA and the design consultants, as a result, under new alignment, two graveyards will be impacted.A few mosques will be impacted and these will be re-built by the project at a suitable place with the consultation of the local community.
We want to meet Project Director to avoid adverse project impacts, how could we do this?	You can meet the Project Director to register your issues. Provided address of Project Director, Peshawar.
The women queried that is there any chance to avoid their houses?	The team assured them to report their concern to the relevant authority. Detailed design will ultimately convey resettlement impacts.
By avoiding graveyards, many houses near these graveyards may also be safe?	Yes, there is chance to avoid those residential houses.
The women asked that will the land for new houses be provided by the Government.	No. The compensation of affected house and land will be paid to the PAP in cash. The PAP can arrange new site of living as per his own choice and requirement.
Agreed or disagree for the proposed project?	After avoiding graveyards, the locals are satisfied to a great extent. But still they were disagreed by the current alignment due to residential houses under impact and dislocation of the families.

4.6 CONSULTATIONS WITH INDIVIDUAL PAPS

Apart from the group consultations at various locations, consultations with individual persons being affected were also conducted throughout the alignment. When there were affected structures or assets of a person within in the RoW, the team contacted the affected persons, introduced the project and collected the data of the PAP along with measurement of the

affected structures etc. The teams walked inch by inch in the ROW and noted down all affected structures/assets and interacted/consulted with the affected person.

Total 199 PAPs for residential structures and 08 PAPs for commercial structures were contacted in individual capacity to discuss the project and impacts on their assets. The village wise list of each PAP is attached as **Annexure - XI**. Due to new alignment 72 persons of 8 villages were consulted regarding project impacts and their opinion noted. This consultation is documented above.

4.7 CONSULTATION FOR COMMUNITY AND PUBLIC AFFECTED STRUCTURES/ FACILITIES

During census survey for the Resettlement Action Plan (RAP. Forthcoming), the survey teams observed many structures under project impact including graveyard, mosque, school and water supply scheme. Because a vast majority of the locals are benefiting from these facilities, they have concerns upon the project impacts. The concerned locals strongly demanded to change the alignment for the safeguard of these assets and community properties.

Consultation in village Nogazi, at km 10+500

Consultation in Masho Gagger, at km 20+400

Consultation in village Sango Maira at km 20

Consultation in Maira Masho Gagger at km 21

Consultation in village Masho Khel

Consultation, Bara road at km 12+800

4.8 CONSULTATION WITH GOVERNMENT DEPARTMENTS

For consultation with Government departments a letter was sent to all the concerned departments for acquisition of data /information as well as for inviting their feedback/concerns /suggestions regarding the Social and Environmental Impacts of the project during the months of August, 2022. The purpose of the letter to the concerned officers to keep them well informed regarding the purpose of the visiting Environment and Soical team. A number of brief consultations with community people were also arranged during the site visits of the RoW. It was through brief informal interview with Agriculture District Officer Peshawar, On Farm Water Management officer of Nowshera, Peshawar, Khyber, Agriculture Officer (Extension) Nowshera, HQ Wildlife Peshawar, Add. AC Revenue, DFO Nowshera Forest Division, Agri. Statistics Officer, Agriculture Officer (Extension) Nowshera, Dy. DG Social Welfare Peshawar, Deputy Planning Officer Peshawar, Agriculture Officer (Extension) Peshawar , Sub Divisional Officer C&W Nowshera, AC Pabbi Nowshera, PA to AC Nowshera and Director Agri. Peshawar.

The consultant experts explained the proposed project and its impacts to the Government officials in concerned districts. **Table 2.4** presents findings of consultation meetings with government departments. The complete photolog of consultations with PAPs and government departments is attached as **Annexure XII.**

Table 4.5: Consultations with Government Departments

Sr. No	Designation & Department	Points of Discussion / Apprehensions	Remarks
01	District Agriculture Officer Peshawar	The project alignment will adversely affect the agricultural land, especially maize and sugarcane crops from the proposed alignment. In addition, the fruit orchards such as Plum, Apricot and Peach will also be damaged. Wheat and various types of vegetables are grown. Due to rapid urbanization, the existing agricultural land is under extreme pressure. Agricultural land is shrinking due to urban development.	Incorporated in chap 6
02	Agriculture Officer (Extension) Nowshera	The proposed project has negative impacts on the agriculture land but it will resolve the traffic issue. Most people depend on agriculture, therefore proposed alignment will ultimately affect the livelihood of the local community. It will create social issues as well.	Incorporated in chap 6

Sr. No	Designation & Department	Points of Discussion / Apprehensions	Remarks
03	District Officer on-farm Water Management Nowshera	The proposed project will not affect our ongoing projects. However, the proposed project will disturb the agricultural land and residential area.	No impact on department projects.
04	District Officer on-farm Water Management Peshawar	The proposed alignment of the project was discussed with the officer. He apprised that the proposed project will not affect their ongoing projects.	No impact on department projects.
05	District Officer on-farm Water Management Khyber	The proposed alignment of the project was discussed with the officer. The survey team was told that the proposed project will not affect their ongoing projects.	No impact on department projects.
06	District HQ OFWM	The project alignment and attributes were discussed with the officer in detail. It was anticipated that there would be no impacts on their ongoing projects, therefore, they have no apprehensions regarding the project.	No impact on department projects.
06	Add. AC Revenue	AC inquired about cutting of forest trees and orchards. He was also informed about effect on assets within the alignment.	Incorporated in chap 6
07	HQ Wildlife Peshawar	District Peshawar and Khyber have variety of species, which change with the altitude. In these districts, the species are not endangered, which may affect with the proposed project. Only fruit orchards and agriculture land will be affected by the proposed project. If government changes the alignment of the project to the non-populated areas, then this issue will also be resolved.	Incorporated in chap 6
08	DFO Nowshera Forest Division	There is no harm to reserved forest. Mostly poplar trees and agricultural land will be affected from the proposed alignment.	Incorporated in chap 6
09	Agri. Statistics Officer	The project will badly affect the agricultural land in the area. Wheat, sugarcane, maize and various types of vegetables are grown in the district. The agricultural land is shrinking day by day due to infrastructure development and projects.	Incorporated in chap 6
10	Deputy Planning Officer	The proposed project will affect the agricultural land and residential area of the district.	Incorporated in chap 6
11	Dy. DG Social Welfare	The proposed project has negative impacts on the local community. Majority of local community rely on agriculture. The commencement of project will reduce the agricultural land, which will affect their livelihood. The major source of income will be disturbed from this project. Therefore, government should re-align the proposed alignment.	Incorporated in chap 6
12	C&W Buildings	The proposed project was briefed to the SDO and his team members. They have no major concerns about the project.	Incorporated in chap 6
13	AC Pabbi	The local community have some serious observations on the proposed alignment of the project. The agricultural land will be affected which will ultimately affect the socio-	Incorporated in chap 6

Sr. No	Designation & Department	Points of Discussion / Apprehensions	Remarks
		economic conditions of the area. The local community emphasized to construct the road in barren area.	
14	PA to AC Nowshera	The proposed alignment was discussed with PA to AC for acquisition of requisite data.	-
15	Director Agri. Peshawar	The alignment of the proposed link road project is mostly passing from the agricultural land, which will ultimately destroy the agriculture practices of the area and residential area. The government should re-align the alignment in scantily populated area and barren land.	Incorporated in chap 6

Meeting with Deputy DG Social Welfare Qayyum Khan (0345 9153665)

Meeting with Deputy Director Planning, Muhammad Asif (0333-9127525)

Meeting with DG Agriculture Extension, Shams Ur Rehman (0300-5891457)

Meeting with Agriculture Statistics Officer

4.9 CONSULTATION WITH FEMALE PAPS

A total 8 formal consultations were conducted during June 2023 with the female PAPs residing along the project corridor by a Gender Specialist as one of the members of survey team. Information on the project was disseminated followed by discussion on roles of women within their families, their concerns regarding livelihood post land acquisition, skill acquired and/or required, plans particularly of those rendered landless, gender-based violence and harassment, access to water, social services and markets. Findings of consultation have been provided in the **Table 4.5** below

Table 4.6: Consultation with Female PAPs

Sr. No.	Village	Date	No. of Participants	Main Concern of the Participants	Responses
1.	Mushtarzai	14-06-2023	10	• Our social cohesion will be affected.	Efforts will be made to preserve social cohesion in affected communities, such as relocating families (self-relocation) together to maintain their networks.
				• They are apprehensive about losing their housing and lands	Open and transparent communication will be prioritized with affected women and the community to build trust and address concerns throughout the project. Fair and just compensation will be ensured.
				• The route alignment should be carried out in a way that it would disrupt the minimum community/ community structures & infrastructures.	Highway Design team will be requested to consider this concern.

Sr. No.	Village	Date	No. of Participants	Main Concern of the Participants	Responses
2.	Ghareebabad	14-06-2023	14	• The project staff, contractors and other people who will work on the project should not disturb the mobility of local women in their routine activities like, collecting fire woods, fetching drinking water from nearby area (in some cases) and others. • Job opportunities should be provided to male members of our village • The project should provide the timely compensation to affected people for damaged assets/ structures, proper assistance in re-construction of similar structures	Contractor will be responsible not to restrict women mobility. The contractors will provide jobs to the locals on priority basis. Compensation will be paid before taking possession of the road alignment
3.	Garhi Mali Khel	15-06-2023	15	• Women are very much worried about their lands and houses. Relocation will be problem • Influx of outside Labor will lead to further restriction on women's mobility and will increase female security risks. • Without proper legal documentation, community members may face difficulties in proving their property ownership, which can hinder their ability to receive fair compensation for their land.	Due gender consultation will be done at all stages of the project to address their concerns properly. Contractor will provide awareness and train his Labor about how to respect local norms/values. He also will be responsible not to restrict women mobility. NHA will set up a dedicated grievance redressed mechanism for affected individuals to address concerns and provide timely responses. Compensation will be transparently provided according to the LAA 1984. Due compensation of house will be provided as per market rate for relocation

Sr. No.	Village	Date	No. of Participants	Main Concern of the Participants	Responses
				• House was constructed just two years ago, fear of losing her home is a distressing	
4.	Mohalla Afridi/Badaber	15-06-2023	06	• Women are afraid to leave their home as according to them, they will never be able to build them again • Adequate and timely payment of the lost assets must be ensured. • Privacy of women should be utmost priority in this tribal belt that should not be affected due to road construction. • A colony should be built for relocated People so that they can live in close vicinity • Many people have no legal documentation for house ownership, so they fear that they will not be eligible for compensation amount as per prevailing Gov. Laws • Gov. Rate is less for buying a land. Market rate should be provided	Adequate compensation will be provided for the construction of new houses, and a grievance redressed mechanism (GRM) will be established to address their concerns in a timely manner Due Compensation will be paid before taking possession of the road alignment Mitigation measures will be proposed to ensure women purdah and privacy. Concern will be communicated to NHA NHA will establish transparent GRM to address community concerns. Compensation will be paid as per LAA 1984. Valuation will be according to the market rate. .
5.	Masho Gagger	15-06-2023	06	• Displacement will lead to social disconnection of the community • Houses should not be affected.	Efforts will be made to preserve social bonding. NHA should consider options such as relocating families together to maintain social networks. Measures were proposed to minimize impact on houses.

Sr. No.	Village	Date	No. of Participants	Main Concern of the Participants	Responses
					Where unavoidable, compensation will be paid as per replace cost.
				• The presence of outside labor should not restrict the movement of local women working in nearby fields. • There will be increase in respiratory diseases due to heavy dust during construction. • Women also shared their concerns over security in the area particularly for young girls going to school.	Contractor will be responsible not to restrict women mobility. Contractor will sprinkle water to suppress dust. Contractor will be responsible to train his workers regarding local norms and culture and to respect it.
6.	Khan Khel Mohallah, Surizai Bala	16-06-2023	08	• Our Social Bonding will be broken • Gov. Taxes make the actual value/price less than market. • A housing scheme is already causing conflicts in this area. People are already engaged with the Commissioner and PDMA. A village member should be appointed as the focal person during land acquisition. • Usually Gov. only consult Patwari, and local people especially women are consulted • Project should provide jobs to male family members	NHA should consider options such as relocating families together (self relocation basis) to maintain social networks, Due compensation will be paid as per prevailing laws of Govt. Noted. Member of local community will be designated as focal person during land acquisition and GRM implementation. All APs including women will be consulted at all stages of land acquisition properly. The contractors will provide jobs to the locals on priority basis.

Sr. No.	Village	Date	No. of Participants	Main Concern of the Participants	Responses
7.	Tarnab Farm, Jabba	17-06-2023	06	• Compensation to should be in the shape of newly built colony where all family members get area to live • Social Bonding will be finished • Compensation should be done before to execute the civil works.	These concerns will be shared with NHA. It will be family's self-relocation to maintain their social networks. Compensation will be paid before taking possession of the road alignment
8.	Aziz Khan Garhi, Mera Kachuri	17-06-2023	06	• Middle school is present in the village but for higher education girls have to go Sokano area. Due to this project, road access will be easy. After road construction, there is chances that higher schools may be open in this area • Houses should not be affected. • Compensation should be adequate and in the shape of house, money and land. • The presence of outside labor should not restrict the movement of local women working in nearby fields.	Yes. This is development project will bring many benefits for the local communities Measures were proposed to minimize impact on houses. Where unavoidable, compensation will be paid as per replace cost. These concerns will be shared with NHA. Contractor will be responsible not to restrict women mobility.

Consultation with Female PAPs in Garhi Mali Khel

Consultation with Female PAPs in Masho Gagger:

Meeting with Female PAPs in Mushtarzai

Meeting with Female PAPs in Ghareebabad

Figure 4-1: Consultation with Female PAPs Pictures

4.10 SUMMARY OF CONSULATION AND CONCERNS RAISED BY PAPs

The following different types of meetings, consultations and focused group discussions were held with the communities and PAPs, facing different types of project impacts. These meetings and consultation were conducted at the different time and locations with different number of participants as shown in **Table 4.6**.

Table 4.7 Types of Meetings/Consultations

Sr#	Types of Meeting/Consultations	No. of Participants
6.	PAPs of residential structure	199
7.	PAPs of commercial structure	08
8.	FGD	131
9.	Gender Assessment (Women's feedback on project impacts)	71
10.	Village profile	124

The stakeholder engagement plan is attached as **Annexure IV.**

4.11 RECOMMENDATION

Feedback received during reconnaissance and scoping included land acquisition and resettlement issues, impact on livelihoods, archaeological aspects of the area and inclusion of chance find procedures in ESIA, compliance with local norms and privacy of women, solid waste generation, vibrations in the area, potential contamination of surface and groundwater, air emissions, compliance with National Environmental Quality Standards (NEQS). The ESIA and ESMP will ensure proper mitigation measures are put in place to address these concerns and impacts.

5 ANALYSIS OF ALTERNATIVES

This chapter is an attempt to compare feasible alternatives to the proposed development in respect to site, technology, design, etc. The criteria adopted for the evaluation of the alternate route for construction of proposed link road comprise of engineering, economic, environmental and social considerations.

This refers to the consideration of alternatives and to these decisions, which will to a large extent, pre-define the Project design. Consequently, the Analysis of Alternatives described in this section is structured to follow a 'narrowing approach' involving a series of logical steps, starting with the high-level alternatives followed by description of more detailed alternatives considered as part of the Project. This project is significantly influenced by the route selection.

Using this commonly adopted narrowing approach, the Analysis of Alternatives considers alternatives in the following sequence:

- The 'Zero' or 'No Project' alternative
- Widening of Existing Roads
- Construction of SLR

5.1 PROJECT OPTIONS

5.1.1 No Project or Zero Alternative

The "no project" alternative is required to ensure the consideration of the original environment without any development. This is necessary for the decision-makers in considering all possibilities. The development will have a minimal effect on the physical environment. In terms of the social environment, the "no-project" alternative would result in traffic detours during rains, increase travel hazard, eliminate job opportunities, higher transport costs, higher travel time, increase the dust nuisance created by driving on deteriorated road and increase the wear and tear on the vehicles.

The no project conditions will result in further worsening the present environmental conditions and increased disturbance to residents of area and the road users. Socio-economic conditions will also be deteriorated due to lack of proper link between the areas up north and rest of Pakistan.

5.1.2 Widening of Existing Roads

These alternatives involve widening the existing roads such as N-55, N-5, reducing sharp curves and turns to enhance the existing alignment's capacity for increasing traffic volume and axle load. However, this approach necessitates extensive land acquisition and resettlement, with potential temporary negative impacts during the construction period.

The current road infrastructure in use for Pak-Afghan trades is heavily strained, with a constant flow of trailers day and night. Unfortunately, the existing road is unable to adequately accommodate the substantial traffic volume, resulting in frequent traffic jams at different sections. Therefore, an Expressway Road is dire need for the region for facilitating trade between Pakistan and Afghanistan, as well as supporting trade routes with other countries such as those in Central Asia. Additionally, improving connectivity for trade involving India and Afghanistan further underlines the critical need for an efficient and well-designed Expressway Road system.

The positive aspects are feasible and cost-effective design is to endure the heavy traffic, generate employment opportunities, develop an efficient trade corridor, avoid the traffic hazards, ensure a stable traffic flow, provide comfort to commuters and reduce the vehicle maintenance cost.

The negative aspects are access to new areas and settlements will not be developed and there will be no improvement in the existing road infrastructure particularly addressing limitations related to distance and velocity. The daily surge in traffic, coupled with increased trade movement along the regional trade corridor, is exacerbating the strain on the road. This mounting pressure will result the road inadequate to meet the evolving needs and demands in the foreseeable future.

Impacts on the environment will be caused by improvement of the road quality without yielding any advantage. Resettlement related issues will arise while accommodating dual carriageway in build-up areas. The conclusion is that it's not possible to widen the existing roads as it passes through build-up area, has sharp curves as well as turns, and has limited RoW. Furthermore, it is not a sound engineering proposal nor does it allow for all the envisaged benefits of the proposed project to be realized. Therefore, this option cannot be supported.

5.1.3 Construction of Southern Link Road

This alternative will involve construction of link road from Sathi Khel (District Khyber) to N-5 at Dheri District Nowshera. The SLR will be the part of the PTEX.

The proposed link road will be constructed on a new alignment, which will traverse through agricultural, residential, commercial and barren land. However, land acquisition and resettlement will be involved and there would be potential negative impacts during construction on temporary basis. Positive impacts include smooth traffic flow, decreased travel hazards, lower transport cost, decreased travel time, decreased wear and tear on the vehicles as well as job opportunities to the local population.

The proposed link road is the dire need to cater the existing heavy traffic load at N-55 and it will able to accommodate the increased vehicular movement. Additionally, in view the importance of ongoing Central Asian Regional Economic Cooperation (CAREC) Program and China Pakistan Economic Corridor (CPEC), it is important that the existing roads should have a link road improve the Trade facilities between Pak – Afghan and Pak – Central Asia countries.

5.2 COMPARATIVE ANALYSIS OF ALIGNMENT OPTIONS

Comparative analysis of the three alignment options for SLR with their pros and cons are discussed in **Table 5.1** and route is represented in **Figure 5.1**.

Table 5.1: Comparison of Alignment Options for SLR

Description	Option 1 (Proposed Alignment)	Option 2	Option 3
Length	42.53 km (Approximately)	50 km (Approximately)	46 km (Approximately)
Design Considerations	• **Right-of-way**: The width of RoW for link road considered is 100 m, i.e., 50 m on either side from the center of the road.	• **Right-of-way:** The width of RoW for link road considered is 100 m, i.e., 50 m on either side from the center of the road.	• **Right-of-way:** The width of RoW for link road considered is 100 m, i.e., 50 m on either side from the center of the road. • **Accessibility:** The alignment runs through

Description	Option 1 (Proposed Alignment)	Option 2	Option 3
	• **Accessibility**: The alignment runs through agriculture land, residential and barren land. The alignment is accessible through existing N-5, N-55, Bara Road and Frontier Road. • However, the length along this route will be shortened as compared to other two proposed so lesser cost of construction and resettlement cost.	• **Accessibility:** The alignment runs through agriculture land, residential and barren land. The alignment is accessible through existing N-5, N-55 and Bara Road, Hayatabad-Bara Road. • The length along this route will be longer as compared to other alternatives so involves higher cost of construction and resettlement cost.	agriculture land, residential and barren land. The alignment is accessible through existing M-1, GT Road, N-5, N-55 and Bara Road and Hayatabad-Bara Road. • The length along this route will be longer as compared to new proposed so higher cost of construction and high resettlement cost.
Environmental and social considerations	• **Physical displacement:** Low physical displacement anticipated in terms of relocation and loss of shelter as compared to old alignment. • **Economic displacement:** Less economic displacement in terms of loss of livelihood, houses and assets are involved. • In District Peshawar and Nowshera, agriculture, seasonal crops and Orchards will affect from the proposed route. • Comparatively less Sensitive receptors such as Mosque, School, and Graveyard will affect from the proposed alignment.	• **Physical displacement:** High physical displacement anticipated in terms of relocation and loss of shelter. • **Economic displacement:** High economic displacement in terms of loss of livelihood, houses and assets was involved. • In District Peshawar and Nowshera, agriculture, seasonal crops and Orchards will affect from the proposed route. • Huge numbers of sensitive receptors such as Mosque, School, and Graveyard will affect from the proposed alignment.	• **Physical displacement:** High physical displacement anticipated in terms of relocation and loss of shelter. • **Economic displacement:** High economic displacement in terms of loss of livelihood, houses and assets was involved. • In District Peshawar and Nowshera, agriculture, seasonal crops and Orchards will affect from the proposed route. • Huge number of sensitive receptors such as Mosque, School, and Graveyard etc. will affect from the proposed alignment.
	•	•	•
Cultural and Religious sites	• Two graveyards and two mosques are present within RoW	• 10 Graveyards and 2 mosques are present within RoW	• Graveyards and mosques maybe avoided within RoW
Ecology	• No protected area, i.e., Game Reserves, National Parks, and	• No protected area, i.e., Game Reserves, National Parks, and Wildlife	• No protected area, i.e., Game Reserves, National Parks, and Wildlife

Description	Option 1 (Proposed Alignment)	Option 2	Option 3
	Wildlife Sanctuaries, fall on the RoW. • 11,140 fruit trees and forest trees such as Popular and *Acacia Nilotica etc.* will affect from the proposed route. No Reserved Forest will affect. • No wetlands, notified by the GOP, along the alignment route. Thus, no impact on any wetland biodiversity. • 1 fish farm was observed or reported in the project area. • No plant species of conservation importance has been observed or reported from the AoI. • No threatened or endemic herpetofauna species. • Lesser water bodies like canal/ distributaries in the RoW.	Sanctuaries, fall on the RoW. • High impact on the flora and fauna of the Reserved Forest. • No wetlands, notified by the GOP, along the alignment route. Thus, no impact on any wetland biodiversity. • No fishing activities were observed or reported in the project area. • No plant species of conservation importance has been observed or reported from the AoI. • No threatened or endemic herpetofauna species. • Water bodies are present in RoW.	Sanctuaries, fall on the RoW. • High impact on the flora and fauna of the Reserved Forest. • No wetlands, notified by the GOP, along the alignment route. Thus, no impact on any wetland biodiversity. • No fishing activities were observed or reported in the project area. • No plant species of conservation importance has been observed or reported from the AoI. • No threatened or endemic herpetofauna species. • Water bodies are present in ROW.
Land	1050 acres	▪ Not estimated in Detail	1375 acres
Residential Structures	199	▪ Not estimated in Detail	506
Commercial Structures	08	▪ Not estimated in Detail	72

5.3 OVERVIEW OF ALIGNMENT OPTIONS

Based on the above comparison, the construction of new link road alignment (42.53 KM Option 1–new alignment) was found environmentally sound and economical feasible than other alignments provided by design consultants.

6 DESCRIPTION OF BASELINE ENVIRONMENT

6.1 GENERAL

The baseline environmental and social information for the SLR project was collected in the field during the months of August, September 2022 and May 2023. Additionally, this information has been supplemented by the acquisition and review of high-resolution satellite data.

6.2 STUDY AREA

SLR Project is about 42.53 km long and 100m in width, starting from Sathi Khel in District Khyber to main N 5 Dheri in District Nowshera. The project will be constructed between three Districts namely Khyber, Peshawar and Nowshera.

Nowshera District lies between 33^{o} – 41’ to 34^{o} – 10’ North latitudes and 71^{o} - 39’ to 72^{o} - 16’ East longitudes. It is bounded on the east by Attock District of Punjab province and in the west by the districts of Peshawar and Charsadda, in the north by districts of Mardan and Swabi and in the south by Kohat district.

District Peshawar lies in 34°00'0.00" North latitude and 71°44'59.99" East longitudes. The district is surrounded by Mohmand District, Khyber, Charsadda, Nowshera and Kohat District.

District Khyber lies in 33.9405° North latitude and 71.0498° East longitudes. The district is surrounded by Peshawar, Orakzai, Kohat, Kurram and Mohmand District.

The project study area primarily includes areas through which the link road project is proposed and where contractor camps/labor camps will be constructed. In addition, it also includes the surrounding areas where the influence of the project implementation will be anticipated. The area of most concerns is included.

Direct Area of Influence: The Project Area of Influence (AOI) is referred to the corridor or area that will be directly affected by the project activities. For this project, the right of way (RoW), measures between 100m (50m on either side), which is also the direct area of influence. AOI map at end point of the proposed route of proposed project is shown as **Figure 6.1**, whereas the full map is shown as **Annexure VIII.**

Indirect Area of Influence: AOI[6] refers to a radius of 0.5 km wide strip around the project boundary for identifying the potential impacts of the proposed project. For this project, the AOI was also selected 0.5km from centerline for noise and other construction related impact parameters.

This is indirect Area of Influence that will be (indirectly) affected by the project activities. Also, this 0.5 km area is selected for collection of baseline data. The direct AoI is RoW i.e., 50 m at either side of Center line.

[6] (AoI) Area of Influence that will be (indirectly) affected by the project activities. Also, this 0.5 km area is selected for collection of baselines data.

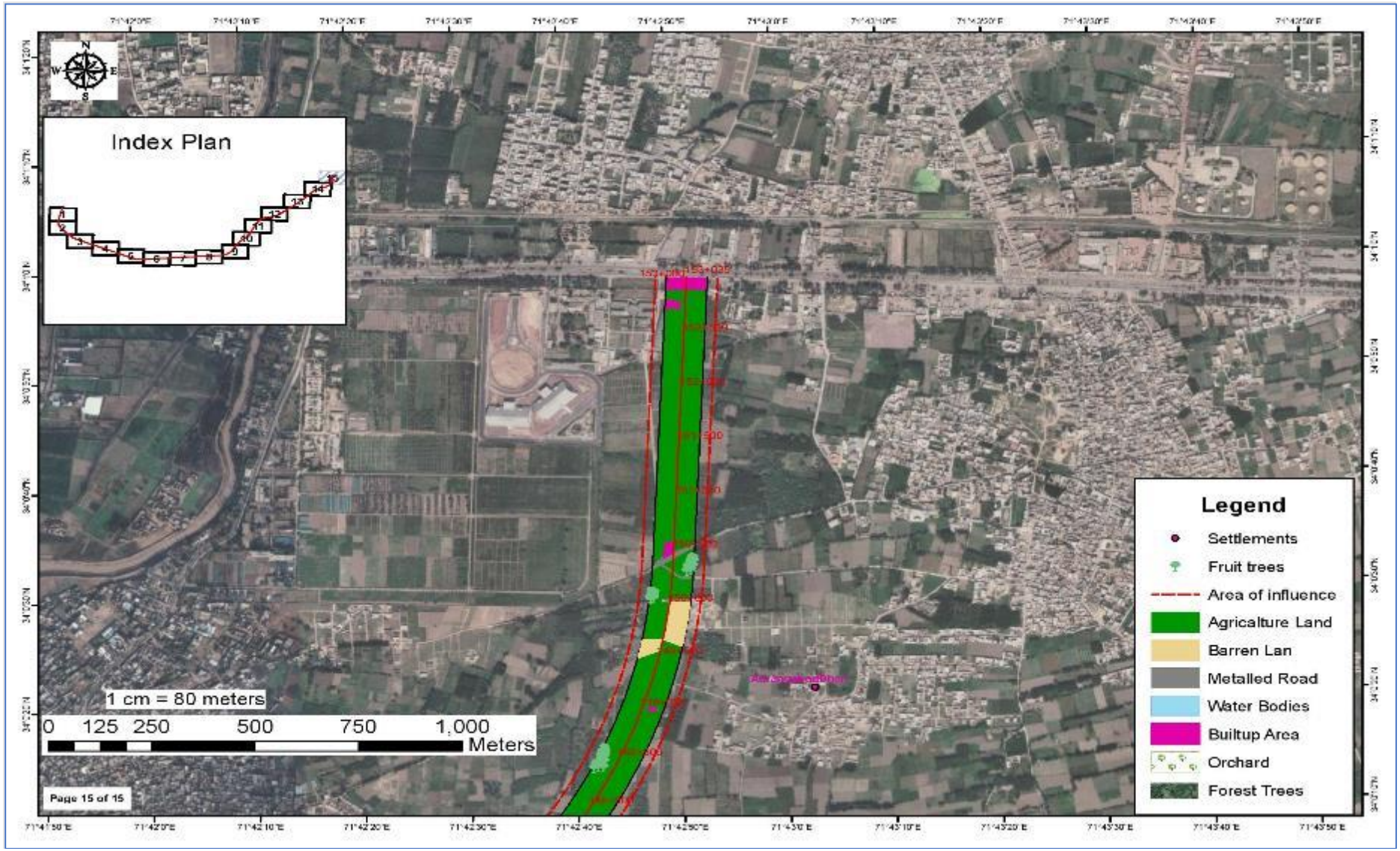


Figure 6-1: AOI Map of Southern Link Road

The required information/ data of a baseline study was classified into two main categories, i.e., primary data and secondary data. The primary data was collected directly from the concerned communities and affected households while secondary data and information were gathered through secondary sources such as census report, research publications, topographic sheets, other published data related to the project such as wildlife, livestock, fishery, forestry, agriculture, horticulture, climate etc.

- The baseline study includes the following aspects:
- Physical Environment
- Biological Environment
- Socioeconomic Environment

6.3 PHYSICAL ENVIRONMENT

Baseline studies on the physical parameters including land resources, topography, climate, geology, seismicity, soils, water resources etc., in the project area are indicative of the following information.

6.3.1 Topography, Geography and Geology

The initial alignment follows the mountainous areas and passes near the settlements of Sathi Khel Bara Qadeem towards the plain area of Dheri, District Nowshera. In general, the topography is mountainous along the Torkham-Jamrud road and after 23 km enters into a flatter region and agricultural areas of village Masho Mera, District Peshawar. Khyber Agency has a barren and rugged mountainous terrain. It consists mostly of hilly tracks and mountains, with narrow strips of valleys. It is the meeting place of a series of ranges, such as the Koh-e-Safaid, an off-shoot of the mighty Hindukush Mountains.

The geology of the area is suitable for link road construction. The rocks exposed include sedimentary, metamorphic formations ranging from Carboniferous to Pre-Cambrian age. Among the major rock types are sandstones, siltstones, shales, phyllites, marbles, quartzites, schist's and carbonate rocks.

The rocks exposed include sedimentary, metamorphic formations ranging from Carboniferous to Pre-Cambrian age. Among the major rock types are sandstones, siltstones, shales, phyllites, marbles, quartzites, schist's and carbonate rocks. Consequently, the existing geological features within and around the alignment are completely suitable for the construction of the link road project.

6.3.2 Land Use

About 9.19 km of the alignment of SLR (220 acres) fall within the District Khyber. The land is unused and barren. Agriculture is limited in this region due to rocky soils, steep slopes, lack of suitable land and limited water supply. Scanty shrub vegetation along slopes and other areas are used as grazing and fuel wood gathering. Whereas 33.34 km (865 acres) of alignment towards District Peshawar and Nowshera the land consists of dense irrigated agricultural, orchards and residential area.

A small section land use map of the proposed project is represented in **Figure 6.2** below, whereas the completed land use map is represented as **Annexure VIII.**

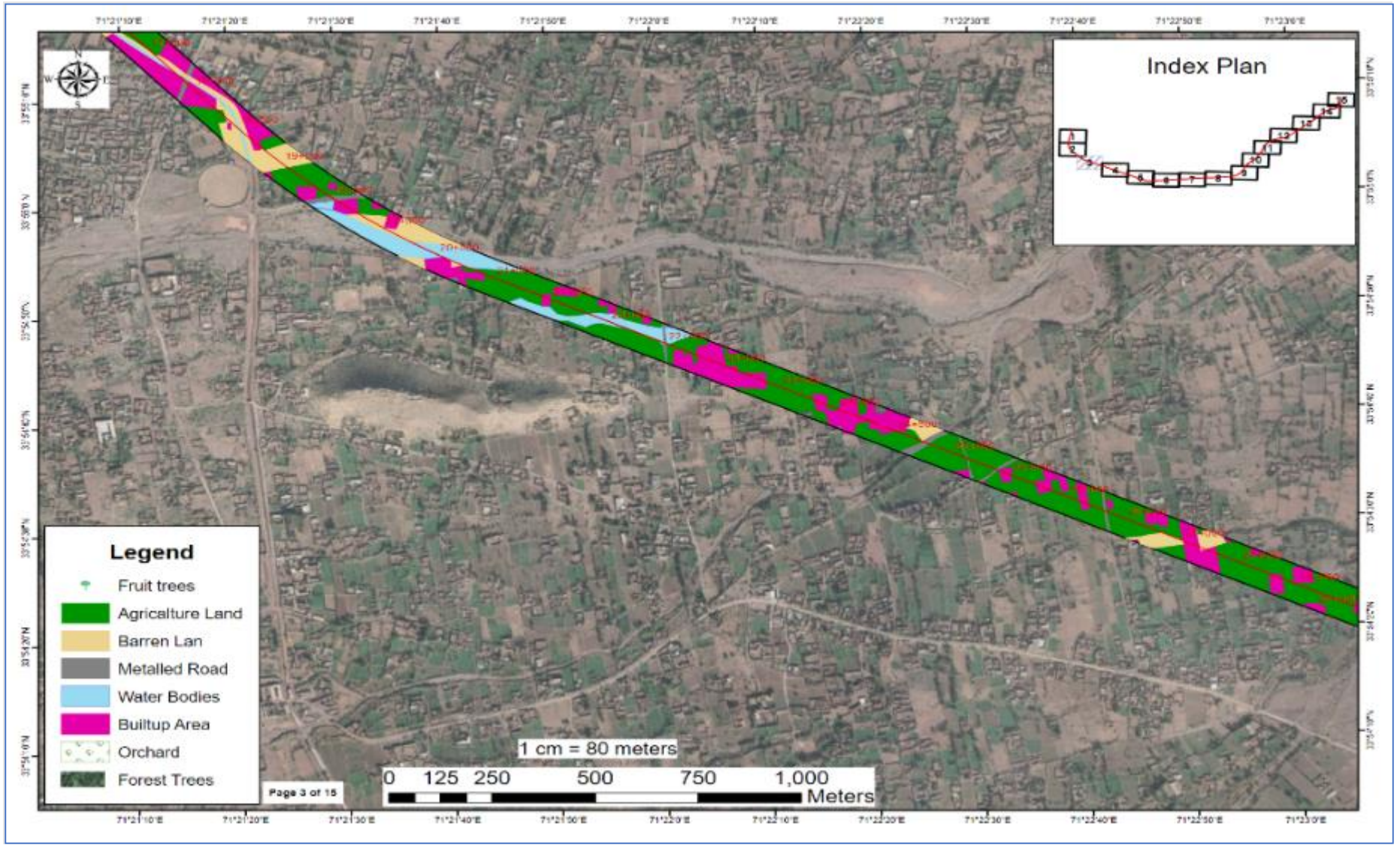


Figure 6-2: Land Use

6.3.3 Climate

Peshawar has a hot semi-arid steppe climate, which is very dry with little rainfall. It can rain at any time of the year but the rain does not last long. As well as being arid, the climate is extremely hot in the summer but slightly cooler in the winter months. There is no monsoon period. Throughout the year, temperatures fall dramatically at night, sometimes by as much as 20°C

6.3.4 Rainfall and Temperature

The rainfall and temperature pattern of any particular area plays significant role in defining the design layout and parameters of the infrastructure involved. Based on long term regime analysis, any significant variation in the rainfall and/ or temperature were also explored in terms of any possible climate change scenario. However, data accuracy or redundancy were analyzed before undertaking any such regime analysis. The project area falls in the climatic zone where rainfall is relatively moderate (semi-arid) and peri-urban area. The long-term data climatic data including rainfall and temperature was available at Peshawar (representative station) which was obtained from Pakistan Meteorological Department (1974-2018).

The long-term rainfall analysis showed no significant trend as long term average shows similar pattern though moving average shows reduction from 2014 onwards in **Figure 6.3.**

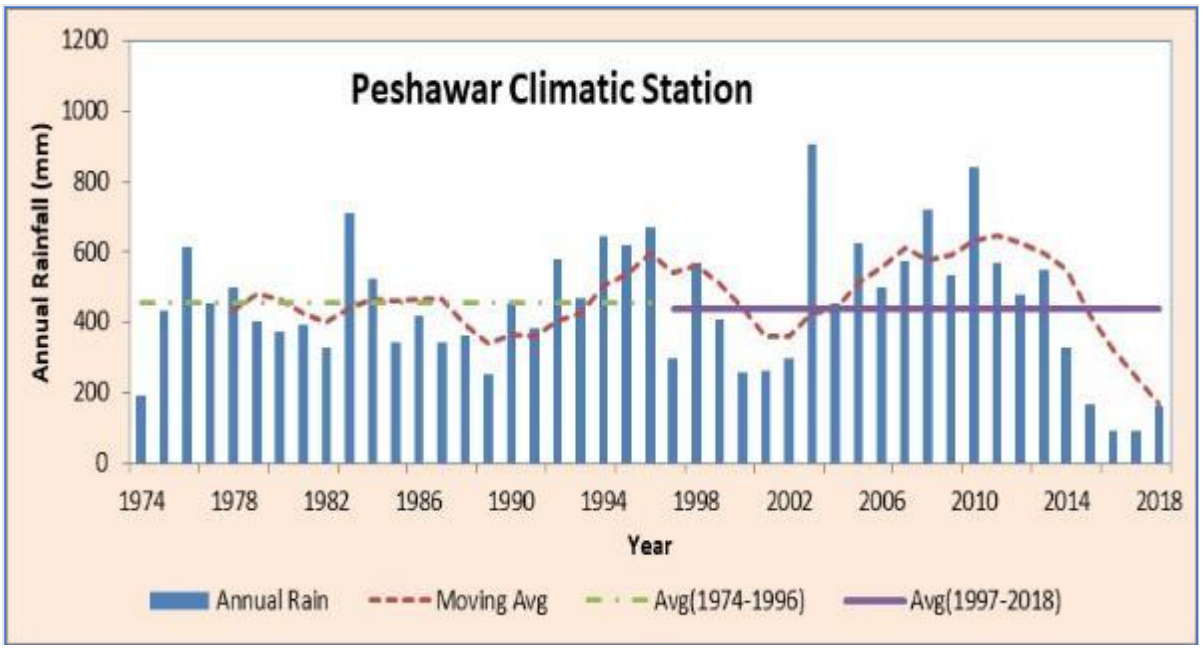


Figure 6-3: Long-term annual rainfall pattern at Peshawar

Similar trend was also observed for annual maximum temperature although the winter temperatures are getting milder **Figures 6.4** with exception of year 2012 when exceptionally low temperature -15 °C was observed **Figure 6.5.** The warm season lasts from the April to September with an average daily high temperature of above 34°C. The cold season lasts from the December to February with an average daily high temperature below 21°C.

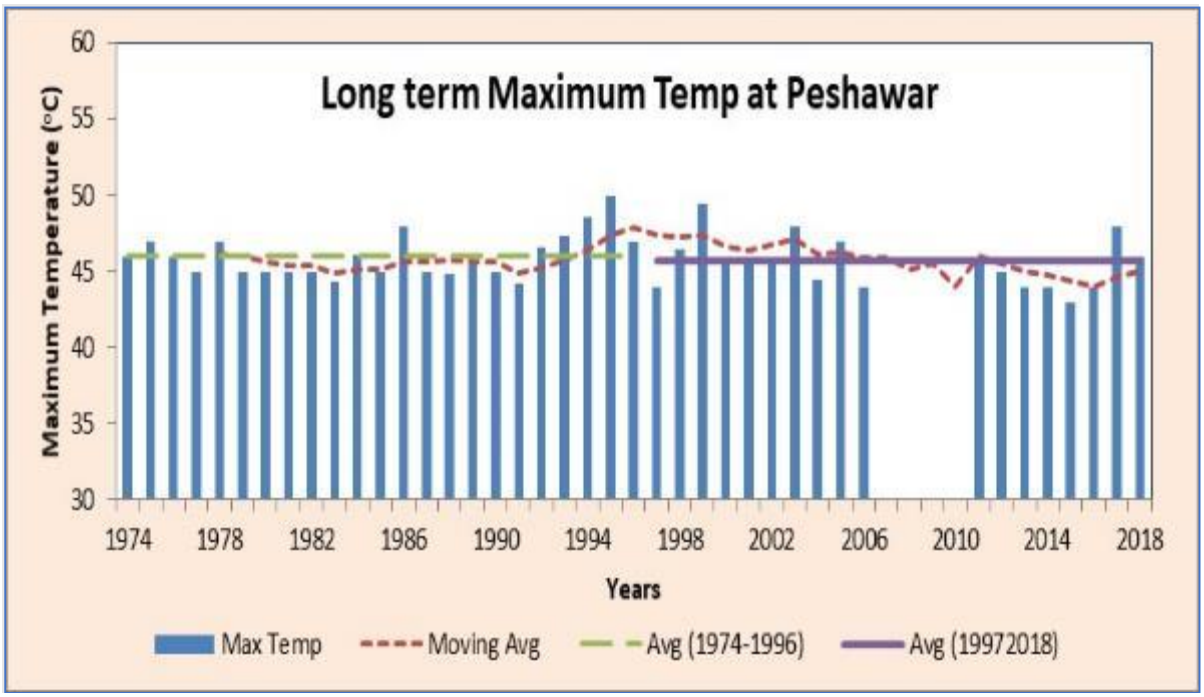


Figure 6-4: Long-Term Annual Maximum Temperature Pattern at Peshawar

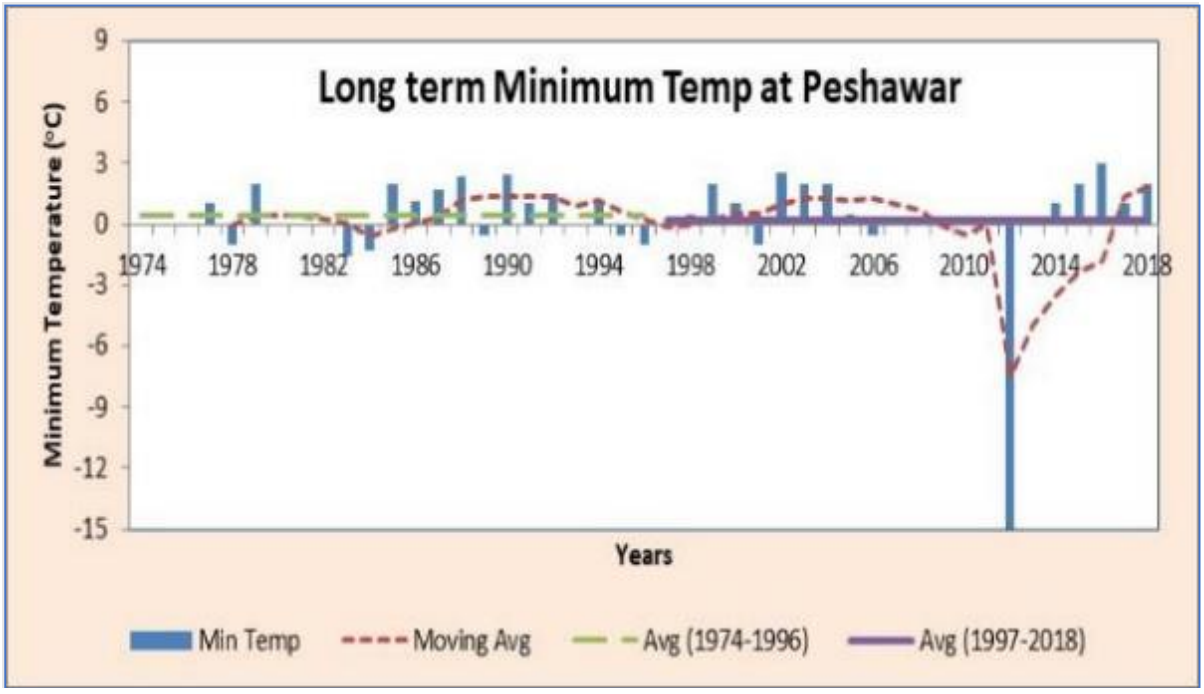


Figure 6-5: Long-Term Annual Minimum Temperature Pattern at Peshawar

6.3.5 Wind Speed

Over the course of the year, the typical wind speed varies between 0 m/s and 6 m/s (calm to moderate breeze), rarely exceeding 12m/s (strong breeze) as can be seen in **Figure 6-7** below.

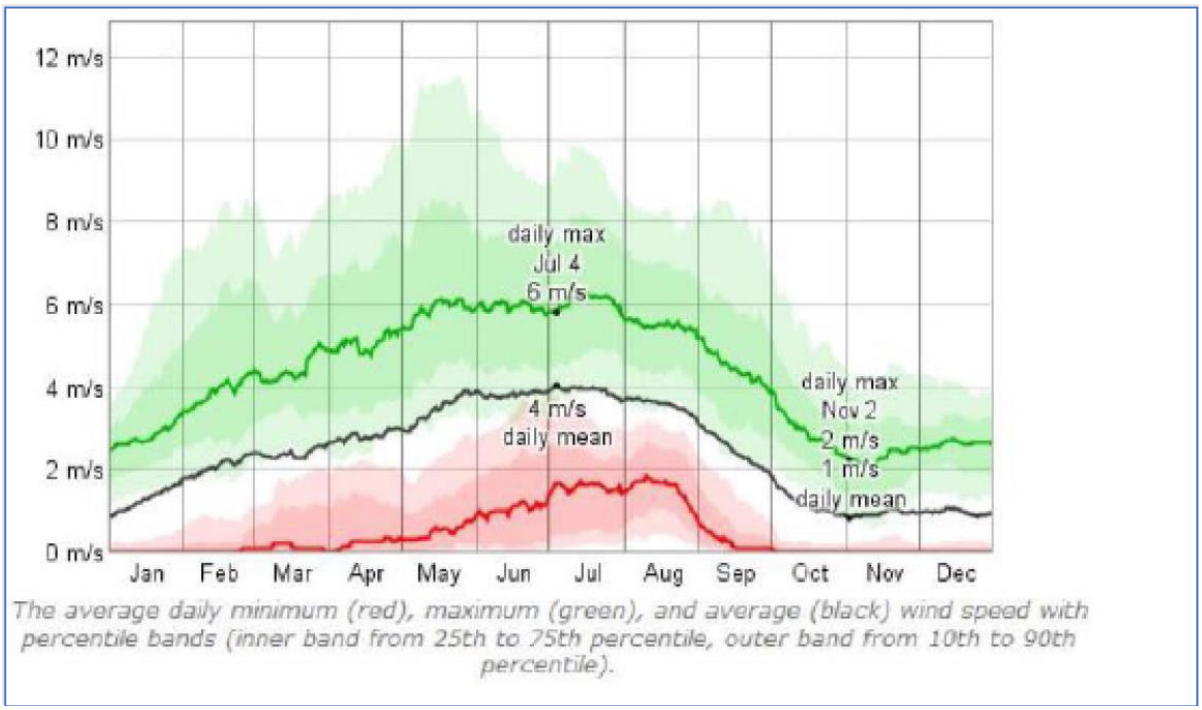
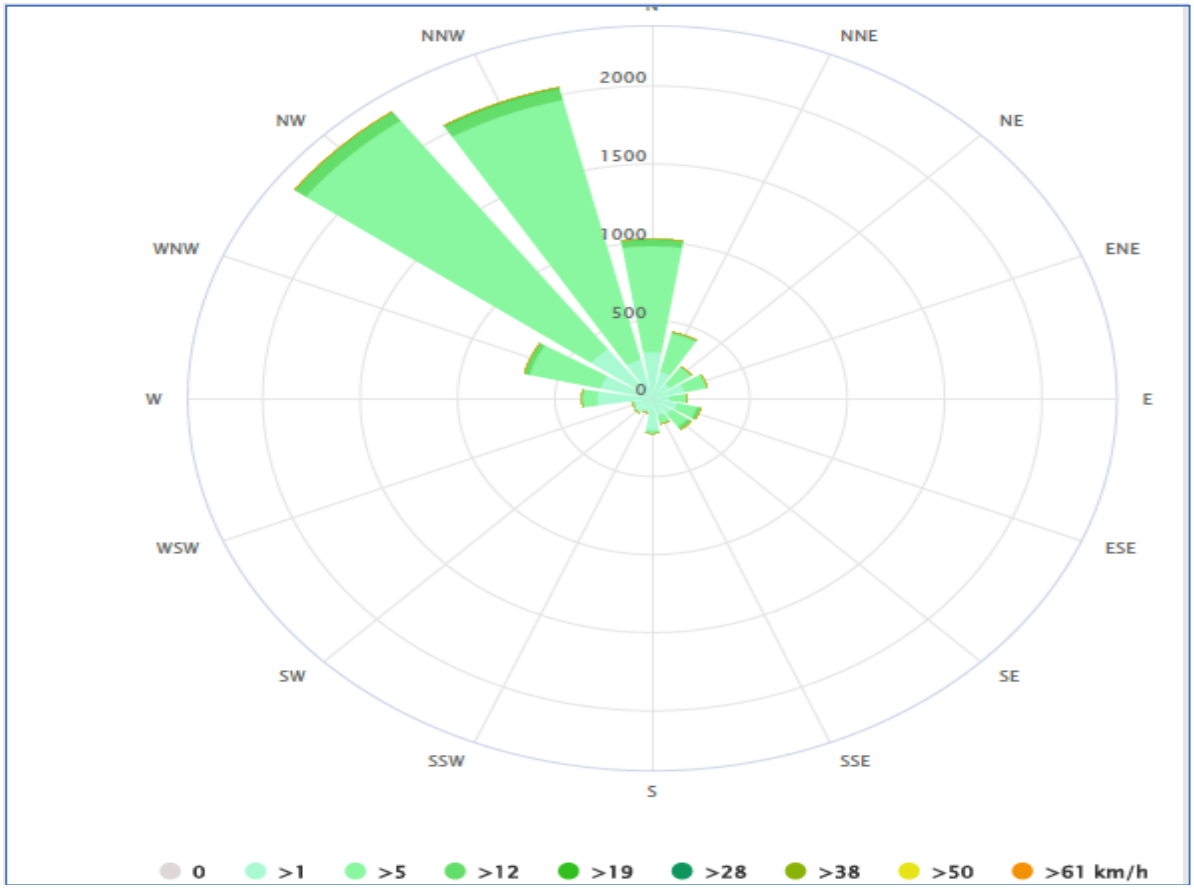


Figure 6-6: Wind Speed Profile of Peshawar City

The Wind rose profile7 for Peshawar is provided as **Figure 6.6** below.



[7] https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/peshawar_pakistan_1168197

6.3.6 Relative Humidity[8]

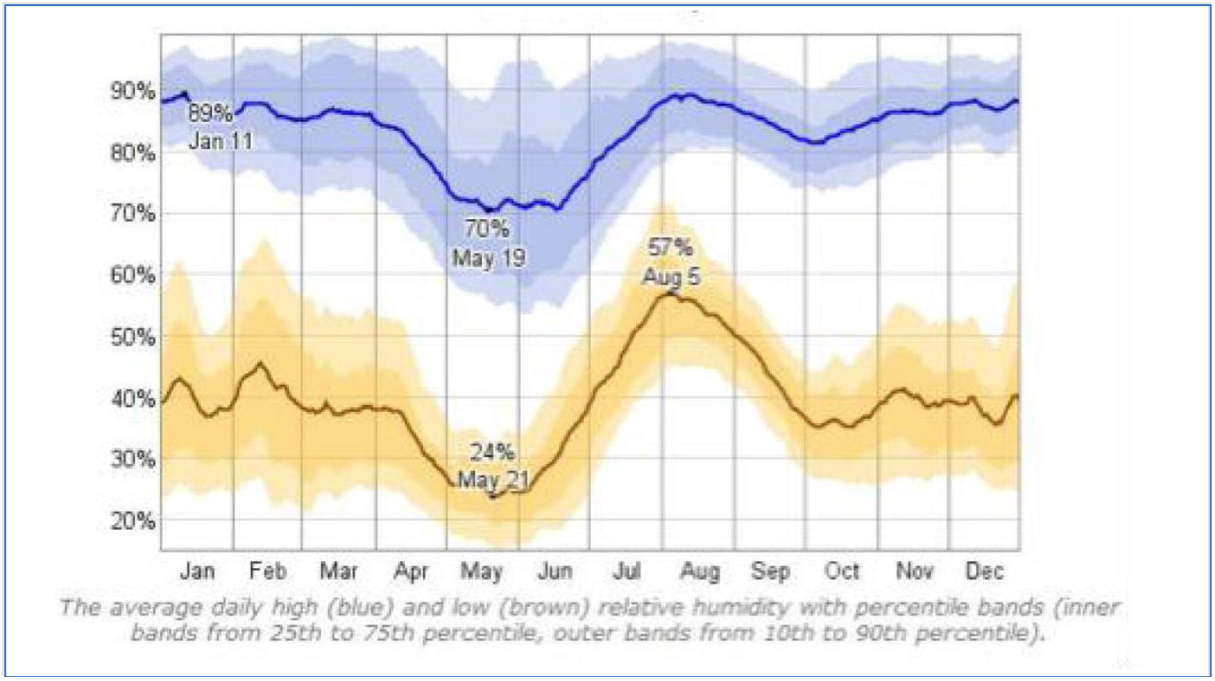


Figure 6-7: Humidity Profile of Peshawar City

The relative humidity typically ranges from 24% (dry) to 89% (very humid) over the course of the year, rarely dropping below 15% (dry) and reaching as high as 99% (very humid) as can be seen in Figure 5-6 below. The air is driest around the 21st of May, at which time the relative humidity drops below 29% (dry) three days out of four; it is most humid around the 11th of January, exceeding 85% (humid) three days out of four.

Although heat waves[9] do not have a statistically significant trend in Peshawar, longer periods of rate of increase of maximum and minimum temperature together with heat waves and increased precipitation can cause increases in humidity and water consumption.

6.3.7 Soil

The Northern section of the link road (District Khyber) has slightly steep slopes and virtually limited soil cover. The areas slopes have medium to course textured and stony soils.

Valleys Soils (Peshawar District) contain alluvial soils, mixed with gravels and pebbles deposited by storm water runoff. These are of generally medium to coarse soils, moderately to strongly calcareous and well drained.

The best soils occur in level to gently sloping areas and are composed of very fine sand and sandy loam derived from limestone, sandstone, and shale and schist rocks.

The soil in the Southern section of the link road alignment is fertile and relatively good for agriculture.

[8] ADB Khyber Pakhtunkhwa Cities Improvement Project (2021) ttps://www.adb.org/projects/documents/pak-51036-002-iee-2

[9] Heatwaves period can be defined as when consecutive 3-days temperature remains >45°C/day.

6.3.8 Seismology

Geological survey of Pakistan has divided Pakistan into five seismic zones. The project area, lies in seismic Zone 2B which is Moderate hazard zone corresponding to peak ground acceleration (PGA) values of 0.16 to 0.24 m/sec^2. Normally, the earthquake ranges 3-5 on Richter scale. **Figure 6.9** shows seismic map of Pakistan.

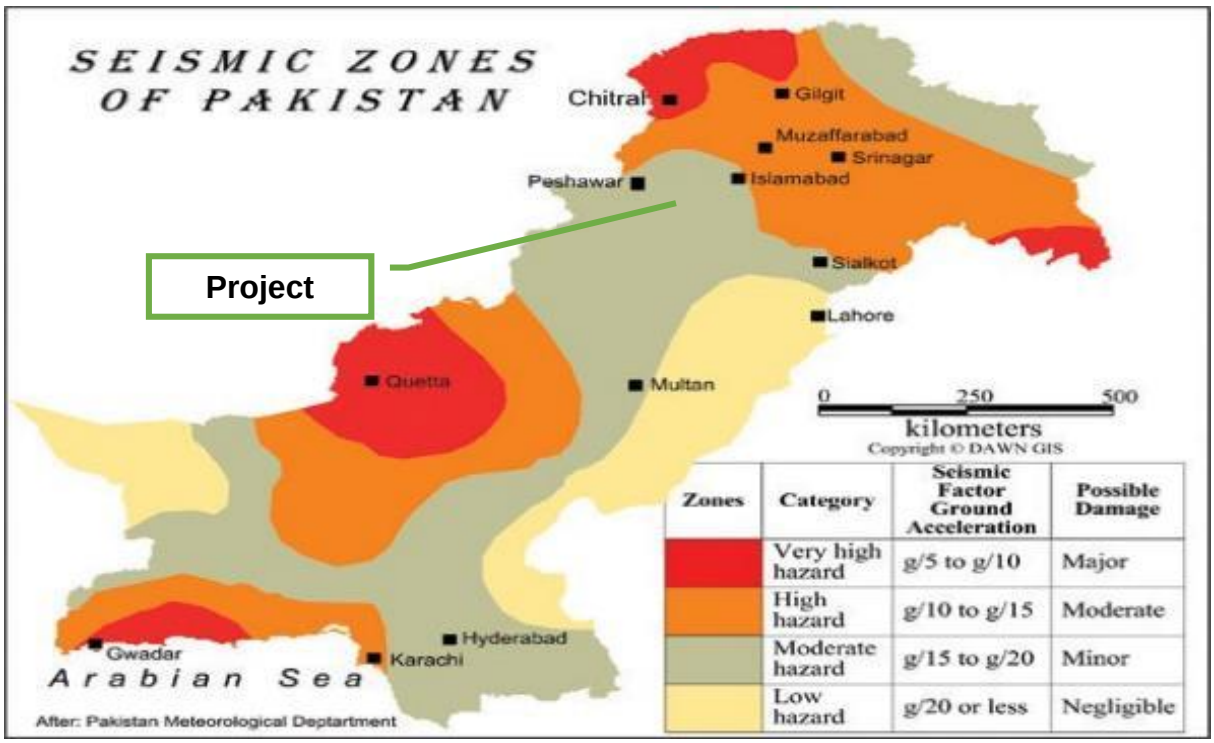


Figure 6-8: Seismic Zoning Map of Pakistan and Project Area

6.3.9 Hydrology

Bara River flows from Tirah crosses Bara Tehsil and enters in the Peshawar Valley but the ground water recharge rates are slow due to the hard rocky nature of the surface. Local people hence obtain water from both sources, still finding it difficult to fulfill their water needs. Other than obtaining groundwater through boreholes, seasonal watercourses form the major source of water provision in the region. These seasonal surface water bodies known as *khwars* can be found at intermittent intervals throughout the project area.

There is no water storage facility in the Khyber District or its vicinity, so most of the water is received either from rainfall or melted snow through non-perennial *khwars*, that passes on to the downstream areas of the province and country. The melted snow and (at high altitude) rain are available only for a few months of the year, and therefore the water resource is very limited.

There are three important rivers flowing, i.e., Bara River, Swat River and Kabul River in Peshawar region. Kabul River is the biggest river, which enters Peshawar near Warsak in the west, and discharges into Indus River, 4 km downstream of Jehangira. It divides Peshawar into the northern and southern part. Swat River enters Peshawar in the northwest near village Manda Qila and falls into Kabul River near Charsadda.

6.3.10 Surface Water

Bara River is main perennial surface water resource of the project area. Bara River flows from the south and enters Peshawar near Jhansi Post. It supplies Peshawar with drinking and irrigation water and discharges into Kabul River. It also drains large area of northern part of Peshawar and finally discharges in the Kabul River 5 km downstream of Nowshera.

Project area contain several large and small streams (i.e. including Zindai Khwar, Janay Khwar etc.) mostly non-perennial and flow is observed mainly under the influence of rainfall in their catchments originating from the mountains. Besides there are large number of irrigation watercourses and few natural flow paths.

Agriculture in Peshawar is largely dependent on Canals. Moreover, tube wells irrigation is also available in some places. The irrigated land in district Peshawar constitutes a large percentage as compared to other districts of Khyber Pakhtunkhwa. 73% of the rural mouza are irrigated by canals while 15-20 % are irrigated by other sources including river, Tube-wells, ravine, and spring stream etc.

6.3.11 Groundwater

Due to presence of Bara River near the project area, groundwater is available at 30-40 feet but the drinkable water is extracted at 150 feet depth which has also been contaminated since 2010 major flood. This issue requires water treatment solution for the health concerns of the locals.

6.3.12 Solid waste and Wastewater Situation

In District Peshawar and Nowshera, there are open water channels for storm water and sewerage. The wastewater from commercial and residential areas discharges into these open drains which subsequently merge into Bara River and River Kabul. The solid waste of these areas is managed by their respective Municipal Corporations which disposes it into the open dumping areas.

6.3.13 Environmental Testing and Monitoring

Environmental Testing & monitoring of environmental parameters such as air quality, noise level, drinking water quality & surface water quality was done for the project area. These tests were performed by experienced staff from a KP EPA certified laboratory, namely “STEPS Environmental Laboratory”.

In general, there is no continuous major source of noise & air pollution along the proposed route alignment. Intermittent sources include traffic and nearby marketplaces. So, air and Noise levels were recorded near sensitive receptors and road to have a baseline representative of the project area.

Drinking water samples were collected from the communities residing in the close vicinity of the project alignment to assess any potential impacts on their drinking water sources during construction. This ensures that the project takes into account the potential risks to the local community's access to clean and safe drinking water.

Surface water samples were collected from surface water resources crossing the proposed alignment. This baseline measurement provides valuable data to compare against post-construction measurements, enabling the project to identify any changes or impacts on surface water resources during and after construction.

The locations which were selected for carrying out these tests and monitoring are detailed in the **Table-6.1.**

Table 6.1 Environmental Testing and Monitoring Points

Sr. No.	Location	Coordinates	Ambient Air	Noise	Drinking Water	Surface water
1	Main G.T Toad	34°00"58.9"N 71°42'51.09"E	G.T Road	G.T Road	Borehole	Canal
2	Frontier Road	33°53'05.80"N 71°29'48.357"E	Bara - Mattni Road	Bara - Mattni Road	Borehole	-
3	Qamber Khel Pakka Tara	33°55'12.15"N 71°21'15.83"E	Village Area	Village Area	Borehole	Distributary

The reports are attached **Annexure VIII** while the discussion on these results is as follows:

6.3.14 Water Resources

The communities residing in the project area Districts rely on Tube well, rainfall and groundwater aquifers to meet their water needs. There is perennial irrigation system in and around the project area, so water shortage is not an issue. Water for domestic use is acquired from boring wells and public water supply system also exist. Almost all the population surveyed for this project has access to drinking water.

i. **Drinking Water Quality (Ground Water)**

The complete lab reports for drinking water quality of the sample collected at all three locations and results are given below.

Results and Analysis

All parameters analyzed are within NEQs for drinking water. The complete results of the drinking water quality sampling are summarized as below **Table 6.2.**

Table 6.2: Ground Water Sampling Reports

S. No.	Parameters	NDWQS Limits	Concentration	Method used	Remarks
Main G.T Road					
A. Field Analysis.					
01	pH	6.5-8.5	**7.5**	Hanna Digital meter	**Satisfactory**
02	Temp	-	**27 ºC**	Thermometer	
03	Dissolve Oxygen	-	**0 ppm**	Multipara meter Photometer	
04	Turbidity	≤ 5NTU	**0.98**	2100 P HACH	**Satisfactory**
B. Lab. Analysis.					
05	E. Conductivity	NGVS	**1126**	HI 98130 Combo Hanna	
06	TDS	1000 ppm	**564**	HI 98130 Combo Hanna	**Satisfactory**
07	Colour	< 15 TCU	**Colourless**	Multipara meter Photometer	**Satisfactory**
08	Door	Odor less	**Unobjectionable**	Sensory evaluation	**Satisfactory**

S. No.	Parameters	NDWQS Limits	Concentration	Method used	Remarks
09	Taste	Tasteless	**Unobjectionable**	Sensory evaluation	**Satisfactory**
10	Total Alkalinity	< 500 ppm	**257**	Multipara meter Photometer	**Satisfactory**
11	Total Hardness	< 500 ppm	**416**	Titration based method	**Satisfactory**
12	Calcium	≤ 250 ppm	**117.34**	Multipara meter Photometer	**Satisfactory**
13	Magnesium	≤ 250 ppm	**47.2**	Multipara meter Photometer	**Satisfactory**
14	Sodium	≤ 200 ppm	**83.7**	Meter	**Satisfactory**
15	Potassium	NGVS	**12.6**	Multipara meter Photometer	
16	Sulphate	≤ 250 ppm	**158.3**	Multipara meter Photometer	**Satisfactory**
17	Chloride	≤ 250 ppm	**68**	Kit base method	**Satisfactory**
18	Nitrate	≤ 50 ppm	**8.7**	Multipara meter Photometer	**Satisfactory**
19	Nitrite	≤ 03 ppm	**1.52**	Multipara meter Photometer	**Satisfactory**
20	Fluoride	≤ 1.5 ppm	**0.87**	Multipara meter Photometer	**Satisfactory**
21	Arsenic	≤ 0.01 ppm	**0.003**	Multipara meter Photometer	**Satisfactory**
22	Iron	≤ 2 ppm	**0.86**	Multipara meter Photometer	**Satisfactory**
23	Copper	≤ 2 ppm	**0.43**	Multipara meter Photometer	**Satisfactory**
24	E.coli	+Ve/ -Ve	**-Ve**	Compact Dry EC plates	**-Ve**
25	Faecal Coliform	0 CFU/100 ml	**0.00**	DelAgua Kit	**Nil**
Batatal Bazar Road Garibabad					
A. Field Analysis.					
01	Ph	6.5-8.5	**7.8**	Hanna Digital meter	**Satisfactory**
02	Temp	-	**28 ºC**	Thermometer	
03	Dissolve Oxygen	-	**0 ppm**	Multiparameter Photometer	
04	Turbidity	≤ 5NTU	**0.89**	2100 P HACH	**Satisfactory**
B. Lab. Analysis.					
05	E. Conductivity	NGVS	**526**	HI 98130 Combo Hanna	
06	TDS	1000 ppm	**321**	HI 98130 Combo Hanna	**Satisfactory**
07	Colour	< 15 TCU	**Colourless**	Multiparameter Photometer	**Satisfactory**
08	Odor	Odourless	**Unobjectionable**	Sensory evaluation	**Satisfactory**
09	Taste	Tasteless	**Unobjectionable**	Sensory evaluation	**Satisfactory**

S. No.	Parameters	NDWQS Limits	Concentration	Method used	Remarks
10	Total Alkalinity	< 500 ppm	**213**	Multiparameter Photometer	**Satisfactory**
11	Total Hardness	< 500 ppm	**301**	Titration based method	**Satisfactory**
12	Calcium	≤ 250 ppm	**89.04**	Multiparameter Photometer	**Satisfactory**
13	Magnesium	≤ 250 ppm	**21**	Multiparameter Photometer	**Satisfactory**
14	Sodium	≤ 200 ppm	**10**	Meter	**Satisfactory**
15	Potassium	NGVS	**14**	Multiparameter Photometer	
16	Sulphate	≤ 250 ppm	**31**	Multiparameter Photometer	**Satisfactory**
17	Chloride	≤ 250 ppm	**40.9**	Kit base method	**Satisfactory**
18	Nitrate	≤ 50 ppm	**15.3**	Multiparameter Photometer	**Satisfactory**
19	Nitrite	≤ 03 ppm	**1.29**	Multiparameter Photometer	**Satisfactory**
20	Fluoride	≤ 1.5 ppm	**0.18**	Multiparameter Photometer	**Satisfactory**
21	Arsenic	≤ 0.01 ppm	**0.00**	Multiparameter Photometer	**Satisfactory**
22	Iron	≤ 2 ppm	**0.38**	Multiparameter Photometer	**Satisfactory**
23	Copper	≤ 2 ppm	**0.4**	Multiparameter Photometer	**Satisfactory**
24	E.coli	+Ve/ -Ve	**-Ve**	Compact Dry EC plates	**-Ve**
25	Fecal Coliform	0 CFU/100 ml	**0.00**	DelAgua Kit	**Nil**
Shalober Bara					
A. Field Analysis.					
01	Ph	6.5-8.5	**7.8**	Hanna Digital meter	**Satisfactory**
02	Temp	-	**26 ºC**	Thermometer	
03	Dissolve Oxygen	-	**0 ppm**	Multiparameter Photometer	
04	Turbidity	≤ 5NTU	**0.73**	2100 P HACH	**Satisfactory**
B. Lab. Analysis.					
05	E. Conductivity	NGVS	**751**	HI 98130 Combo Hanna	
06	TDS	1000 ppm	**373**	HI 98130 Combo Hanna	**Satisfactory**
07	Colour	< 15 TCU	**Colourless**	Multiparameter Photometer	**Satisfactory**
08	Odor	Odourless	**Unobjectionable**	Sensory evaluation	**Satisfactory**
09	Taste	Tasteless	**Unobjectionable**	Sensory evaluation	**Satisfactory**
10	Total Alkalinity	< 500 ppm	**223**	Multiparameter Photometer	**Satisfactory**

S. No.	Parameters	NDWQS Limits	Concentration	Method used	Remarks
11	Total Hardness	< 500 ppm	**343**	Titration based method	**Satisfactory**
12	Calcium	≤ 250 ppm	**112**	Multiparameter Photometer	**Satisfactory**
13	Magnesium	≤ 250 ppm	**28**	Multiparameter Photometer	**Satisfactory**
14	Sodium	≤ 200 ppm	**47.8**	Meter	**Satisfactory**
15	Potassium	NGVS	**11.8**	Multiparameter Photometer	
16	Sulphate	≤ 250 ppm	**114**	Multiparameter Photometer	**Satisfactory**
17	Chloride	≤ 250 ppm	**55**	Kit base method	**Satisfactory**
18	Nitrate	≤ 50 ppm	**09**	Multiparameter Photometer	**Satisfactory**
19	Nitrite	≤ 03 ppm	**1.15**	Multiparameter Photometer	**Satisfactory**
20	Fluoride	≤ 1.5 ppm	**0.48**	Multiparameter Photometer	**Satisfactory**
21	Arsenic	≤ 0.01 ppm	**0.00**	Multiparameter Photometer	**Satisfactory**
22	Iron	≤ 2 ppm	**0.19**	Multiparameter Photometer	**Satisfactory**
23	Copper	≤ 2 ppm	**0.42**	Multiparameter Photometer	**Satisfactory**
24	E.coli	+Ve/ -Ve	**-Ve**	Compact Dry EC plates	**-Ve**
25	Faecal Coliform	0 CFU/100 ml	**0**	DelAgua Kit	**Nil**

ii. Surface Water Quality

The lab reports for Surface Water Quality of the sample collected at AOI locations are shown as **Annexure VIII.**

6.3.14.1 Results

All the parameters are within NEQs limit. The complete results of the Surface Water quality tested are summarized in **Table 6.3.**

Table 6.3: Surface Water Reports

S. No.	Parameters	NDWQS Limits	Concentration	Method used	Remarks
Canal Water					
A. Field Analysis.					
01	Ph	6.5-8.5	**7.7**	Hanna Digital meter	**Satisfactory**
02	Temp	-	**27 ºC**	Thermometer	
03	Dissolve Oxygen	-	**0 ppm**	Multiparameter Photometer	
04	Turbidity	≤ 5NTU	**4.89**	2100 P HACH	**Satisfactory**
B. Lab. Analysis.					

S. No.	Parameters	NDWQS Limits	Concentration	Method used	Remarks
05	E. Conductivity	NGVS	**340**	HI 98130 Combo Hanna	
06	TDS	1000 ppm	**194**	HI 98130 Combo Hanna	**Satisfactory**
07	Colour	< 15 TCU	**Colourless**	Multiparameter Photometer	**Satisfactory**
08	Odor	Odourless	**Unobjectionable**	Sensory evaluation	**Satisfactory**
09	Taste	Tasteless	**Unobjectionable**	Sensory evaluation	**Satisfactory**
10	Total Alkalinity	< 500 ppm	**138**	Multiparameter Photometer	**Satisfactory**
11	Total Hardness	< 500 ppm	**290**	Titration based method	**Satisfactory**
12	Calcium	≤ 250 ppm	**61**	Multiparameter Photometer	**Satisfactory**
13	Magnesium	≤ 250 ppm	**37**	Multiparameter Photometer	**Satisfactory**
14	Sodium	≤ 200 ppm	**6**	Meter	**Satisfactory**
15	Potassium	NGVS	**5.3**	Multiparameter Photometer	
16	Sulphate	≤ 250 ppm	**59**	Multiparameter Photometer	**Satisfactory**
17	Chloride	≤ 250 ppm	**41.9**	Kit base method	**Satisfactory**
18	Nitrate	≤ 50 ppm	**7.5**	Multiparameter Photometer	**Satisfactory**
19	Nitrite	≤ 03 ppm	**2.3**	Multiparameter Photometer	**Satisfactory**
20	Fluoride	≤ 1.5 ppm	**0.5**	Multiparameter Photometer	**Satisfactory**
21	Arsenic	≤ 0.01 ppm	**0.004**	Multiparameter Photometer	**Satisfactory**
22	Iron	≤ 2 ppm	**0.61**	Multiparameter Photometer	**Satisfactory**
23	Copper	≤ 2 ppm	**0.02**	Multiparameter Photometer	**Satisfactory**
24	E.coli	+Ve/ -Ve	**-Ve**	Compact Dry EC plates	**-Ve**
25	Fecal Coliform	0 CFU/100 ml	**0**	DelAgua Kit	**Nil**
Kabul River Distributary					
A. Field Analysis.					
01	Ph	6.5-8.5	**7.6**	Hanna Digital meter	**Satisfactory**
02	Temp	-	**27 ºC**	Thermometer	
03	Dissolve Oxygen	-	**0 ppm**	Multiparameter Photometer	
04	Turbidity	≤ 5NTU	**2.67**	2100 P HACH	**Satisfactory**
B. Lab. Analysis.					
05	E. Conductivity	NGVS	**752**	HI 98130 Combo Hanna	

S. No.	Parameters	NDWQS Limits	Concentration	Method used	Remarks
06	TDS	1000 ppm	**386**	HI 98130 Combo Hanna	**Satisfactory**
07	Colour	< 15 TCU	**Colourless**	Multiparameter Photometer	**Satisfactory**
08	Odor	Odourless	**Unobjectionable**	Sensory evaluation	**Satisfactory**
09	Taste	Tasteless	**Unobjectionable**	Sensory evaluation	**Satisfactory**
10	Total Alkalinity	< 500 ppm	**159**	Multiparameter Photometer	**Satisfactory**
11	Total Hardness	< 500 ppm	**363**	Titration based method	**Satisfactory**
12	Calcium	≤ 250 ppm	**78**	Multiparameter Photometer	**Satisfactory**
13	Magnesium	≤ 250 ppm	**46**	Multiparameter Photometer	**Satisfactory**
14	Sodium	≤ 200 ppm	**12**	Meter	**Satisfactory**
15	Potassium	NGVS	**10.2**	Multiparameter Photometer	
16	Sulphate	≤ 250 ppm	**61.5**	Multiparameter Photometer	**Satisfactory**
17	Chloride	≤ 250 ppm	**38**	Kit base method	**Satisfactory**
18	Nitrate	≤ 50 ppm	**10**	Multiparameter Photometer	**Satisfactory**
19	Nitrite	≤ 03 ppm	**1.25**	Multiparameter Photometer	**Satisfactory**
20	Fluoride	≤ 1.5 ppm	**0.78**	Multiparameter Photometer	**Satisfactory**
21	Arsenic	≤ 0.01 ppm	**0.00**	Multiparameter Photometer	**Satisfactory**
22	Iron	≤ 2 ppm	**0.43**	Multiparameter Photometer	**Satisfactory**
23	Copper	≤ 2 ppm	**0.67**	Multiparameter Photometer	**Satisfactory**
24	E.coli	+Ve/ -Ve	**-Ve**	Compact Dry EC plates	**-Ve**
25	Fecal Coliform	0 CFU/100 ml	**0**	DelAgua Kit	**Nil**

6.3.15 Ambient Air Quality

The lab reports for Ambient Air Quality of the sample tested at all locations are shown as **Annexure VIII.**

6.3.15.1 Results and Analysis

All parameters analyzed were within NEQs limits except PM_{10} and $PM_{2.5}$ at main G.T road and Batatal Bazar Road Garibabad. The reason of high concentration of these parameters is the flow of heavy traffic, Mechanical Workshops, Heavy Truck Parking Terminals, presence of Oil storage depot and dust from movement of agricultural machinery. The complete results of the ambient air quality sampling are summarized below **Table 6.4.**

Table 6.4: Ambient Air Quality Results

S.No.	Parameters	NEQS Limits	Concentration	Method used	Remarks
G.T Road					
01	PM 2.5	35 µg/m^3	**78.9**	-β Ray Absorption method	**Un-Satisfactory**
02	PM 10	150 µg/m^3	**218.7**	-β Ray Absorption method	**Un-Satisfactory**
03	CO_2	- mg/m^3	**947**	40 CFR Part 50, App. D (US-EPA)	**-**
04	CO	10 mg/m^3	**1.4**	Non-Dispersive Infra-Red (NDIR) method	**Satisfactory**
05	NO	40 µg/m^3	**18.5**	Gas Phase Chemiluminescence	**Satisfactory**
06	NO_2	80 µg/m^3	**77.4**	Gas Phase Chemiluminescence	**Satisfactory**
07	SO_2	120 µg/m^3	**64.3**	UV fluorescence (UVF)	**Satisfactory**
08	NOx	µg/m^3	**95.9**	Addition	**Satisfactory**
09	O_3	130 µg/ m^3	**45.6**	Non-Dispersive UV Absorption method	**Satisfactory**
Batatal Bazar Road Garibabad					
01	PM 2.5	35 µg/m^3	**40.8**	-β Ray Absorption method	**Un-Satisfactory**
02	PM 10	150 µg/m^3	**161.6**	-β Ray Absorption method	**Un-Satisfactory**
03	CO_2	- mg/m^3	**778**	40 CFR Part 50, App. D (US-EPA)	**-**
04	CO	10 mg/m^3	**1.9**	Non-Dispersive Infra-Red (NDIR) method	**Satisfactory**
05	NO	40 µg/m^3	**19.6**	Gas Phase Chemiluminescence	**Satisfactory**
06	NO_2	80 µg/m^3	**68.2**	Gas Phase Chemiluminescence	**Satisfactory**
07	SO_2	120 µg/m^3	**55.7**	UV fluorescence (UVF)	**Satisfactory**
08	NOx	µg/m^3	**87.8**	Addition	**Satisfactory**
09	O_3	130 µg/ m^3	**24.1**	Non-Dispersive UV Absorption method	**Satisfactory**
Shalober Bara					
01	PM 2.5	35 µg/m^3	**28.4**	-β Ray Absorption method	**Satisfactory**
02	PM 10	150 µg/m^3	**56.8**	-β Ray Absorption method	**Satisfactory**
03	CO_2	- mg/m^3	**364**	40 CFR Part 50, App. D (US-EPA)	**-**
04	CO	10 mg/m^3	**1.7**	Non-Dispersive Infra-Red (NDIR) method	**Satisfactory**
05	NO	40 µg/m^3	**11.7**	Gas Phase Chemiluminescence	**Satisfactory**
06	NO_2	80 µg/m^3	**32.5**	Gas Phase Chemiluminescence	**Satisfactory**
07	SO_2	120 µg/m^3	**29.3**	UV fluorescence (UVF)	**Satisfactory**
08	NOx	µg/m^3	**44.2**	Addition	**Satisfactory**
09	O_3	130 µg/ m^3	**13.4**	Non-Dispersive UV Absorption method	**Satisfactory**

6.3.16 Noise

The lab reports for Noise Quality of the sample tested at all three locations are shown as Annexure **VIII.**

Results and Analysis

At G.T road and Batatal Bazar Road noise level was out of limit because of heavy traffic, mechanical workshops and commercial market. Whereas, at Shalober Bara location noise level was within limit. The results of the Noise quality tested are summarized below **Table 6.5.**

Table 6.5: Noise Level Result

Location	NEQS Limits	Concentration	Method used	Remarks
Noise Level				
G.T Road	65 dB (A)	**81.94**	BS 7445:2003	**Un-Satisfactory**
Batatal Bazar Road Garibabad	65 dB (A)	**68.3**	BS 7445:2003	**Un-Satisfactory**
Shalober Bara	55 dB (A)	**51.6**	BS 7445:2003	**Satisfactory**

6.4 BIOLOGICAL ENVIRONMENT

Keeping as middle point, the bridge adjacent to Bara Bazar, there is a marked difference of terrain in the eastern and western section of the project. The Western section being higher in average altitude, had no canal irrigation. This irrigation network in the East makes a key difference between the two sections mentioned. The Eastern half is irrigated crop land, and green.

The western half, most of which falls in hilly terrain is barren. And it is considered barren in a way that average rain fall is not too high for the entire region, but this section being hilly does not retain that little rain-based moisture, and runoff renders this barren or semi barren and only thorny scanty vegetation is found in small patches in this western half of the project area. While the Eastern part, rich in Biodiversity, vegetation and sufficient water availability for crops and fruit trees through canals water supply and also supplemented by tube wells.

Based on consultations with government environmental agencies, local specialists on flora, a search of the literature on endangered species in Pakistan and the results of field investigations, there is no indication that rare, endangered or protected species of vegetation are likely to exist within the AOI.

Biodiversity was studied along the proposed alignment starting from Sathi Khel to Dheri at GT road during September 2022. Assessment of biodiversity was made covering the following two points;

- Floral Composition of the study area
- Faunal Composition of the study area

Second Ecology survey of updated alignment of proposed route of SLR was done during May 2023. This biodiversity survey was conducted at following selected sites.

Table 6.6: Biodiversity Survey sites (May 2023 survey)

Serial/ Site #	Site Name and Description	Reference Photograph on site (with coordinates/proof of visit)

1	Jamrud Area-Kambar Khel Access Road, Near Usman Masjid, towards FC Qila, mountain pass.		
2	Shakas Road opposite FC Check post, Near Stone crushers, at stream bed		
3	Masjid Bilal Nogazi Baba near Graveyard		
4	Bara bazar Khyber Agency. Near FC headquarter till bara bridge	Photography was not allowed due to security situation. 	-do- However, Addition site was taken to replace, as described in following section of sampling.
5	Badaber-Mera Road		

6	Mashogagar near Roadside towards Brick Klein		
7	Additional survey site near nogazi baba for bird survey day 2 (21st May. 2023 morning)		

6.4.1 Habitat Type(s) of Study Area:

The following are the main habitat types observed in Project Area.

- The irrigated planes of KP province marked as zone IV-B according to Agro Ecological map of Pakistan, are the site for the project in most of its eastern part. These planes are starting from Right bank of the River Indus to the Peshawar vale, which is mainly agricultural region falling in “Tropical and Dry subtropical warm scrub land” vegetative zone.
- While some of the part of the Western portion of this project falls among the Agro ecological Zone VII, which is part of the Zone known as “Western Dry Mountain” region representing the “Dry sub-tropical” as well as dry and semi temperate vegetative zone, while mostly the project area remains out of this vegetation type, with some influence of hilly terrine in its western section.

Generally, the natural habitats along project alignment are largely modified. In the study area these modifications are due to human interventions since decades due to agriculture based activities and human settlements in plane areas. The natural habitat areas represent those areas where local or wild species are present in their natural environment while in modified habitats, due to human interventions many changes have occurred in local or native fauna and flora, this scenario can be observed prevailing all along the study area.

Over-exploitation of fuel wood and other timber yielding species as well as fodder plants and other economically important species, and grazing pressure are reasons for the degradation and modification of the habitat. While in the western section of the project mostly in Jamrud Ares, there are predominantly dry conditions. No species flourish well except xerophytes, while many palatable grasses and other herbs from Asteraceae are found to exist but heavily overgrazed. This increased grazing has changed the overall biodiversity and land cover for the western section noticeably.

6.4.2 Flora

The natural vegetation has been altered in order to carry out the agricultural and semi-commercial/developmental activities including houses, shelters for animals and semi-paved Roads within the project boundary. Some of the invasive (non-native disturbing alien) species have been recorded which may be removed completely during project construction phase and no alternate plantation plan is required for the herbaceous invasive plants. Vegetation cover for these invasive species dominated by i.e. Parthenium hysterophorus distributed evenly in old fields, followed by Lantana camara, Calotropis procera, and occasional Parkinsonian julifloara in small patches.

Some of the local/native shrub species were found to exist in the core project area including *Beri* (Ziziphus nimularia), shrubby from of Kikar (Acacia sp).

A few tree species, e.g. *Tali* (Dalbergia sissoo), along with some poorly formed trees including *Shahtoot* (Morus sp), Albizia (Albizia labac), and *Wild Fig* (Ficus sp), Ficus banghalensis were found scattered i.e. one to two specimen each at distant sites/localities.

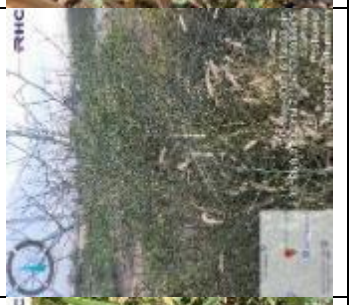
A number of shrubby habit plants including *Phulahi* (Acacia modesta), K*ikar* (Acacia **sp.)** are found growing on the site with stunted growth. *Kikar* is usually a small to medium sized thorny bush and also available as old tall trees.

NATURALLY OCCURRING NON-DOMINANT SHRUBS:

Some Naturally occurring shrubs are also present on the project area including *Ber* **Zizyphus sp.,** *Jungli Kikar* ***Acacia niloica,*** *Phulahi* **Acacia modesta** in shrubby habit (not tree), Occasional young *eucalypt* i.e. *Sufaida* (Eucalyptus sp.), *Aak* (*Calotropis procera*), young shrubby *Sheesam* (Dilbergia Sisso) and *Jand* (*Prosopis cineraria*) were recorded along the project site.

Table 6.7: Floral species in different Habitats (Second Biodiversity Survey May 2023)

Serial No.	Botanical name	Common name Vernacular name	Habitat	Conservation status as per IUCN red list	Field Photographs along with Coordinate / Location Information
1	*Withania somnifera*	Ashwaga-ndha	Semi Dryland habitat to semi-desert marginal habitat type	Common	
2	*Phoenix dectilifera*	Khajoor	semi-desert marginal habitat type	Common	

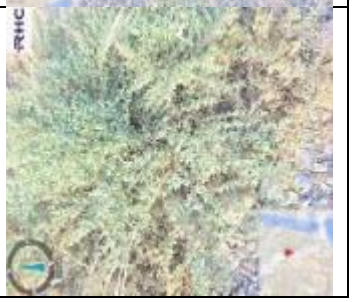
Serial No.	Botanical name	Common name Vernacular name	Habitat	Conservation status as per IUCN red list	Field Photographs along with Coordinate / Location Information
3	*Capparis desidua*	Karir	semi desert and desert areas; soil erosion sites	Common	
4	*Prosopis juliflora*	Jand	semi desert and desert areas	Common	
5	*Poaceae sp*	Nil	Dry areas	Present commonly but overgrazed in most cases	
6	*Poa annua*	Deela	semi desert and desert areas	Common	
7	*Typha sp.*	Dib, dub	Wetlands and warm tropical to subtropical habitats	Common	

Serial No.	Botanical name	Common name Vernacular name	Habitat	Conservation status as per IUCN red list	Field Photographs along with Coordinate / Location Information
8	*Dalbergia sisso*	Sisso wood, sisso tree	Subtropical to tropical areas	Common Cultivated	
9	*Calotropis procera*	Ak	Dry degraded soils and semi desert places	Common	
10	*Argemone mexican*	Mexican poppy	Sub-humid subtropical to temperate	Unknown, as it has been banned for cultivation (in this case the plant growing, may be as an escape from field nearby)	 
12	*Carthymus oxycantha*	Pohli	Common wed of the wheat and other crop fields, was found abundantly in waste lands too	Common	

Serial No.	Botanical name	Common name Vernacular name	Habitat	Conservation status as per IUCN red list	Field Photographs along with Coordinate / Location Information
13	*Zizyphus sp.*	Ber	Dry sub-tropical habitats semi desert and desert areas	Common	
14	*Eucalyptus citriodora*	Sufaida	Tropical lands and waterlogged areas too	Common	
15	*Cynodon dactylon*	Khabbal	Common invasive grass f warm subtropical and temperate habitats	Common	 
16	*Acacia nilotica*	Kikar/Babul	Dry and warm habitats semi desert and desert areas	Common	

Serial No.	Botanical name	Common name Vernacular name	Habitat	Conservation status as per IUCN red list	Field Photographs along with Coordinate / Location Information
17	*Albizzia lebbek*	Siris	Dry sub-tropical habitats	Common	
18	*Tamarix aphylla*	Tamarix	Tropical to sub-tropical wet lands usually	Common	
19	*Conocarpus lancifolius*	Conocarpus	Tropical to sub-tropical	Common	
20	*Polygonum aviculare*	Prostrate knotweed	semi desert and desert habitats	Common	
21	*Silybum marianum*	Milk thistle	Sub-tropical semi humid areas	Common	

Serial No.	Botanical name	Common name Vernacular name	Habitat	Conservation status as per IUCN red list	Field Photographs along with Coordinate / Location Information
22	*Solanum suratensis*		Dry sub-tropical habitats	Common	 
23	*Heliotropium europaeum*		Desert and sub-tropical in origin	Common	
24	*Polygonum aviculare*	Knot weed	Dry sub-tropical habitats	Common	
25	*Arva sp*		Dry sub-tropical habitats semi desert and desert areas	Common	

Serial No.	Botanical name	Common name Vernacular name	Habitat	Conservation status as per IUCN red list	Field Photographs along with Coordinate / Location Information
26	*Centaurea pseudosinaica*		Cold to moderate temperature sub-tropical habitats	Rare for the site. Not threated as reported in most of Arabian plant losts	
27	*Convolvulus arvansis*		Irrigated areas, adopted with a number of vegetation including the croplands	common	
28	*Centaurium pulchellum*		sub-tropical habitats semi wet areas	common	
29	*Euphorbia prostrata*		Dry semi desert and desert areas	common	
30	*Atriplex tartarica*		semi desert and desert areas occasionally found in wetter places too		

Serial No.	Botanical name	Common name Vernacular name	Habitat	Conservation status as per IUCN red list	Field Photographs along with Coordinate / Location Information
31	*Atriplex cinerea*		Dry sub-tropical habitats mostly in marginal lands and abandoned fields too		
32	*Morus nigra*	Toot shahtoot	Tropical to sub-tropical	Common, cultivated mostly	
33	*Trifolium Agri field*	barseem	Tropical to sub-tropical	Common escape from fields, found all around the irrigated lands	
34	*Imparata sp.*	Fur grass	Dry subtropical	Common, found growing near solid waste dump and medical waste too	
35	*Parthenium hysterophorus*	Bitter Broom	Common invasive sp. Of agri lands and waste marginal areas	common	
11	*Alhaji mororum*	Khardar	semi desert and desert areas	Common	not available

6.4.3 Fauna

A variety of anthropogenic activities were found to occur since decades, and impact the local Fauna in different ways. The human interferences mainly through extensive agriculture at least

in the Eastern Section (half) of the proposed project has marked influence on over all biodiversity, and specially on animals for their limited populations or entirely absence of certain species mainly large mammals and herpetofauna (reptile and amphibians). These impacts have reduced biodiversity, which is further intensified by the limited floral diversity and scanty plant cover, hence there is limited availability of the shelter for the wild animals.

The overall diversity of wildlife was also low in general, but particularly large mammalian populations as mentioned above, were virtually lacking in the area. There are limited noticeable species, usually small to medium sized mammals, while some important species include herpetofauna, have been reported from the area, mainly by respondents and Forest and wildlife officials and records. Besides this limited faunal diversity, a noticeable avian species diversity is found within the reference area which is dominated by the migratory species of birds, with many winter migrants from North, and several monsoon migrants of the East which are native to the subcontinent and are mostly represented by the stable populations.

Data Collection Methodology: Field data collected for estimation of faunal bio-diversity was carried out by using a combination of field estimation and identification methods (including plot searches, point counts and ground surveys) at the random locations in the Reference Area, mainly following the strategy of sampling and observations done at vintage points for birds. For mammals the common water points were visited several times to record the foot marks in order to identify visiting species as indirect method. Additionally, to mark the mammalian species indirectly their burrows, and dens along with hiding places were also considered/recorded/photographed. For these observation field surveys were done by selecting the dawn and dust times of the day.

Choice of sites: During fieldwork, 6 main locations were sampled, all in the vicinity of the plant sampling sites as described in methodology section 1. The sampling locations were randomly selected; while ensuring that in each region (Eastern and western sections of the project area) sufficient locations may be sampled. So that maximum number of species of each habitat may be observed and recognized. Besides this the variations in species type and distribution within both sections of the study area are accounted to the best possibility.

In order to identify and search for the mammal, birds, amphibian, fish, reptilian species; the 6 sites used for vegetation survey (with one additional site, as described in Section 1, Vegetation Sampling) were visited at different times of the day, according to their remoteness and expected faunal diversity value, hence making the survey visits to a total of 9 to 10 samplings, within the reference area. The records obtained and information gathered through literature, and during visits to Pakistan Forest Institute (PFI), the Climate Change Forestry, Environment and Wildlife Department, consulting Wildlife Department`s field record/data showed that the reference area provided suitable habitat for local wildlife species.

It has been indicated from records that mammalian populations are merger in the area, attributed to the human influence and related developmental activities. As far as migratory birds are concerned, the winter migrants are associated to the water bodies only. Major water bodies i.e. rivers are located outside project area and at a greater distance, i.e. distance and possible locations relevant to the passage of the winter migratory birds are at least 10 Km in case of River Kabul in north and up to 40 Km in case of River Indus in East. There is almost no possibility of finding such winter migrants in the project areas at any part of the year, being located far away from the Eastern and Norther waterbodies/Rivers. However, the summer migrants those follow the monsoon rains are found frequently in summers. And they are mostly considered as common birds with stable populations, hence they are least concerned with reference to conservation, common example may be the Indian Roller, Common Whitethroat, Reed Warbler etc., most birds species tend to move further south, because area is dry and winter is harsh at the project area therefore breeding grounds as well as nesting is difficult.

For some of the bird, mammalian and fish species, the secondary data was also used to prepare the list of species commonly found inside the reference area.

These references include;

- Tom, J. Robert's Mammals of Pakistan.
- Richard Grimmet *et al. 2008,* Edited by D & M Publishing Lambourn Woodlands, Hungerford Berkshire, Published by Christopher Helm, A & M Black Publishers Limited, 38 Soho Sq. London, UK.
- Tom, J. Robert's Birds of Pakistan Vol. 1 (Passerine) & Vol. 2 (non-Passerine)

Three main techniques were used during the survey including; An Hour Plot Search method that is simple method to conduct one-hour survey by a team of three to four persons. The observatory walks i.e., Transect walk was conducted along with Transect data collection at mid-day to afternoon time around small water bodies, while in the absence of water bodies in western section, the walk was along hilly terrine, and along canals in Eastern section respectively. While in other drier sites along with transect data collection of the plant species, the team members were intended to detect as many species of birds, reptiles and mammals as possible within a circular zone of approximately 50-100 and occasionally 150-meter radius. Fecal pallets, footprints, identifiable tracks, dens/tunnels/burrows etc. were used for the identification of species. This method was subsequently followed by ground survey method/technique for the identification of water associated mammals, amphibians and birds. In this method the team members walk around edge of the water spots and water channels and select a suitable site for making observations (vantage point) within hotspots using binoculars and cameras.

The survey team also ensured that the birds were observed without causing any disturbance. Another method used during the survey was Point count method in order to monitor land birds from a distance. An observer standing in one spot recorded all birds seen or heard.

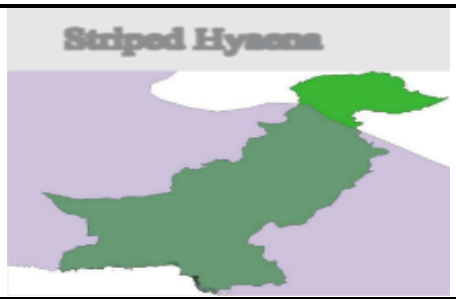
a) Mammals of Study Area:

Important among the mammals are Jackals, Wild Boars, Mongoose, field Rats, Mice, and occasionally Foxes were identified by their dens, and observation of their marks, while Flying foxes (bat species) has also been reported by some informants during interviews. For the western hilly and relatively undisturbed section of the project, whereas in agricultural field areas smaller rodent species and Hedgehogs (*Hysterix indica*, porcupine) are reported to exist in addition to the above mentioned mammalian species. Among these species most are the pests of crop fields.

A brief of Mammals species of the region is given bellow.

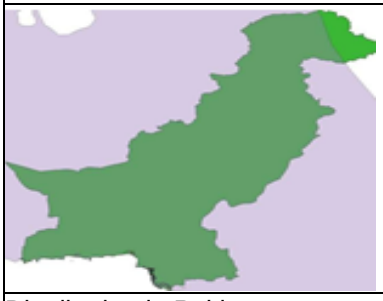
Common Name	**Greater Yellow Bat**
Scientific Name	***Scotophilus heathii***
Brief Introduction and Ecological Description	The greater Asiatic yellow bat (*Scotophilus heathii*) is a species of vesper bat. It is found in Afghanistan, Bangladesh, Cambodia, China, India, Indonesia, Laos, Myanmar, Nepal, Pakistan, Philippines, Sri Lanka, Thailand and Vietnam. These are large bats, with smaller body length is 8–9 cm. Forearms 6–7 cm. Wingspan 40 cm. Weight 48–52 g. Adults are yellowish bronze brown above and bright yellow to reddish below. Wing membrane is blackish brown. Short and dense fur except on neck. Muzzle is blunt, naked, and dark, long tailed. Young are dark grayish brown. IUCN Red List status is Lease Concern (LC) for this species.
Common Name	**Asiatic or Golden Jackal**
Scientific Name	**Canis aureus**

Brief Introduction and Ecological Description Photograph from field are Jackal's Den	The golden jackal (*Canis aureus*) is a wolf-like small to medium sized canid, that is native to Southeast Europe, Southwest Asia, South Asia, and regions of Southeast Asia. Compared with the Arabian wolf, which is the smallest of the gray wolves (*Canis lupus*), the jackal is smaller and possesses shorter legs, a shorter tail, a more elongated torso, a narrower and more pointed muzzle. The golden jackal's coat can vary in color from a yellowish in summer to a dark beige in winter. It is listed as 'least concern' on the IUCN Red List due to its widespread distribution and high density in areas with plenty of available food and optimum shelter. Hence its population in the study area is stable, and decline due to project construction activities is not expected for its population, as IUCN also Lists its status as least concerned (LC)
Common Name	**Red/Desert Fox**
Scientific Name	**Vulpes vulpes**
Brief Introduction and Ecological Description  Burrow of Indian hare	The white-footed fox (*Vulpes vulpes*), also known as the desert fox, is a small, Asiatic subspecies of red fox which occurs throughout most of northwestern Indian subcontinent, Pakistan's dry and natural vegetation areas. It is mostly found on and around hills or in the broad sandy beds of semi-dry rivers, rarely in fields, and in the vicinity of water spots smaller animals. Its IUCN RedList Status is LC and marked as Stable.
Common Name	**Grey Mongoose**
Scientific Name	**Herpestes Edwardsi**
Brief Introduction and Ecological Description	The Grey mongoose (*Herpestes edwardsi*) is a mongoose species native to the Indian subcontinent and West Asia. It is known to have stable populations in area. Mongoose inhabits open forests, scrublands and cultivated fields, often close to human habitation. It lives in burrows, hedgerows and thickets, among groves of trees, and takes shelter under rocks or bushes and even in drains. It is very bold and inquisitive seldom venturing far from cover. Usually found singly or in pairs. It preys on rodents, snakes, birds' eggs and hatchlings, lizards and variety of invertebrates. Very successful invasive animal species that breeds throughout the year. Population in this study area is stable, and IUCN Red List status for the species is Least Concerned.
Common Name	**Striped Hyena**
Scientific Name	**Hyaena hyaena**
Brief Introduction and Ecological Description	Not spotted during survey, only secoundry data records are available. The striped hyena (*Hyaena hyaena*) is a species of hyena native to North and East Africa, the Middle East, the Caucasus, Central Asia and the Indian subcontinent. It is listed by the **IUCN as NT near-threatened**, as the global population is estimated to be under 10,000 mature individuals, it may come close to meeting a continuing decline of 10% over next few generations, hence making it really close to extinction. It is the smallest of the Hyaena species, having a smaller and less specialized skull. Though primarily a scavenger, large specimens have been known to kill their own prey. Being a strict nocturnal animal it is active an hour or more after the sun sets and it is secretive hence chances for sporting one in field are rare. As mentioned the striped hyena typically only emerges in complete darkness, and is quick to return to its lair before sunrise. IUCN Status is NT and Population has been marked as Declining according to Red List data.

		
	Distribution in Pakistan	Species appearance and Characteristic features (Source courtly: https://www.shutterstock.com/search/stalking-hyena accessed on 28-05-2023)

Common Name	**Indian Hare**
Scientific Name	***Lepus nigricollis***
Brief Introduction and Ecological Description 	*Lepus nigricollis* are also called black-napped hares due to the patch of black fur that runs along the nape of their neck. The top of the tail is also black and the back and face are brown with black hairs scattered throughout. IUCN status according to red list is LC and Population decline or stability is not defined in IUCN data.

Burrow of Indian hare

Common Name	**Porcupine**
Scientific Name	**Hystrix indica**
Brief Introduction and Ecological Description  Burrow of Porcupine	The Indian crested porcupine (*Hystrix indica*) is a rodent species native to southern Asia and the Middle East. It is listed as Least Concern on the IUCN Red List. It belongs to the Old World porcupine family, Hystricidae. They consume a variety of natural and agricultural plant material, including roots, bulbs, fruits, grains, drupe and tubers, along with insects and small vertebrates, as they are able to exploit low quality forage hence these survive well in marginal environments like the project area. They are adapted for living in seasonally fluctuating habitats like the current study site. Hence, its IUCN Red List Status is LC and marked as Stable.
	
Distribution in Pakistan	Species appearance and Characteristic features

Common Name	**Roof Rat**
Scientific Name	**Rattus rattus**
Brief Introduction and Ecological Description	The black rat, also known as ship rat, roof rat, or house rat, is a common long-tailed rodent of the stereotypical rat genus Rattus, in the subfamily Murinae. It likely originated in the Indian Subcontinent, but is now found worldwide. The black rat is black to light brown in color with a lighter underside. IUCN Status is LC.
Common Name	**House Mouse**
Scientific Name	**Mus musculus**
Brief Introduction and Ecological Description	The house mouse is a small mammal of the order Rodentia, characteristically having a pointed snout, large rounded ears, and a long and hairy tail. It is one of the most abundant species of the genus Mus, while IUCN Status is LC as that of House rat, with population status stable according to the IUCN Database.
Common Name	**Wild Bore**
Scientific Name	**Sus scrofa**
Brief Introduction and Ecological Description	One of the common agricultural pest species of the study area, while IUCN Status is LC being a pest of crop fields populations are expected to be stable however the populations worldwide are marked as unknown accorded to IUCN database. Also known to exist in most parts of Southern KP and all around Punjab and Sindh planes. In our project area, it is reported absent in the western section, however in the eastern agricultural section it is found.

Distribution in Pakistan

Species appearance and Characteristic features

b) Birds of Study Area:

Attributed to the dry climatic conditions, the study area does not represent a large variety of avifauna. However, certain important species are known to exist in the area. some of them are of ecological importance as well as have importance of conservation level such as a few winter migrants, like occasionally found cranes in pre winter season, and native partridge species.

Notable populations as well as variety of sparrows and smaller passerines is also observed during survey, and due to these types of bird's presence, their predator birds such as small buzzards and hawks as well as kites are also observed in the Study Area, particularly in the Western hilly section.

Due to the presence of some canals in some of the areas, and presence of the irrigation system in Eastern project section, a variety of birds is found. Both sections of the project area are comprising of variable vegetative zones, geography, habitat types etc. but very dry conditions, therefore winter visitors' birds' choice remains limited.

Meanwhile this locality for interim stay or breeding is also less suitable due to lack of vegetation cover as well as no protected areas nearby. The main Avifauna species are listed below.

Note: Identification reference Book used to identify our field photography specimens: Helm Field Guide Birds of Pakistan

Table 6.8: The list of animal species and Selected Plates of Filed visit describing habitats:

Common name	**Biological name**	**Conservation status as per IUCN red list Status (Additional native or non-native)**	**Photograph and Identification Reference (Helm Field Guide Birds of Pakistan)** Page wise reference given below for each Bird Species.
Cattle Egret	Bubulcus ibis	**LC, Increasing population according to IUCN Status of population.** Resident	 142 7a
Great Cormorant	Phalacrocorax carbo	**LC, Increasing population.** (Winter migrant occasional passage)	 140 7a
Little Egret	Egretta garzetta	**LC, Increasing population.** Resident	 142 1a
Greater Egret	Egretta alba	Wintering	

Common name	**Biological name**	**Conservation status as per IUCN red list Status (Additional native or non-native)**	**Photograph and Identification Reference (Helm Field Guide Birds of Pakistan)** Page wise reference given below for each Bird Species**.**
			142 5a, b
Grey Heron	Ardea cinerea	**LC, Increasing population according to IUCN Status of population** Wintering	142 3a b c
Eurasian Wigeon	Anas penelope	**LC, stable population according to IUCN Status of population** Wintering	56 4a b c
Common Honey Buzzard	Buteo buteo	**LC, Increasing population according to IUCN Status of population.** Irregular year round visitor	 130 3a
Black Kite	Milvus migrans	**LC, Increasing population according to IUCN Status of population.** Resident	118 3a b c d
Eurasian Sparrow Hawk	Accipiter nisus	**LC, its population is Stable according to IUCN Status of population.** Occasional wintering	128 2a b c d
Peregrine Falcon	Falco peregrinus	**LC, Increasing population according to IUCN Status of population** Wintering	138 4 a b c d
Common Quail (batair)	Coturnix coturnix	**LC, its population is on a gradual Decrease according to IUCN Status of population.** Resident	48 4a b
Baillon's Crake	Porzana pusilla	**LC, according to IUCN Status of population is Unknown.** Wintering	 90 5ab

Common name	**Biological name**	**Conservation status as per IUCN red list Status (Additional native or non-native)**	**Photograph and Identification Reference (Helm Field Guide Birds of Pakistan)** Page wise reference given below for each Bird Species**.**
Red-wattled Lapwing	Vnellus indicus	**LC, Increasing population according to IUCN Status of population** Resident	106 3a b
Little Stint	Calidris minuta	**LC, Increasing population** Double passage or ordinary migrant	98 7 a b
Ruff	Philomachus pugnax	**LC, but Decreasing Populations.** Occasional ordinary migrant	100 4a b c d e f
Common Snipe	Gallinago gallinago	**LC, but Decreasing Populations** Wintering	94 4 a b c
Green Sandpiper	Tringa ochropus	**LC, Increasing population according to IUCN Status of population** Wintering	98 1a b c
Rock Pigeon or Rock Dove	Columba livia	**LC, but Decreasing Populations** Resident	
Indian Ring Dove	Streptopelia decaocto	**LC, Stable Population** Resident	
Turtle Dove	Streptopelia tranquebarica	**LC, Stable Population** Summer breeding	

Common name	**Biological name**	**Conservation status as per IUCN red list Status (Additional native or non-native)**	**Photograph and Identification Reference (Helm Field Guide Birds of Pakistan)** Page wise reference given below for each Bird Species**.**
Rose Ringed Parakeet	Psittacula krameri	**LC, Stable Population** Resident	
Pied Cuckoo	Clamator jacobinus	**LC, Stable Population** Summer breeding	
Common Crow Pheasant	Centropus sinensis	**LC, Stable Population** Resident	
Short-eared Owl	Asio flammeus	**LC, but Decreasing Populations** Spring migrant	

Common name	**Biological name**	**Conservation status as per IUCN red list Status (Additional native or non-native)**	**Photograph and Identification Reference (Helm Field Guide Birds of Pakistan)** Page wise reference given below for each Bird Species**.**
House Swift	Apus affinis	**LC, Increasing population according to IUCN Status of population** Resident	
White throated Kingfisher	Halcyon smyrnensis	**LC, Increasing population according to IUCN Status of population** Resident	
Blue cheeked Bee Eater	Merops persicus	**LC, according to IUCN Status of population is STABLE** Resident	
Indian Roller 2	Coracias benghalensis	**LC, Increasing population according to IUCN Status of population** Spring and Autumn migrant	

Common name	**Biological name**	**Conservation status as per IUCN red list Status (Additional native or non-native)**	**Photograph and Identification Reference (Helm Field Guide Birds of Pakistan)** Page wise reference given below for each Bird Species**.**
Hoopoe	Upupa epops	**LC, but Decreasing Populations** Resident	
Oriental Sky Lark	Alauda gulgula	**LC, but Decreasing Populations** Resident	
Crested Lark	Galerida cristata	**LC, but Decreasing Populations** Resident	
Brown-throated Martin	Riparia paludicola	**LC**. Resident	

Common name	**Biological name**	**Conservation status as per IUCN red list Status (Additional native or non-native)**	**Photograph and Identification Reference (Helm Field Guide Birds of Pakistan)** Page wise reference given below for each Bird Species**.**
Barn Swallow	Hirundo rustica	**LC** Wintering	
Indiana Cliff Swallow	Hirundo fluvicola	**LC** Resident	
Magpie Robin	Copsychus saularis	**LC** Occasional breeding	
Black Redstart	Phoenicurus ochruros	**LC** Wintering	
Isabelline Wheatear	Oenanthe isabellina	**LC** Wintering	
Golden-tailed Wheatear	Oenanthe xanthoprymna	**LC** Wintering	
Indian Robin	Saxicoloides fulicata	**LC. Stable Population** Resident	
Blyth's Reed Warbler	Acrocephalus	**LC** Double passage or ordinary migrant	

Common name	**Biological name**	**Conservation status as per IUCN red list Status (Additional native or non-native)**	**Photograph and Identification Reference (Helm Field Guide Birds of Pakistan)** Page wise reference given below for each Bird Species**.**
House Sparrow	Passer domesticus indicus	**LC, Increasing Population** Resident	
Desert Warbler	Sylvia nana	**LC** Wintering	
Common Whitethroat	Sylvia communis	**LC. Increasing Population** Autumn migrant	
Common Babbler	Turdoides caudatus	**LC, Increasing population according to IUCN Status of population** Resident	
Great Grey Shrike	Lanius excubitor	**LC, Increasing population according to IUCN Status of population** Summer breeding	

Common name	**Biological name**	**Conservation status as per IUCN red list Status (Additional native or non-native)**	**Photograph and Identification Reference (Helm Field Guide Birds of Pakistan)** Page wise reference given below for each Bird Species**.**
Drongo/King Crow	Dicrurus macrocercus	**LC** Resident	
House Crow	Corvus splendens	**LC** Resident	
Common Myna	Acridotheres tristis	**LC** Resident	
Bnak Myna	Acridotheres ginginianus	**LC** Resident	

Common name	**Biological name**	**Conservation status as per IUCN red list Status (Additional native or non-native)**	**Photograph and Identification Reference (Helm Field Guide Birds of Pakistan)** Page wise reference given below for each Bird Species**.**
Common Sparrow	Passer pyrrhnotus	**LC, Increasing Population** Resident	
Streaked Weaver	Ploceus manyar	**LC** Resident	
Indian Silverback	Lonchura malabarica	**LC, Stable Population** Double passage or ordinary migrant/resident	

c) Snakes of Study Area:

Snakes are considered as the carnivorous reptiles of the suborder Serpents. Despite searching and waiting along agricultural fields, no direct sight for snakes is included, while reported species of snakes of Study Area are listed below.

Sp. Name	**IUCN red list Status**
Ramphotyphlops braminus	LC
Coluber ventromaculatus	LC
Lytorhynchus paradoxus	LC
Psammophis leithii leithii	LC
Spalerosophis diadema	LC

d) Reptiles and Amphibians of Study Area:

Lizards are the dominant group of reptiles in the dry arid regions of Pakistan. They belong to the group showing enormous variations in their morphology to get fit in different habitats, as the Study Area have an excellent variety of topography along with dry climatic conditions, hence area according to local climate, morphology and habitat types. Lizards of area are living in barren soils and sandy areas only.

There is 1 species of frog and one toad specie were reported form the area. One soft shell turtle species was observed in a canal, but could not captured in photograph for the identification purpose although this specimen could not be recorded. However, being an area under extensive cultivation, this is possible to find these water reptiles and some Amphibian species as dominant fauna of the area, particularly in monsoon.

Observed and reported species of lizards are listed below.

Sp. Name	Common Name	IUCN red list Status
Laudakia melanura	Black Rock Agama	LC
Eublepharis macularius	Common Leopard Gecko	LC
Cyrtopodion montiumsalsorum	Salt Range Gecko	LC
Cyrtopodion potoharensis	Potwar Gecko	LC
Eutropis macularia	Bronze Mabuya	LC

One of the Common Frog Spp belonging to Genus *Rana*

No fish Species were recorded from the area, as major Fish catch is based on fish farms and Kabul River as well as Indus which is about 15 Km and 50 Km away from Project Site respectively.

e) Conclusion:

The Study Area, i.e., District Peshawar being under extensive cultivation for cereal as well as vegetables and other cash crops around the year, has become a low Bio-diversity and ecological poor region over time, mainly due to developmental activities and land use pattern change. All most all of the animal species seem to associate with the crop field and/or marginal lands, some migratory species are there. So as to overwinter in the warmer climate and leave the site to further south in case of colder winters. Passerine species are relatively abundant as there is grain cultivation as well as grain processing on filed and in nearby areas, provide an ample availability of seeds and leftovers for smaller birds. However, non-passerines are also found as *soma* small waterlogged areas and canals are there in the eastern region of the project. However, most biodiversity has been removed/ruined due to addition of fertilizer, and pesticides. Its unique geographic location and water availability can support a lot of local as well as new flora and fauna, but due to anthropogenic activities this has a limited scope.

Peshawar District consists of agricultural plains, lakes/ponds etc. As Peshawar is situated at Kabul River, at upper far bank (about 60 Km) of the Indus River and western hills the biodiversity shall be more as compared to the current observed.

The proposed project is a linear development which will not involve much on ground infrastructural development as that of Agriculture or large-scale housing schemes, but during the construction phase maximum care will be given to the protection of native vegetation as well as animal species, which will include no tree removal, or systematic felling / tree cutting and providing alternate plantation scheme. This alternate/replacement plantation shall include

fast growing species of course of noninvasive nature. Species like Eucalyptus will be avoided, however Conocarpus and Dalbergia may be recommended to be cultivated at the layer level. Conocarpus layer may be removed after few years and the next layer of sisso tree may be retained.

This has been concluded that no adverse impact is predicted into local fauna, flora and their ecology.

f) Recommendations:

After the detailed study and discussion, the following measures are recommended to minimize the adverse effects of the Project on local Ecosystem.

- Noise and pollution control measures should be exercised for the prevention of negative impacts on resident fauna and flora by plantation of noise absorbing tree/tall shrub layers along the road and in the green belts.
- Proper disposal of all types of constructional wastes or used materials are recommended, to avoid its negative impacts on local ecology in future.
- During the construction phase a considerable amount of loose soil and other wastage will be produced. It is suggested that the same will be dumped at proper depressions/dumping sites, to avoide any damage to the environment in the immediate surroundings.
- Linear plantations of suitable plants/trees along suitable ornamental species are recommended for multiple positive impacts and betterment of ecosystem.
- Heavy noise/sounds causing machinery will be avoided.
- Constructional work may carry out during day timing to avoid negative impacts on major mammals and Resident nocturnal Fauna.
- Exercise Environmental Management Plan (EMP) in full spirit.

6.4.4 Protected Areas/ National Sanctuaries, Wildlife

There is no protected area in the vicinity of the project area. There is no wildlife sanctuary in the close vicinity of the project area.

There is no endangered species reported in the project area by the Wildlife Department of Khyber Pakhtunkhwa.

6.4.5 Wetlands and Aquatic Biology

River Kabul is almost 10 km away from the end point of the project hence there is no fisheries, wetlands and aquatic biology within the vicinity or project area.

There are no Ramsar or other wetlands that provide either resting or breeding habitat for any economically, ecologically or socially important species of birds or other wildlife within or in the vicinity of the project as shown in **Figure 6.9.**

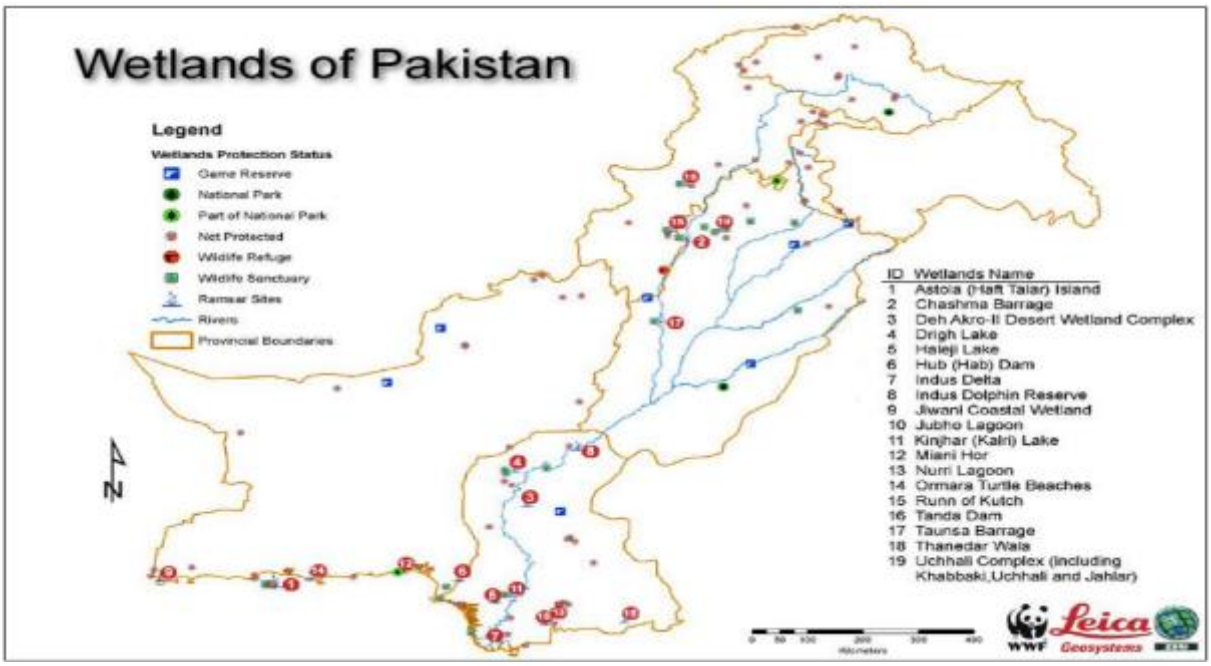


Figure 6-9: Wetlands of Pakistan

Rohu, mahasheer, soal, swati and carp are found in the Bara River, the only perennial water body in the area. Commercial fishing does not exist on the Bara; however, sometimes individual fishing does occur.

6.5 SOCIOECONOMIC ENVIRONMENT

This section briefly describes the overall socio-economic baseline conditions of the villages/hamlets (*killis*) that fall in the RoW. This task aimed at gathering:(i) Demographic Characteristics; (ii) Main Occupation & Source of Income (iii) Land Ownership Status (iv) Housing Condition (v) Religion (vi) Language Spoken in the project area (vii) Institutional Facilities (viii) Educational Facilities (ix) Source of Drinking Water. The Questionnaires of Socio-economic, Asset inventory, Village Profile and Focus Group Discussion (FGDs) are provided in the **Annexures XIX**, **XX** and **XXI** respectively in the Annexures Volume.

6.5.1 Methodology adopted for Socio-economic Data/Village Profile

During the socioeconomic survey, the team faced many challenges from the people of the project area, e.g., difficulty in accessing the views of women and reluctance from community members to share information about their land and structure affected by the project by the project's current alignment.

6.5.2 Demographic Characteristics

Field surveys were systematically conducted to prepare village profiles and collected data from 14 Mouza, including smaller settlements along the proposed alignment. The survey areas ranged from a maximum 10,000 households (HHs) in Mera Kachuri to a minimum of 23 HHs in Masho Khel Village, with a combined population of 179,985 across the 12 villages. A structured questionnaire was employed to gather information on various indicators, and key informants such as Maliks (tribal heads), Elders, Teachers, Imams, Numberdars (village revenue official), Chairmen of municipal bodies and other community participants played a pivotal role in providing data during the meetings. The findings of population are summarized below in **Table 6.9.**

Table 6.9: Demographic Characteristics of Villages

S.#	Population of the Studied Village						
	Name of Visited Village	Total HHs	Total population	Avg. Family size	Male (%)	Female (%)	Sex Ratio (Male: Female)
1.	Mera Surizai	45	675	15	49	51	100:104
2.	Mera Kachuri	10000	120000	12	50	50	100:100
3.	Jabba	6000	72000	12	48	52	100: 108
4.	Satteno	340	4420	13	47	53	100:112
5.	Surizai Bala	3000	33000	11	49	51	100:104
6.	Masho Gagger	450	5850	13	48	52	100:108
7.	Ghareebabad Batatal	200	2200	11	48	52	100:108
8.	Mushtarzai	70	840	12	47	53	100:112
9.	Mera Mashogagar	300	4200	14	47	53	100:112
10.	Masho Khel	23	300	13	49	51	100:104
11.	Nogazi Baba	100	1500	15	48	52	100:108
12.	Bara Qadeem	700	7000	10	48	52	100:108
Total		**21228**	**179985**	**12**	**48.5**	**51.5**	**100:105**

6.5.3 Main Occupation, Source of Income and Land Ownership Status

During the field survey and data collection to ascertain village profile, the data regarding main occupation, major source of income and land ownership was collected from the community members. The data is presented in the **Table 6.10** indicated that in Peshawar and Nowshera area, land was fertile and under cultivation. Majority locals are engaged in farming, but in the village of Nogazi Baba, mostly HH source of income was Govt. service. Major crops of the area are wheat, rice, maize, sugarcane, fodder, jawar (sorghum) and bajra (millet). The project area is very close to Peshawar city, an adjoining urban area where the participants engage in various small businesses, including running shops and hotels, as well as holding government positions such as teacher, clerk, Patwari, driver etc.

While in Khyber District due to scarcity of water, rainfed agriculture and low rainfall, the locals adopted various occupations for the livelihoods such as driver, shop keeping, other small business, etc. The below table depicts the life style status of the local residents. The **Figure 6.16** showing the major occupations with multi-responses in project area.

Table 6.10: Main Occupations, Source of Income of the Studied Villages

Sr. No.	Source of Income of visited Villages	Main Occupation (%) (with multi responses)	Major Source of Income	Land Ownership
1	Mera Surizai (Peshawar)	Farming=30	Own Business, Farming	Owners
		Govt. Service=20		
		Private. Service=10		
		Own Business=40		
		Other=10		
2	Mera Kachuri (Peshawar)	Farming=75	Own Business, Farming	Owners
		Govt. Service=15		
		Private. Service=10		
		Own Business=15		
		Other=5		
3	Jabba Khalsa (Nowshera)	Farming=70	Farming	Owners
		Govt. Service=30		

Sr. No.	Source of Income of visited Villages	Main Occupation (%) (with multi responses)	Major Source of Income	Land Ownership
		Private. Service=20 Own Business=10 Other=7		
4	Satteno Kalay (Peshawar)	Farming=70 Govt. Service=20 Private. Service=20 Own Business=30 Other=5	Farming	Owners
5	Surizai Bala (Peshawar)	Farming=60 Govt. Service=25 Private. Service=20 Own Business=10 Other=5	Farming	Owners
6	Masho Gagger (Peshawar)	Farming=60 Govt. Service=10 Private. Service=20 Own Business=10 Other=2	Farming	Owners
7	Masho Mera (Peshawar)	Farming=60 Govt. Service=15 Private. Service=10 Own Business=10 Other=10	Farming	Owners
8	Ghareebabad Batatal (Peshawar)	Farming=30 Govt. Service=5 Private. Service=15 Own Business=30 Other=25	Farming	Owners + Tenant
9	Musterzai (Peshawar)	Farming=70 Govt. Service=20 Private. Service=5 Own Business=5 Other=5	Farming	Owners
10	Maira Mashogagar (Peshawar)	Farming=60 Govt. Service=20 Private. Service=25 Own Business=5	Farming	Owners + Tenant
11	Masho Khel (Peshawar)	Farming=70 Govt. Service=60 Private. Service=10 Own Business=10 Other=10	Farming	Owners + Tenant
12	Nogazi Baba (Khyber)	Farming=60 Govt. Service=10 Private. Service=20 Own Business=35 Other=5	Service	Owners
13	Bara Qadeem (Peshawar)	Farming=40 Govt. Service=10 Private. Service=25 Own Business=30 Other=10	Farming + Service	Owners
14	Masho Gagar (Peshawar)	Farming=40 Govt. Service=20 Private. Service=30	Farming	Owners

Sr. No.	Source of Income of visited Villages	Main Occupation (%) (with multi responses)	Major Source of Income	Land Ownership
		Own Business=25 Other=10		

6.5.4 Housing Conditions in the Studied Villages

During the data collection of village profile, information was gathered regarding type of residential structures. The data indicated that 75 percent houses of the studied villages/killis were found Pacca (solid/permanent) followed by 20 percent were Semi Pacca and only 5 percent were Kacha (not built with solid material like bricks/stone. Usually mud) houses as shown in the **Figure 6.10**. The people preferred to spend their savings to construct Pacca or Semi Pacca houses for the durability and safety of the families particularly in heavy rains and flood seasons.

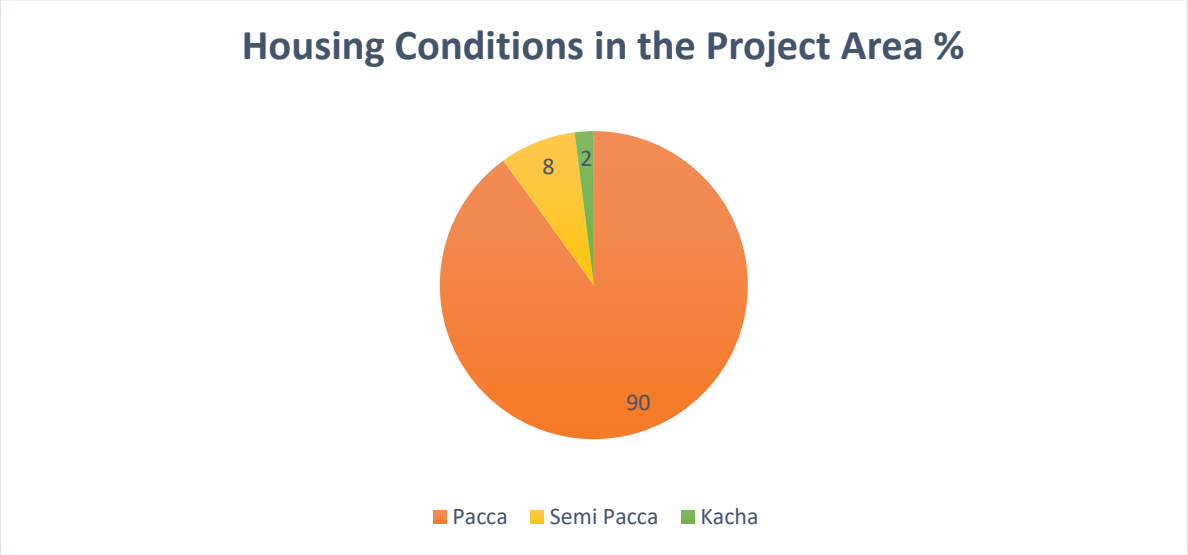


Figure 6-10: Housing Conditions

6.5.5 Religion and Ethnic Group

The survey findings shown that 100 percent people were Muslim in and around the project area. People from other religion such as Sikh also lived in other districts of the province but were not found in the project area.

6.5.6 Language Spoken

The survey findings show that 100 percent people were Pathans and their mother tongue was Pashto. In District Nowshera and Peshawar residents can speak Urdu as well as Pashto language. Similarly, in District Khyber mostly people speak Pashto and, in few areas, Urdu language is also spoken.

Urdu is the common language in writing. The literacy rate for female in Khyber District is 17%, while for male it is 76.3%, and overall it is 49.4%. For Peshawar male literacy rate is 56%, female 26% and overall literacy rate is 42%. For Nowshera the overall literacy rate is 42.5% having 60.55% for male and 22.68% for female.

6.5.7 Educational Institutions in the Surveyed Villages/Killi

The data was collected on village basis from 12 Villages/killis regarding educational status of the area. The data indicated that almost in all villages, primary, middle and high schools were

available, Inter College was available for boys in five surveyed villages (Mera Kachuri, Satteno Kalay, Masho Mera, Maira Mashogagar and Bara Qadeem). Degree College was also available in Satteno Kalay, Maira Mashogagar and Masho Gagar. Culturally, there is limited inclination to enrol girls in higher education. After completing the surveys of the villages along the alignment in Oct.-Nov.2022 and in May 2023, both girl's and a boy's schools at km 33+500, in village Surizai Payan were reported falling under the RoW and require relocation. Due to design requirements of the road, it is not possible at this stage to change the alignment of road. Nevertheless, the community has already shown its willingness to relocate the facility to a better location, one that offers increased space and a greater number of rooms for the students. The decision has been made in consultation of education department and the local community.

It is imperative to shift perspectives and address disparity to improve the educational situation. The Overall educational institutions in the studied villages/killis is presented in the **Table 6.11**.

Table 6.11: Educational Institutions in Studied Villages/Killi

Availability of Educational Facilities																	
Facility			**Mehra Surizai**	**Mehra Kachuri**	**Jabba Khalsa**	**Satteno Kalay**	**Surizai Bala**	**Masho Gagger**	**Masho Mera**	**Gharee-babad Batatal**	**Mush-tarzai**	**Maira Mashoga-gar**	**Masho Khel**	**Nogazi Baba**	**Bara Qadeem**	**Masho Gagar**
Primary School	BOYS	YES	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		NO														
	GIRLS	YES	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓
		NO								✓						
Middle School	BOYS	YES	✓	✓		✓		✓	✓		✓	✓		✓	✓	✓
		NO			✓		✓			✓			✓			
	GIRLS	YES		✓	✓	✓	✓		✓		✓			✓	✓	✓
		NO	✓					✓		✓		✓	✓			
High School	BOYS	YES		✓		✓	✓		✓		✓	✓	✓	✓	✓	
		NO	✓		✓			✓		✓						✓
	GIRLS	YES			✓		✓				✓	✓			✓	
		NO	✓	✓		✓		✓	✓	✓	✓		✓	✓		✓
Dini Madrassa	BOYS	YES	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	
		NO								✓						✓
	GIRLS	YES	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓	✓	
		NO				✓				✓						✓
Inter College	BOYS	YES		✓		✓			✓			✓			✓	
		NO	✓		✓		✓	✓		✓	✓		✓	✓		✓
	GIRLS	YES			✓							✓				
		NO	✓	✓		✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
Degree College	BOYS	YES				✓						✓			✓	
		NO	✓	✓	✓		✓	✓		✓	✓		✓	✓		✓
	GIRLS	YES		✓	✓	✓		✓				✓				
		NO	✓				✓		✓	✓	✓		✓	✓	✓	✓

6.5.8 Institutional Facilities Available

The data was collected and presented in the **Table 6.12** indicate that overall, the surveyed villages have these facilities. In the village of Mera Surizai all facilities are available like Hospital, Dispensary, BHU, Private Medical Practitioners, Veterinary Dispensary, Post office, Bank, Police Station, however, in the village of Masho Gagar there have no such facility exists. In case, if one facility is not available in the village, the people are using same facility in another village. So, they were benefitting directly and indirectly from these facilities.

Table 6.12: Availability of Institutional Facilities

Facility		Mehra Surizai	Mehra Kachuri	Jabba Khalsa	Satteno Kalay	Surizai Bala	Masho Gagger	Masho Mera	Ghareebabad Batatal	Mushtarzai	Maira Mashog-agar	Masho Khel	Nogazi Baba	Bara Qadeem	Masho Gagar
Hospital	YES	✓				✓	✓	✓					✓	✓	
	NO		✓	✓	✓				✓	✓	✓	✓			✓
Dispensary	YES	✓	✓	✓	✓				✓	✓		✓	✓	✓	
	NO					✓	✓	✓			✓				✓
BHU/RHU	YES	✓	✓		✓	✓	✓						✓	✓	
	NO			✓				✓	✓	✓	✓	✓			✓
Private Practitioner	YES	✓	✓		✓	✓		✓	✓	✓	✓	✓			
	NO			✓			✓						✓	✓	✓
Veterinary Dispensary	YES	✓				✓		✓					✓		
	NO		✓	✓	✓		✓		✓	✓	✓	✓		✓	✓
Artificial insemination Centre for cattle.	YES														
	NO	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Post Office	YES	✓	✓		✓	✓	✓	✓	✓	✓		✓	✓	✓	
	NO			✓							✓				✓
Bank	YES	✓	✓		✓	✓	✓	✓	✓	✓			✓	✓	
	NO			✓							✓	✓			✓
Police Station/ Post	YES	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	NO			✓											✓
Any Other	YES														
	NO	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

6.5.9 Source of Drinking and Irrigation Water

In most villages, the major source of water was through hand pumps. In a few villages water supply system and wells were also the main source of drinking water. In this context, data was collected and presented in the **Tables 6-13.**

Table 6.13: Source of Drinking Water

Sr. No.	Source of Drinking Water	Hand Pump	Well	Water Supply	Others (Bore)
1	Mehra Surizai	□			
2	Mehra Kachuri	□		□	
3	Jabba Khalsa	□			□
4	Satteno Kalay	□			□
5	Surizai Bala	□			□
6	Masho Gagger	□			□
7	Masho Mera	□			□
8	Ghareebabad Batatal		□	□	
9	Mushtarzai			□	
10	Maira Mashogagar		□	□	
11	Masho Khel		□	□	
12	Nogazi Baba		□	□	
13	Bara Qadeem			□	
14	Masho Gagar		□	□	

The irrigation data was collected, mostly farmers were using the canal water for irrigation and few farmers have installed their private owned tube wells for agriculture purposes. Further information presented in the **Tables 6-14.**

Table 6.14: Source of Irrigation Water

Sr. No.	Source of Irrigation Water	Canal	Tube well	Well	Rain	Canal+ Tube well
1	Mehra Surizai	✓				
2	Mehra Kachuri					✓
3	Jabba Khalsa	✓				
4	Satteno Kalay	✓				
5	Surizai Bala	✓				
6	Masho Gagger	✓				
7	Masho Mera	✓				
8	Ghareebabad Batatal					✓
9	Mushtarzai	✓				
10	Maira Mashogagar		✓			
11	Masho Khel					✓
12	Nogazi Baba		✓		✓	
13	Bara Qadeem	✓				
14	Masho Gagar					✓

6.5.10 Administrative Setup

The project area comes in District Khyber, Peshawar and Nowshera. The Assistant Commissioner sits at the tehsil headquarters and leads the Tehsil Administration. The Deputy Commissioner leads the District Administration. The Assistant Director, Local Government and Rural Development of each district is responsible for coordinating matters relating to secretarial functions of village and neighborhood councils in the district.

6.5.11 Security Situation in the Project Area

The Torkham Border, part of the Khyber District, plays a crucial role as an economic corridor between Pakistan and Afghanistan. Nonetheless, the security situation, specifically within district Khyber, is presently unsatisfactory, keeping in view the previous security record before merger of FATA into KP. Moreover, currently there is no ongoing conflict in the project area. However, the SMP will be updated if such sensitive situation arises. In response to these challenges, a security management plan has been prepared and attached as **Annexure IV.** Conversely, the security conditions in the project area falling in Peshawar and Nowshera districts is generally considered satisfactory, and people of these areas are supportive of the project.

6.5.12 Community Religious Sensitive Sites/Structures

The proposed road is passing through rural areas of Peshawar. There are 2 mosques located in the proposed RoW of SLR Road. These are Pacca structures located in Bara Qadeem and Masho Gagar.

Graveyards

Ten graveyards along the RoW were significantly affected by the original alignment. These graveyards, situated in Nogazi Baba, Sangu Maira, Bara Road, Ghareebabad, Mushterzai, Garhi Malli Khel (at 2 places), Masho Gagar and Jabba faced potential disturbance. To address this sensitive issue, meetings and consultations were conducted with NHA and design engineers. Following these discussions, adjustments were made to the alignment by the end of August 2023, successfully averting any impact on the eight graveyards and addressing the community Concerns.

Graveyard located at Nogazi Baba

Graveyard located at Mushtarzai

6.5.13 Public Utilities

Electricity: Power supply is available in all dwelling of the proposed alignment approximately 59 poles of 11 KV, 30 poles of 220 KV, 10 Transformers and 1 pole 132 KVA will be relocated.

Sui Gas Pipe Line is spread in all over the dwellings which will be affected during construction of the proposed road. At village Masho Gagar main pipeline of the Sui Gas will be affected at KM 20+200.

	
Main Sui Gas pipeline passing in village Masho Gagar at KM 20+200	Main Sui Gas pipeline passing in Masho Gagar

6.5.14 Transportation infrastructure

The transportation infrastructure in Tehsil Peshawar adequately supports the project area, while Tehsil Bara faces dissatisfaction due to insufficient infrastructure. Notably, three major roads insect with the SLR alignment at different locations, i.e., Kohat Road near Badaber. Bara Road in Bara Qadeem, and Shah Kass Road in Nogazi Baba. To address these intersections, overhead bridges will be constructed for seamless and safe road crossings.

6.6 GENDER ASSESSMENT

In June 2023, consultations were conducted with women in eight villages affected by the project in Peshawar and Nowshera districts, resulting in data collection from 71 female respondents. Attempts to engage women in Sathi Khel, Khyber District were hindered by the extremely conservative social environment, and efforts will be made during project implementation to engage with them. The surveyed women in Peshawar and Nowshera districts represented both farming and non-farming communities. A structured questionnaire was used for interviews and data collection, covering topics such as women's role and responsibilities, decision making within family, preference of male children, women involvement in institutions, gender preference in education, women health issues, access to potable drinking water, control over assets, earning opportunities, and project impact on women. The questionnaire also explored aspects of finance, resources social attitudes, vulnerability and pressing needs of women.

Additionally, the questionnaire covered aspects such as access to earning opportunities, utilization of earnings, control over salaries, male attitudes towards women, caregiving, social protection for vulnerable individuals, gender-based violence, and project benefits for women, the impact of the project on women, and the pressing needs of women. Furthermore, data was collected to understand the opinions and suggestions of the participants regarding the proposed project.

The details of surveyed villages and participants are summarized in the T**able 6-15**, while photographs of the female participants are appended in the **Figure 8-1.** The scanned attendance sheets of female participants are provided in the **Annexure XXII.**

Table 6.15: Name of the Surveyed Villages and Nos. of Female Participants

Sr. No.	Name of Village	Nos.
1	Tarnab Farm, Jabba	06

Sr. No.	Name of Village	Nos.
2	Aziz Khan Garhi, Mera Kachuri	06
3	Khan Khel Mohallah, Surizai Bala	08
4	Garhi Mali Khel	15
5	Mohalla Afridi/Badaber	06
6	Masho Gagger	06
7	Mushtarzai	10
8	Ghareebabad	14
TOTAL		**71**

The data has been tabulated for interpretation, and it is presented in both tabular and narrative formats. The narrative includes detailed explanations, leading to the formulation of conclusions and recommendations, systematically outlined in the subsequent sections.

6.6.1 Roles and Responsibilities of Women

During the field assessment, data was collected to ascertain the situation regarding gender roles and responsibilities in the project area.

During visits to villages along the project alignment, it was observed that women in households engage in a variety of daily activities. These include childcare, meal preparation, laundry, house cleaning, ironing, water fetching, fuel wood collection, and caregiving for the ill and elderly. Additionally, women take on responsibilities such as tending to livestock, preparing fodder, milking cows, and working in the fields like sowing, harvesting, and vegetables picking. The women's roles are multifaceted, involving both domestic responsibilities and agricultural tasks, showcasing their diverse and significant contributions within their families and communities.

A significant number of female respondents conveyed a profound sense of dissatisfaction in their lives, primarily attributed to their low income and limited resources. In their communities, men are traditionally perceived as the sole breadwinners. Many of these men either work as laborers in the Middle East or are holding a low-paying local jobs due to limited literacy levels. As a result, household incomes frequently struggle to meet basic daily expenses.

This financial strain has severe consequences. Women find it difficult to afford nutritious food, leading to various health issues among family members, including joint pain, high blood pressure, and skin diseases. The inadequate access to essential resources exacerbates their struggles, impacting not just their physical health but also their overall well-being. This situation highlights the pressing need for interventions to create and improve the economic opportunities and their living conditions.

6.6.1.1 Roles & Responsibilities of Women regarding Livestock and Agriculture Management.

The findings from the eight selected villages in both the districts align with the socio-cultural norms of the province i.e., family responsibilities are clearly divided between males and females. Women are predominantly responsible for overseeing and carrying out most of the housekeeping activities, while men are primarily engaged in outdoor tasks or are mostly unemployed. Women play significant roles in livestock and agriculture management, including but not limited to caring for animals (i.e., daily care of livestock, including feeding, cleaning, and ensuring their well-being), breeding management, and healthcare. Women are also engaged in crop cultivation, planting and harvesting, weeding and pest control, water management, as well as community and family support.

6.6.1.2 Decision-Making

According to the Pakistan Census Report of 2023, the overall rural population rate stands at 61.18%, with 49% of this population attributed to females. In the eight villages surveyed along the project alignment, with a total population of 209,856, comprising a total of 17,488 households, including 7 women-headed households in the selected villages).

The area is predominantly male dominated, with men making decisions about children's education, including who gets educated and the number of children to have. Men also determine decisions regarding marriages, buying and selling assets, and whether women should work outside the home. However, there are very few decisions in which women are consulted, and they only contribute to a handful of choices, such as decisions about children's marriages and which health facilities to avail.

Due to the low levels of literacy within the female community and the prevailing patriarchal mindset, there exists a limited understanding about women's rights among the communities in the project area. Women's rights are either intentionally or unintentionally disregarded or violated, particularly their property rights.

It was also observed during the discussion with the women group at Faqir Kalay that women do not have any say regarding their rightful share of inheritance and they are dependent on men and merely treated as beneficiaries. In this societal context, women are often denied their rightful share of inheritance, as property ownership is traditionally perceived as the exclusive domain of men. Consequently, women are discouraged from asserting their property rights, and even if they do, it is culturally deemed inappropriate. Women are expected to relinquish their inheritance rights in favor of their brothers and other male family members, leading them to be unjustly deprived of their property rights.

The conservative norms in the area either discourage or do not allow females from pursuing higher education and engaging in non-traditional work outside their homes. Addressing these cultural norms is essential to ensuring gender equality and promoting women's rights in through project interventions.

6.6.1.3 Access to Education and Skill

Education plays an important role for the overall development of a society.

During consultation with female community members of the project area, out of total 71 contacted women, only 9 were literate (12.5 %) and they express their concern that girls of their villages are not encouraged to pursue higher education or professional education such as Doctor, Engineer etc. Three questions were placed in the questionnaire regarding “Access to Education and Skill” like:

i. Are there any constraints for girls accessing education? What are the main constraints?
ii. Gender preference for sending children to school?
iii. Are there any vocational centres/schools for girls/women? What kinds of training courses are available with these vocational centres?

During the field assessment, the data was collected in this regard. These were open ended questions, and the responses were recorded in narrative qualitative form.

It was observed that some of the villages adjacent to urban Peshawar along the project corridor, higher education facilities and technical training opportunities are available for both girls and boys. While boys take advantage of these opportunities, girls often remain deprived

due to cultural reasons. Women in the area have requested the availability of these opportunities for both their daughters and sons at the village level. This would not only save money spent on transportation for male students but also enable girls to learn technical skills and pursue higher education. Some of them expressed a desire for their daughters to receive higher education for self-awareness and independence.

6.6.1.4 Access to Health Facilities

Health facilities showed a disappointing situation in the area. All the respondents showed their serious concerns over health facilities. Few questions were put in the questionnaire for female respondents as:

- What kinds of health facilities are available in the area? Do women seek pre- and post-natal health Consultations and care? If not, what are the main constraints?
- Distance from the nearest health facility in KMs? (BHU, RHC District Hospital)?
- What are the main health issues for women? Any common water borne diseases in the area?

In the villages Khan Khel, Garhi Mali Khel and Ghareebabad in District Peshawar, only 2-3 villages have BHUs, leaving a lack of proper health facilities. Limited access to healthcare facilities is exacerbated by factors such as poverty, preventing women from seeking pre and post-healthcare due to distant health facilities. The reluctance of their male partners to seek professional medical help. They believe to medicate themselves with herbs which are advised by their elders. This custom is being adopted generation to generation. Most of the health facilities are 25-30 km away from their villages. The main health issues facing by the women are; anxiety, skin diseases, sugar, blood pressure, disability and chest infection. There was not any type of water born disease identified because mostly people were having water boring system. All areas are in need of female reproductive health services (gynecologist along with a medical specialist/s). Many people were just consulting local dispensary with unqualified medical staff and getting recovered from the some of the diseases by using steroids to address certain illnesses.

6.6.1.5 Access to Drinking Water

During field assessment, the data on drinking water and its quality was collected. Three questions were added in the questionnaire to ascertain the existing situation of drinking water. The following questions were asked:

i. What are the main sources of drinking water?
ii. What are the key issues of drinking water in the area?
iii. Do women fetch water in the area? Distance travelled by women (in kms) to access water? Time used in fetching water?

The women are hesitant to fetch water from far -away areas, instead they have taken water pipes from the other houses, having boring or hand pumps. As per the statement of respondents, 57% reported good quality of drinking water, while 43% reported that water quality was not good. While the monitoring and testing performed for baseline studies at this point revealed that the quality of water is satisfactory.

6.6.1.6 Access to Finance/ Credit

The study of the project area indicated the following situation against the following questions:

i. What kind of financial services (such as banking, micro-finance, and savings) are available to women?

ii. What kind of challenges/constraints women face in accessing financial services?

There was no trend of getting loan by the females. If there is need of finance, the male members arrange from different sources including banks etc. No bank account was reported by the female respondents as males do not allow for such activity.

6.6.1.7 Access and Control over Resources/Property

The study conducted in the project area indicated the following situation against the questions:

i. What are the common trends of women ownership of land and assets?
ii. What kind of issues, women face in access and control over resources/assets/property?

Generally, the assets and property issues are managed and controlled by the male of the household. Even if the asset and property may legally belong to women but they can't claim for it and they are also not allowed to disclose it to others. After the assessment of 08 villages, data was collected in this regard to ascertain the local situation. 100% of the respondents responded that the females alone cannot sell or purchase their properties, but widowed women get their land and property and they have authority to sell it. Mostly the males manage such activities, or they can manage with mutual understanding. For example, if the males desire to sell her house or land for another purpose, he will ask her to follow and sign the papers.

6.6.1.8 Access to Income Earning Opportunities

As the project area is diverse; villages located in the tribal belt are more conservative regarding women's productive mobility and their roles in non-traditional activities. Therefore, women are mainly engaged in household chores. In contrast, in villages adjacent to the urban city, women are involved in some income-generating activities. For example, there are women teachers, and some engage in small businesses related to livestock and grocery items. There are also examples of women doing jobs and earning salaries, practicing tailoring and stitching, embroidery making, running small shops, and doing other local ventures.

During the field assessment and meetings with female respondents, questions were asked about the income source, females' right to use their salary/income in the house and level of satisfaction with salary/wage etc.

Mostly women of the studied districts (Peshawar and Nowshera) were not involved in income generating activities but in the village of Ghareebabad of district Peshawar, 01 woman was serving as Gov. Teacher, 02 were serving as private teachers, 01 was serving in govt. health department and 03 were serving in private health clinic. No women were working with NGOs.

In all villages except one (Ghareebabad), women are not allowed to work outside of their home village. The respondents said this is usually because their male family members avoid sending female members, especially young females to work outside the hometown due to very low wages and insecurity.

Data was also collected regarding "potential area for increasing women's participation in economic activities". During the discussion with female respondents, following key area was identified for increasing women's participation.

i. Gardening and stitching
ii. In education sector (government and private),

iii. In health sector, public and private sector

In the village of Tarnab Farm, Jabba (District Peshawar and Nowshera) the females were interested to take part in the above-mentioned activities to enhance their skill and participation. In most villages however no activities were highlighted to enhance their skill and participation. In the village Aziz Khan Garhi, it was stated that men can decide the field in which their family women can participate.

6.6.1.9 Gender Preference

Data was collected regarding "attitude of the husband, in-laws' family in case of more girl in family. The result indicated rigid attitude of the husband or in-laws but they did not prefer baby girl they always like birth of baby boy.

6.6.1.10 Women Participation in Local Forum

To ascertain the existing situation regarding women engagement, participation and involvement. Majority of the respondents said that male do not allow women to participate in such activities.

6.6.2 Vulnerabilities (Elderly, Disabled, Widows and Minorities)

In the visited villages, in the majority of cases, vulnerable women (elderly, disabled, widows) live in miserable conditions. In case of a poor family, the situation becomes worse.

6.6.3 Gender-based Violence

Gender-Based Violence (GBV) in the project area is prevalent and attributed to social, cultural, and economic dynamics. Women at 8 different villages along the project alignment have reported that GBV has never been considered as violence and it often goes unreported due to fear, stigma, and societal pressure.

Data collected shows very disheartening results. Barring the case of village Khan Khel of Peshawar district where women reported no violence from men, in majority of the villages, women reported facing both physical and mental violence due to domestic and economic issues. In the studied districts, no complaints against such violence were reported/registered with any NGO or police, as per the respondents. Any type of case regarding violence or any other serious problem is handled through the prevailing Jirga system.

6.6.4 Project Benefits for Women

Women in most of the selected villages stated that the compensation provided by the project will help them construct new houses that they foresee will be better and cater to their family requirements. Some women expressed that they would have the option to construct new houses in another place or move to areas outside the city where their daughters can also access better education opportunities, along with their sons who can secure good jobs. It was also anticipated by the women in these communities that the land compensation can help them spend money on their children's education, and families can invest the money in income-generating businesses.

Women mostly demanded a change in the alignment as they feared social disturbance in their surroundings. They also asked that protective measures should be put in place during project implementation to ensure their mobility is not restricted and their safety is ensured. The project should not place obstacles that prevent them from going into their fields. They stated that the

risk of safety, security and privacy will be increased due to outsiders working in the area during construction of the project.

As far as the benefits, the women respondents hoped the project would assist in the following:

- **Educational facility:** There is need to establish more schools with regard to population size. Moreover, the primary schools should be upgraded to high school and college, so that the maximum children could go to school and college.
- **Health Facility:** Sufficient and improved medical facilities are not available in the project area. The females highlighted their concerns that they never get reasonable treatment from the existing basic health unit in the area. No proper medical equipment provided to the health institutions. They reported that there is serious issue of non-availability of a qualified gynaecologist in the existing basic health units. Most of the cases are referred to Peshawar causing many natal complications as well as heavy financial burden.
- **Vocational Training Centres:** Keeping in view the training needs of the community, vocational institutions should be established at Union Council level for easy access of the female community.
- **Drinking Water:** Chances of improvement of availability of drinking water for the locals. Due to construction of road, Government water supply will become easier.

6.6.5 Overall Concerns of women communities about the project:

The women in all the villages are expressing concerns about potential social disconnect if they face displacement due to construction and related activities. The region is conservative, and women's movement is restricted, which amplifies worries about labor influx from outside the community and its impact on female security risks. Moreover, women have shared their anxieties regarding security, especially for young girls attending school. They fear displacement and are apprehensive about health issues, particularly respiratory problems, caused by heavy dust during construction.

One local woman greatly affected by the project, is concerned about her house, constructed just two years ago, which will be completely demolished for the highway construction. The prospect of losing her home distresses her and her family deeply. The new project alignment should take this into consideration and try to avoid her structure.

Property ownership in the area is predominantly held by men in these communities, with a few exceptions such as widows and relatively affluent unmarried women. The communities are also uneasy about property ownership and associated encroachments, not only for women but for the entire community. Insufficient legal documentation can lead to various problems, including the fear of property loss and the potential inability to receive compensation.

The women are anxious since official property compensation rates often fall below market property rates. This concern significantly affects those dealing with encroachment issues, as they fear the compensation received will be inadequate for replacing or relocating their properties.

6.6.6 Findings of the Gender Assessment

The gender assessment and consultation with women provided valuable and concerning information summarized as follows.

Overall, some women respondents expressed serious concerns about the proposed project alignment. They feared displacement due to the laborious work and related security concerns,

especially for their daughters. A few women were deeply concerned as their newly constructed houses were fully covered under the new alignment, and they strongly resisted the idea of demolishing them. They also worried about the social disconnect and the time-consuming process of establishing new social relations. Women, due to their restricted mobility and cultural norms, do not readily socialize with new people. Consequently, some women requested changes in the alignment to spare their newly constructed houses.

The area has a very low women's literacy rate, and major decisions are made by men. Women, except for widows heading their households (though their numbers are few), are not granted property inheritance rights.

The region is highly conservative concerning women. Consequently, women did not allow the project team to take group photos during meetings/consultations. Hence, many participants refrained from signing attendance sheets to avoid revealing their names to outsiders. Women also reported the prevalence of physical and mental violence within their families.

7 GRIEVANCE REDRESS MECHANISM

7.1 GENERAL

An effective grievance mechanism is fundamental not only to facilitate an effective and responsive resettlement process, but also to ensuring that project can proceed on schedule, without delays induced by affected community disaffection.

The main objective of the grievance redress procedure will be to resolve project related grievances to avoid delays. It will also provide to PAPs and workers (men and women)a public forum to raise their objections and through conflict resolution, address these issues adequately. During land acquisition, valuation, compensation and resettlement process various grievances can -arise that might require mitigation.

Major possible grievances are;

- Losses not identified correctly;
- Compensation/assistance inadequate or not as per entitlement matrix;
- Dispute about ownership;
- Delay in disbursement of compensation/assistance; and
- Improper distribution of compensation/assistance in case of joint/communal ownership.

To address any concerns or grievances of PAPs, an effective grievance redress mechanism that fully commensurate with local customs and legal framework is required for timely recourse of grievances and achieving transparency in resettlement process. In view of the applicable legal and administrative framework, a grievance redress system that is fully responsive to local customs and applicable legal framework is proposed for the project.

Composition, Roles and Timeframe for Grievance Close Out at each Level

Level	Chair/ Contact Person	Secretary/ GRO	Members	Frequency of Meeting	Timeframe for Close-out
Tier 1-Village Level	Assistant Director NHA	Social Mobilizer	• Community Representative • Social Organizer Male • Social Organizer Female • Contractor representative • Design & Supervision Consultant (E&S) • Special Invitees (by invitation)	Weekly	10 days
Tier 2-Tehsil	Assistant Commissioner	Social and Resettlement	• Community Representative	Bi-Monthly	21 days

Level		Specialist	• Social & Resettlement Specialist • Gender Specialist • Environment Specialist • Contractor representative • Deputy Director NHA • Design & Supervision Consultant • Special Invitees (by invitation)		
Tier 3-PMU	Project Director	Social & Resettlement Specialist	• Project Director KPEC • DPD • Deputy Director (Land/RS) NHA • Social & Resettlement Specialist-PIU • Environment Specialist PIU • Gender Specialist PIU • Resident Engineer – Design and Supervision Consultants • Environment & Social Specialist Contractor representative • GBV/SEA Service provider Representative • Any other member Special Invitees (by invitation)	Monthly	30 days

7.2 GRIEVANCE REDRESS MECHANISM STRUCTURE

A three-tier redressal structure is planned to address all complaints in the Project. The two KPEC Components will have a common GRM but can have separate GRCs at Tier 1 and Tier 2 as the geographic area of intervention is different. Tier 3 (PMU NHA) of Component 1 will serve both PTEX and SLR interventions. For Component 2, Tier 3 GRC will be established at PMU SDU.

7.2.1 First Tier - Village Grievance Redressal Committee

Complaints can be received at village/community levels. The concerns of the Complainant will be examined at the village level through involvement of the Affected Persons Committees (APCs), formed at village level. The Social Mobilizers (male & female) will, act as focal person to get the grievances recorded, investigated and discussed during APC meetings; facilitate the APs to Project issues in accordance with provisions of the RAP and ESMPs and; coordinate with the GRC and to ensure that the APs recommendations will be implemented and the grievances are addressed accordingly. If the grievance is not resolved at village level it shall be raised at Tehsil level. A Village level Grievance Redress Committee will comprise:

1. Assistant Director NHA, Chair
2. Social Mobilizers (Male and Female).
3. A representative from APC
4. A representative from Contractor.
5. Contractor representative
6. Design & Supervision Consultant (E&S).
7. Special Invitees (by invitation)

Functions and key responsibilities of Village level Tier 1 GRC:

- Organize weekly meetings with the APs who have grievances so as to redress them.
- Ensure that follow-up actions in response to grievances are taken within an agreed timeframe. Report on outstanding/resolved grievances a weekly basis to the Project Authority particularly the serious cases.
- Coordinate through GRC-FIU & PMU with Government departments, at district, provincial and civil society organizations for resolving the grievances of the local communities.
- Ensure the availability of grievance registration forms (in Urdu & Pashtu) in the project area.
- Decision to be taken within 10 days of receipt of complaint

In addition, the Village GRC will ensure that those issues that cannot be solved at the Village level are elevated to the GRC established under the chairmanship of the Assistant Commissioner at the Tehsil level. The complainant may also request that the issue be transferred to the next level if he or she feels it is not being addressed.

7.2.2 Second Tier of Redressal

Tehsil Grievance Redressal Committee (GRC)

If a grievance is not resolved at the Village Level, the Village GRC will elevate it to the FIU level established under the chairmanship of Assistant Commissioner at each Tehsil level. It will be the responsibility of social mobilizers to provide the required feedback to the Deputy Director and Social and Resettlement Specialist regarding the complaints and efforts made at Village Level to resolve the issue.

The GRC at Tehsil level will comprise:

- Assistant Commissioner, Chair
- Deputy Project Director NHA
- Deputy Director (Land/RS) Project
- Social and Resettlement Specialist, Secretary of the Committee
- Environment Specialist
- Gender Specialist
- Environmental & Social Specialist- Construction Contractor
- A Representative from APC
- Special Invitees (by invitation)

Following the preliminary assessment, the AC will investigate the complaint through Social and Resettlement Specialist, which will share its facts finding report with AC in 15 days of receipt of complaint. After receipt of the fact finding report, within next 7 days the AC will convene its meeting with other members as provided above. However, if the complainant/ aggrieved persons are not satisfied with Tehsil GRC decision or if there are delays in resolution, the complainant can request the Committee to elevate complaint to Tier 3 PMU GRC headed by the Project Director, PMU.

Functions and Key Responsibilities of Tehsil level GRC

- Conduct bi-monthly meetings to address grievances not resolved at the village level
- Ensure that handling of grievances is in accordance with national laws and the World Bank procedures.
- Ensure that follow-up actions in response to grievances are taken within an agreed timeframe.
- Maintain a database of all registered grievances, along with details on the nature of the issues raised, the case history and actions taken.
- Report on outstanding/resolved grievances on a weekly basis to the chair particularly the serious cases.
- Coordinate with Government departments, at district, provincial and national levels and civil society organizations for resolving the grievances of the local communities.
- Ensure the availability of grievance registration forms (in Urdu & Pashtu) in the project area.
- Coordinate with community representatives on the efficacy and usefulness of grievance redress procedures and recommend changes, if any required.

7.2.3 Third Tier of Redressal - Project Management Unit (PMU)

If the complainant is not satisfied and the issue is not resolved at the Tehsil level, then Social and Resettlement Specialist will forward the complaint to PMU for remedial measures and decisions/grievance (s) will be resolved accordingly. The PMU will be based at Peshawar, and will be headed by the Project Director, KPEC. The PMU level grievance committee will comprise the following members.

- Project Director KPEC
- DPD
- Deputy Director (Land/RS) NHA

- Social & Resettlement Specialist-PIU
- Environment Specialist PIU
- Gender Specialist PIU
- Resident Engineer – Design and Supervision Consultants
- Environment & Social Specialist Contractor representative
- GBV/SEA Service provider Representative

Any other member Special Invitees (by invitation)

Upon receipt of complaint, the PMU will review the record and call the complaint/complainants to hear and record their concerns and initiate any further investigations (if required) for resolution of the complaint.

The PMU will decide regarding the complaint and inform the aggrieved person, FIU, and Village GRC for required execution on-ground and closure of the grievance process in 30 days. The Complainant may decide to take a legal or any other recourse if he/she is not satisfied with the resolutions due to the deliberations of the tiers of GRM. The detail TORs of the GRC-PMU are as under:

i. The Tier 3-PMU level GRC will meet at least once a month and more regularly as needed and shall convene its meeting on the availability of 60% of the quorum/committee members.
ii. The Project Director will ensure effective implementation of the Grievance Redressal Mechanism (GRM) by establishing and notifying Village (Tier 1) and at Tehsil Level (Tier 2).
iii. Ensure community outreach and information dissemination about the Project GRM.
iv. Investigate grievances specific to Component 1 brought forward by affected persons and general public and shall also review the latest proceedings of the Tier-2 and Tier-3 Committees.
v. Ensure easy access to GRM for affected community
vi. ies especially for women and other vulnerable groups.
vii. Provide a time-bound early, transparent and fair resolution of social and environmental concerns linked to the project and provide timely responses to Complainants.
viii. The committee shall generate a monthly report on the proceedings and progress of Tier-3 GRC.
ix. Maintain and update GRM Database/Complaint Register.

7.2.3.1 Public Complaint Cell

PCC will be established under the environment section of the PMU which will be responsible for receiving complaints and resolve grievances. Since female community members have restricted mobility outside of their villages and homes. Therefore, female PCC staff will be required to undertake visits to the local communities. The frequency of visits will depend on the nature and magnitude of activity in an area and the frequency of grievances.

7.2.3.2 Proposed GRM of NHA

The GRC is an independent body that will regulate the functioning of PCC and the entire grievance redress process. It will address the grievances which remain unresolved by the PCC, including the relevant anonymous complaints received by the project falling in the scope of work. GRM Management Information System would have a public facing complaint register that will have the status of anonymous complaints.
The GRC will consist of the following members:

- Project Director
- Focal Person on Environment
- Environmental Specialist
- RE of CSC
- PM of Contractor
- Representative of GFPs

A separate workers/employee GRM be established managed by main contractor with Project E&S specialists as members. The nature of complaints related to workers will include, but not limited to, the following: GBV complaints, SH, remuneration, working hours, PPE, OHS, protection issues, security issues, social issues, family-work balance, working conditions, CoC, etc.

The complaints can be registered through complaint registers, email addresses, phone numbers and In-writing. Separate boxes and registers for employees/workers will be place within the premises. The existing committee for Project GRM will have relevant individual to address related complaint.

Gender-responsive measures will be taken to ensure confidentiality

7.2.3.3 Filing and Resolving Grievances

Following steps will be followed to log and resolve grievances:

Stage 1: The complaint once received at the PCC either directly (in-person, via phone, email) or through GFPs will be logged with following details:

- Unique complaint tracking number for both parties' record
- Name and contact information of the affected person
- Date of complaint
- Written or oral complaint
- To whom the claim has been addressed initially
- Description of the claim

The complaint will be acknowledged, and confirmation of receipt will be sent to the complainant within two working days. The grievance log/register will remain available to the public at the PCC office, construction site and other key public offices.

Stage 2: As the complaint is logged, PCC will then investigate the reasons behind the grievance and to do so the staff may need to contact the complainant to obtain further details. The PCC will be required to complete preliminary investigation within seven working days of the receipt of the complaint and send a response to the affected person with details on the outcomes of the investigation and the actions PCC intends to take ahead. Following investigation and response to the complainant, if the complainant considers that the grievance has been resolved satisfactorily, the PCC will log the complaint as resolved.

Stage 3: In case the grievance remains unresolved it will be reassessed and GRC will have further dialogue with the complainant to discuss if there are any further steps, which may be taken to reach a mutually agreed resolution to the problem. The GRC will conduct hearings, if necessary, where the PAPs can present concerns. Mediation will be used as a method to resolve pending complaints. The GRC will meet as and when necessary, in case the grievances need to be addressed. The GRC will recommend corrective measures and assign responsibilities for implementing its decision within 15 working days.

Stage 4: If the complainant is not satisfied with the decision of the GRC then they can further pursue their complaint by submitting their case to the appropriate court of law.

7.2.3.4 Record Keeping

Maintaining records of project grievances is critical for ensuring transparency, accountability and follow ups for timely action on closing the project related complaints. The PCC will maintain all records and will be made available to the public and made part of the national and WB monitoring reports indicating the number of grievances received, resolved and the outcomes.

7.2.3.5 Periodic Review

The GRC will conduct quarterly review of PCC's performance, grievances received and processed, and the overall GRM to ensure effectiveness of the mechanism and, where necessary, propose changes for enhancing project's ability to prevent and address grievances.

7.2.4 GRM for Women and Gender-Based Violence

Efforts will be made to ensure that the significantly marginalized women of the area are not negatively affected by the project. Therefore, the contractor's contract will include provisions for mandatory reporting of all incidents having any gender related aspects.

The GRM will be gender sensitive and it will ensure that women can register all types of grievances they may have related to the project. These grievances may relate to the payment of compensation, restrictions in their movement during construction, impact of the privacy, issues related to gender-based violence (GBV) or any other project related issues. To facilitate the aggrieved women (if any) to lodge their complaints and get their concerns resolved through GRM, female project affected person's committees will be formed.

For SEA/SH related issues, the project will partner with a local organization with in-depth expertise in gender issues, strong local presence in and trust, by the communities. The organization will become a member of the GRM Committee and will undertake a range of related activities including but not limited to referring the women's complaints to the relevant tier of the GRM system.

The local partner will:

- Educate and raise awareness of communities about equitable and fair treatment to all genders, and their legal rights and services available to them
- Ensure that GRM services for women folk of the area are in place during the life of the project and verify that they remain able to provide such services,
- Monitor the contractor's relevant contractual obligations and the implementation of mandatory and repeat trainings of workers on gender and sexual harassment policies etc., and
- Undertake gender related issues awareness and prevention trainings of workers.

GRM will have protocols for recording and addressing complaints by the womenfolk. This will include appropriate mechanisms for referral to the service provider. GRM will be enhanced with the feedback received from the service providers. The project will disseminate GRM procedures in the communities.

7.2.5 Community Outreach and Information Dissemination

The Grievance Redress Mechanism for the project will be complimented by a robust information dissemination and community outreach component. As part of this component, the EA will be required to provide relevant information regarding their rights to the PAPs as per the provincial policies and World Bank's OP 4.12 and the approved RAP.

All relevant information will be translated in Urdu to ensure acceptance by local communities. The PAPs will be informed about the three different tiers of the grievance redress procedure, including the roles of the Jirga, the GRC and the PMU in grievance resolution.

The PAPs will be provided information about contact details of the focal points for each of the three tiers. All expenses incurred in arranging grievance negotiations and meetings of GRC as well as logistics required, shall be arranged by the NHA, the EA.

8 POTENTIAL SIGNIFICANT IMPACTS & MITIGATION MEASURES

This Chapter assesses the project for key environmental and social aspects, identifies significant potential impacts that may be caused by the project activities, and proposes appropriate mitigation measures to address these impacts.

The identification of impacts is based on a matrix method. First, the environmental hazards (sources of potential environmental effects) associated with the construction and operational activities of the proposed project are identified based on the project description (presented in Chapter 2). Combining this information with the detailed environmental description/baseline of the project site (presented in Chapter 6), the environmental hazards and sensitivities are identified. These hazards and sensitivities are listed on a matrix to check whether an interaction exists between two elements. Wherever such interactions exist, they are further analyzed for significance and thus the potential environmental impacts are identified.

8.1 IMPACT ASSESSMENT METHODOLOGY

Qualitative predictive techniques are mainly used for the evaluation of the potential impacts as the exact amounts of materials and resources to be used that may impact the environment are not yet decided upon.

The significance of potential impacts was assessed using assessment methodology that considers impact likelihood and consequence of receptors, described below:

8.1.1 Likelihood and Consequence of Impact

The impact assessment requires assigning a value for both the likelihood and probability of an outcome occurring and the consequence or severity of a potential outcome. Based on the se assigned values, a matrix format is used to place the specific hazard within a specific location of the matrix. This location can then be used to determine impact score for that activity.

The likelihood or probability is given the following types and number:

Sr. No.	Likelihood	Definition
1	Certain	Immediate danger to environment, the health and safety of the public, staff, resources, or property; occurs frequently or continuously.
2	Likely	Probably will occur in time if not corrected, or probably will occur one or more times during the life of the project.
3	Unlikely	Possible to occur in time if not corrected.
4	Rare	Will occur rarely and can be negligible.

Next is the Consequence or severity, presented below:

Sr. No.	Consequence	Definition
A	**Catastrophic**	Permanent, severe impact/s to land, biodiversity, ecosystem. Complete breakdown of social order. Widespread desecration of items of global cultural significance. Company directly responsible or complicit in severe and widespread long-term impacts on human rights.
B	**Major**	Significant impact/s land, biodiversity, ecosystem services, water resources or air. A breakdown of social order. Widespread damage to items of global cultural significance. Highly offensive infringements of cultural heritage. Company directly responsible or complicit in severe, long-term impacts on human rights.

Sr. No.	Consequence	Definition
C	**Moderate**	Moderate impact/s land, biodiversity, ecosystem services, water resources or air. Moderate medium-term social impacts or frequent social issues. Moderate damage to structures/items of local cultural heritage significance/sacred locations. Moderate, temporary human rights impacts.
D	**Low**	Low level impact/s to land, biodiversity, ecosystem services, water resources or air. Low-level social impacts. Low-level infringement of cultural heritage or minimal disturbance to heritage structures. Minimal impact on human rights.

8.1.2 Impact = Likelihood x Consequence

Based on the above classification and values, an impact analysis matrix has been developed and presented in Table 6-1.

Table 8.1: Impact Analysis Matrix

Likelihood	Consequence			
	Catastrophic	Major	Moderate	Low
	Value (Likelihood x Consequence)			
Certain	Very High	High	Medium	Low
Likely	High	Medium	Medium	Low
Unlikely	Medium	Medium	Low	Low
Rare	Low	Low	Low	Low

Based on the related values in **Table 6-1**, the following impact categories are identified.

- **Very High Impact:** Requires more intensive mitigation measures
- **High Impact:** Requires intensive mitigation measures
- **Medium Impact:** Requires comparatively less mitigation measures
- **Low Impact:** Professional judgment

8.1.3 Impact Assessment Matrix

The Impact assessment matrix is presented below. This matrix helps the team to prioritize impacts by identifying them as high, medium, and low. Those impacts identified as high will require the most stringent controls available as well as immediate attention. They may even demand that such activities be canceled from the project. Specific workplace controls can be applied so that the associated impacts are more effectively controlled and, therefore, result in a revised assessment category to a more acceptable level. Note that the box at the bottom indicates that if we can remove the impact (such as incorporating engineering design into a process), the impact no longer exists and therefore, is mitigated through controlled measures.

8.2 IMPACT ASSESSMENT MATRIX FOR THE PROJECT

The project's potential impacts and their significance have been assessed using the methodology described in **Section 7.1.**A summary of these impacts and their significance along with the mitigation measures is presented in **Table 7-2.**

Table 8.2: Impact Assessment Matrix

Activity	Likelihood	Consequence	Impact (Consequence x likelihood)	Residual Impact
Design Phase				
Technical Design and Layout Planning	Likely	Major	Medium	Low
Land Acquisition	Certain	Major	High	Medium

Activity	Likelihood	Consequence	Impact (Consequence x likelihood)	Residual Impact
Poor structure/design	Likely	Major	High	Low
Seismicity	Likely	Major	Medium	Low
Flora	Likely	Major	Medium	Low
Physical, Religious and Cultural Resources	Certain	Major	High	Low
Public Utilities	Certain	Major	High	Low
Construction Phase				
Soil Erosion and Contamination	Likely	Moderate	Medium	Low
Borrow Area	Likely	Major	Medium	Low
Batching Plant & asphalt plant	Likely	Major	Medium	Low
Construction Camps/Camp site	Certain	Major	High	Medium
Wastewater Generation at Construction Camp	Likely	Moderate	Medium	Low
Solid Waste (Construction, Municipal and Hazardous Waste)	Likely	Major	Medium	Low
Ambient Air Quality	Certain	Major	High	Low
Noise	Likely	Major	Medium	Low
Water Resources	Likely	Major	Medium	Low
Flora and Fauna	Certain	Major	High	Low
Traffic	Certain	Moderate	Medium	Low
Occupational Health and Safety	Certain	Major	High	Low
Community safety	Likely	Major	Medium	Low
Nuisance/ Disturbance to Social Sensitive Areas	Likely	Moderate	Medium	Low
Influx of Labor	Certain	Major	High	Low
Communicable Diseases	Likely	Major	Medium	Low
Gender Based Violence	Likely	Moderate	Low	Low
Operation Phase				
Air Pollution	Likely	Moderate	Medium	Low
Noise Quality	Likely	Moderate	Medium	Low
Drainage Pattern	Likely	Moderate	Medium	Low
Flora	Likely	Major	Medium	Low
Fauna	Likely	Major	Medium	Low
Pedestrian and Commuter Safety	Likely	Moderate	Medium	Low
Wastes /Hazardous Wastes	Likely	Moderate	Medium	Low
Cumulative and Induced Impact	-	-	-	Positive Impact

The issues from **Table 7-2** and other issues identified as good practices are discussed in following sections in detail.

8.3 DESIGN PHASE IMPACTS

Proper planning during project design can significantly reduce the future negative impacts at the time of construction and operation. Understandably, the potential environmental impacts, in a physical sense, of the design stage are quite low. Since the design stage involves only limited physical activity, its direct impact on environment is also low. The various surveys carried out at the planning level may result in short term impacts on air and soil quality. If the design is carried out without regard to the environmental considerations, it will lead to long term negative implications for local flora, fauna, water quality, water resources, land acquisition etc.

The following aspects can affect the design phase include:

8.3.1 Technical Design and Layout Planning

8.3.1.1 Potential Impacts

Improper route selection for the road alignment may result in social issues, including the need for resettlement and displacement of people.

Incompatible layout plan and engineering design of the project's structures can undermine the overall aesthetic beauty and ambience of the project area. Also designing the structures without considering the prospective and futuristic needs can result in structures with low social acceptability and functionality. Similarly, the local population may also face access problems for their land.

Impact: • Social issues due to improper route selection • Impact on aesthetic beauty and ambience of the project area due to Incompatible layout plan and engineering design			
Applicable Project Phase		*Design*	
Initial Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	Likely	Major	Medium
Mitigation Measures, Offsets and Recommendations			
• Consider the social and resettlement issues in the layout plan, engineering design keeping in view the future needs in line with the local and international standards; • Review and validated all the design possible impacts before the start of construction of the proposed Project. • Minimize the significant social/resettlement impacts by design team after social/resettlement survey of the project area and for the proper route realignment. • Design number of bridges and pedestrian access points to facilitate the local population so that they can access their land. • Provide information about project to the community through awareness programs, distribution of Executive summary of ESIA in Urdu, and joint public consultation/hearing by EPA and NHA during the ESIA approval process and disclosure of RAP and ESIA after its approval on NHA website. • Ensure to adhere all land acquisition procedures as outline in the Resettlement Action Plan (RAP – a separate document) is followed in a transparent manner. • Maintain complete records, particularly for asset valuation and compensation payment. • Address communities' grievances associated with the land acquisition and compensation on priority basis, in order to avoid any unrest/mistrust among the communities towards the project.			
Residual Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	Unlikely	Low	Low

8.3.2 Land Acquisition and Resettlement

During the census inventory and resettlement survey of Option-1 of 42.53 Km alignment of SLR, significant project impacts were observed. The data was collected to assess the project impacts on land, residential structures, commercial structures, graveyard, fixture, crops, fruit and non-fruit trees, petrol pump, farmhouses, mosques, schools, fish farm, poultry farm. WAPDA poles, WAPDA high voltage poles, shops, gas pipeline, nurseries, irrigation channels and roads.

After several meetings and presentations, the concerned authorities decided to change the alignment of SLR. The alignment of SLR has changed from km 0+000 to km 24+400 avoiding a substantial number of residential and commercial structures. The new alignment also saved many public & private structures like electricity poles, graveyards, mosques, water supply structures, farmhouse, petrol pump and police station etc. The new alignment also shortened the route by about 10 km causing reduction of resettlement budget of land and structures. The change also reduced social disturbance significantly.

The village wise land acquisition survey has been started and data on template (details) provided by the NHA to show road length of each mouza/quantity of land of each mouza coming in the row of alignment. Of 7 villages so far collected is presented in the following table. The remaining data will be updated as is received from the concerned revenue department.

Table 8.3 Village wise List of Land Acquisition

Mouza wise List of Affected Persons (PAPs) by Land

S.#	District/Tehsil	Name of Mouza	Chainage /km	Nos. of Khasra	Nos. of PAPs	Affected land (acre)	Total land of affected PAPs	Land use of affected land	Rate as per valuation Table	Total cost (Rs. Million)
1	Peshawar/Shah Alam	Tarnab	40.01 to 41.73	47	321	42.7				
2	Nowshera/Pabbi	Jabba	38.7 to 40.01	60	286	32.5				
3	Peshawar/Saddar	Kachori	33.9 To 38.7	107	1435	118.7				
4	Peshawar/Saddar	Surizai Payan	28.6 to 33.9	184		132.9				
5	Peshawar/Saddar	Surizai bala	26.4 To 28.6			55.3				
6	Peshawar/Saddar	Bedbair Maryam Zai	25.0 To 26.4	20	307	34				
7	Peshawar/Saddar	Hurizai	24.5 To 25.0	13	221	13.6				

Note: deficit data and remaining data will be updated as is received from the concerned revenue patwaries.

As a result of alignment change, the required land for acquisition has been reduced from 1375 acres, then reduced to 1085 acres and now 1050 acres. Additionally, about 60 % residential structures have been saved from 506 to 199 .

The affected assets and structures will be compensated as per Pakistan laws and WB Involuntary Resettlement policy OP 4.12 so that the PAPs should not be worse off. The updated project impacts are summarized below.

Data collection during field surveys showed project impacts on land, residential, commercial and community structures. The impacts also showed on public fixtures, community spaces including graveyards and infrastructures like roads and irrigation channels. Brief summary of these impacts is being provided in the following:

Cost of Land and Resettlement (To be borne by the Government)	After Completion of Resettlement and land Survey
Total Land required for acquisition	Total Land: 1050 Acres (25% decreased due to new alignment)A Agricultural land: 807 acres Unproductive/Residential: 243 acres
Residential structures Commercial Structures Mosques Graveyards	Houses: 199 Commercial: 08 Mosques: 02 Graveyard: 02
Public Structures/Fixtures	WAPDA Electric Poles: 05
Gov. Infrastructures	Road Crossing: 15

	Crossing of Irrigation Channels: 4
Trees Cutting	Fruit Trees: 9420 Non-Fruit Trees: 1720

a. **Affected Crops**

The census survey has revealed that more than 42% of landowners will have their productive land partially impacted (representing affected agricultural land) because of the project intervention. The survey has revealed that about 550 acres of cropped area will be affected due to acquisition of agricultural land. Generally, every type of cash and seasonal crops including wheat rice, maize, sugarcane, cotton and fodder are grown in the project area. Vegetables are also grown as a cash crop in the Peshawar and Nowshera areas.

b. **Affected Fruit and Non-Fruit Trees**

In the survey along the project route, it was noted that there were orchards of plum, apricot, wild fruit like Fig, Ber, etc., and wood trees within RoW. It was noted that there were about 9,420 fruit trees (mostly plum) on 85 acres in orchards form, and timber trees were rarely grown in the project area fall in Peshawar reach of the proposed road. An area 26 acres counting 1,720 non-fruit trees, i.e., Poplar trees. These trees are used for match factories and Tobacco Kiln.

c. **Impact on Vulnerable People**

The PAPs with income below the Official Poverty Line (OPL) will be entitled for special assistance (vulnerability allowance) to ensure their living standard is restored if not improved. However, additional verification of vulnerability will be done upon completion of detailed design. Apart from land affected person, 86 PAPs are identified during socio-economic survey.

The permanent acquisition of various categories of land, i.e., agricultural, residential and barren land for the proposed project will have impact of high significance.

Impacts: Land Acquisition and Resettlement related impacts.			
Applicable Project Phase		*Design*	
Initial Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	Certain	Major	High
Mitigation Measures			
• Implement the mitigation measures of project in compliance with RAP. • Propose a District Compensation Committee to determine compensation amount while in Khyber District constitute the Qaumi Commission will be performing this function. • Calculate the compensation amount for damages based on replacement costs as per the OP/BP 4.12 policy provisions. • Consult and inform through sending notices to the local government as well as the people affected by the project before implementing site clearance procedures. • Determine exactly route direction of travel as well as works and assets that will be moved according to the design by using measures such as measuring machine and marking etc. • Provide compensation prior to taking possession of land/assets. • Obtain No Objection from World Bank prior to start of civil works. • Avoid conflicts with local people during the clearance process by client and district bodies. • Define clearly the boundary of clearance area. • Resolve all type of complaints through grievance redress mechanism (GRM) • Compensate vulnerable persons as per WB OP-4.12.			
Residual Impact Rating	**Likelihood**	**Consequence**	**Impact Score**

	Unlikely	Major	Medium

8.3.3 Change in Hydrologic Regime

The project area has an extensive network of seasonal water stream/ nullahs and Bara River along the proposed route as described in **subsection heading 5.3.10** of Chapter 5. The local community is dependent on these water courses. Any changes in the flow patterns of these water streams will affect the local people and that would be a major negative irreversible impact.

Impacts: • Changes in the flow patterns of streams/Nullahs can affect local community dependent on them			
Applicable Project Phase		*Design*	
Initial Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	Certain	Major	High
Mitigation Measures			
The mitigation measures described below will be implemented while completing the final design of the Project. • As per findings of the Hydrological Study, estimation of the discharge of Bara River & streams/Nullahs of the project area has been calculated against 25 and 100 years return period. • A pre-construction visit is recommended to be conducted by a team comprising Route Engineer, Hydrologist and Hydraulic Engineer to validate the crossing locations and design. • The side drains at the toe of embankment in the form of natural side ditch will be provided to protect the embankment area, if required. The side drains will be designed such that flooding of the pavement and the resulting flow towards embankment slope does not damage the embankment. The pavement shall have a dyke (or curb), which will restrict the flow towards the unprotected embankment slope and this dyke shall have drainage outlets at designed intervals to dispose of the run–off generated by the rainfall falling on the pavement. • For the crossing of drains and water courses, small bridges and culverts (which will be finalized after the finalization of design on ground) have been incorporated in the design. This includes: • Proper design of bridges on nullahs to accommodate design flows; • Small bridges will be constructed on drains coming in the ROW; • Provision of box culverts (for Nullahs, Agricultural waterways, Natural flow etc.) to control flood damages and provision of safety of embankments. The impact of change in hydrologic regime will be low adverse in nature after taking the above-mentioned mitigations.			
Residual Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	Unlikely	Low	Low

8.3.4 Seismicity

According to the seismic zoning map of Pakistan, the project area is located in Seismic Zone 2B, which is Moderate hazard zone corresponding to peak ground acceleration (PGA) values of 0.16 to 0.24 m/sec2 as described in subsection heading 5.3.8. A moderate intensity earthquake impacting the project site can adversely impact the development. This factor requires special consideration of the designers as project structures (especially Bridges, interchange toll plaza etc.,) may be affected negatively in case of earthquake tremors and the significance of damage depends upon the severity of earthquake.

Impacts: • Structural damage due to no seismic analysis			
Applicable Project Phase		*Design*	
Initial Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	Certain	Major	High
Mitigation Measures, Offsets and Recommendations			
• The proposed road and the associated structures will be designed and constructed as per Seismic Building Code of Pakistan 2007 (SBC-07) to comply with minimum requirements for seismic safety of structures. • Geotechnical investigations will be carried out prior to the construction of bridges and culverts keeping in view the seismic hazards of the Project Area.			
Residual Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	Unlikely	Low	Low

8.3.5 Flora

During the pre-construction phase, activities such as installation of construction camps, construction of temporary roads & mobility of construction staff may damage the local vegetation/trees. As the heavy machinery and camps will be moved and installed, which require important space due to which available vegetation is expected to be removed. This impact is Site-specific, Permanent, Irreversible, Possible, Medium Significant and needs to be encountered prior to the start of construction stage.

Impacts: • Damage /Removal of local flora			
Applicable Project Phase		*Design*	
Initial Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	Likely	Major	Medium
Mitigation Measures, Offsets and Recommendations			
The mitigation measures described below will be implemented while completing the final design of the Project. • The camps, mobility of machinery and construction of temporary road should be proper planned and well designed to avoid any loss to local green cover; • It is recommended to establish the construction camps where no or minimum vegetation exists. • Similarly, the alternate routes for roads and points for camps are recommended where no loss of vegetation is expected; and • The location of construction camp should be selected so, as to have limited environmental impact during construction phase and to reduce the cost and land requirement.			
Residual Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	Unlikely	Low	Low

8.3.6 Community Sensitive Religious Sites/Structures

No historical/ archeological site has been identified so far in the corridor of impact. project area. However, some community religious sensitive structures including mosques, graveyard and shrines are these are listed in under **subsection heading 5.6.12** of Chapter 5. Shrines and graveyard are visited occasionally by the surrounding community and devotees, and

mosques are visited frequently to offer daily prayers. These will not be directly affected but the people may face access issues in visiting these facilities.

Impacts: Social issues due to demolishing or limiting access to religious structures			
Applicable Project Phase		*Design*	
Initial Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	Certain	Major	High
Mitigation Measures, Offsets and Recommendations			
• Minimize the adverse impacts on the religious and community structures and places by making changes in design (where possible). • Develop a mechanism for shifting of graveyards with the community consultation and coordination. • Provide alternative access routes in case the access has to be restricted during execution period.			
Residual Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	Unlikely	Low	Low

8.3.7 Public Utilities

The proposed project interventions will affect existing public infrastructure. Public utilities (transmissions 11kv and 220 kV transmission tower pylon, Sui gas pipeline line) will be affected creating disruption of public services and inconvenience to the local residents. Public utilities identified in the RoW of project area listed in subsection heading 6.6.12.

Impacts: Disruption of public utilities and inconvenience to local population due to dislocation/damage of public utilities			
Applicable Project Phase		*Design*	
Initial Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	Certain	Major	High
Mitigation Measures, Offsets and Recommendations			
Mitigation measures will include: • Consult concerned department for the design and budget to relocate the existing utility infrastructures; and • Relocate all public utilities likely to be affected by the proposed Project ahead of time before the actual commencement of the construction work.			
Residual Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	Unlikely	Low	Low

8.4 CONSTRUCTION PHASE IMPACTS

8.4.1 Soil Erosion and Contamination

The clearing of vegetation can also loosen the soil and make it more susceptible to erosion due to wind and rain. There is also a possibility of silt runoff during rainy season causing soil erosion. During the rain, the eroded soil mix with stagnant water to transform into mud, which can affect movement of vehicles and machinery and construction work as well as limit the

movements of local people. Soil may be affected by erosion, compaction and contamination. Soil erosion may occur on roadside, at contractors' camps and at embankment works, because of uncontrolled run-off from equipment washing yards, excavation of earth/cutting operations and clearing of vegetation. Soil may also be impacted due to unauthorized use of borrow areas and quarries, resulting in degradation of landscape. Whereas, contamination of soil may be caused by solid waste generated at campsites, workshop areas and equipment washing yards. This may limit the productive use of land for future. This impact is Medium adverse in nature.

Impact: Soil Erosion and Contamination			
Applicable Project Phase	*Construction*		
Initial Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	Likely	Major	Medium
Mitigation Measures: • The Contractors will be required to instruct and train their workforce in the storage handling and management of materials and chemicals that can potentially cause soil contamination; • Material Safety Data Sheets (MSDS) will be strictly followed during handling and storage of chemicals; • Soil contamination by asphalt will be minimized by placing all containers in a bonded area away from water courses; • Provision of impervious platform with oil and grease trap for collection of spillages during equipment and vehicle maintenance; • All spoils shall be disposed of safely and the site shall be restored back to its original conditions; • In areas with strong sheet flow, high embankments will be provided with chutes and drains/culverts to minimize soil erosion. Stone pitching and retaining walls will be made at high embankments in critical areas; • As applicable and needed, plantation of grasses and shrubs will be done for slope protection; • Productive land or land adjacent to agricultural / irrigated land may not be preferred for excavation; • Non-productive, barren lands in broken terrain, nullahs and publicly recognized waste lands should be given preference for borrowing materials; • Aggregate required for construction procured from quarries and river beds will need approval from authorities; • Solid waste generated at the camp sites will be properly treated and safely disposed only in the demarcated waste disposal sites/areas; • If any contaminated soils are found, they shall be removed and deposited in a sealed pit in an area agreed with the concerned; • Use of modern, well-maintained machinery and vehicles by the contractor to avoid leakages; and • Soils removed during construction would be stockpiled for reuse where possible.			
Residual Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	Unlikely	Low	Low

8.4.2 Borrow Areas

If the contractor desires to excavate the soil then approval must be obtained from the concerned Environmental Specialist of SC and NHA (the implementing body). The excavating activities could have adverse environmental impacts including soil erosion, drainage problem and impact the health and safety of the workers and local population.

Borrow / open pits and its excavation activities may result in land disputes, soil erosion, and loss of vegetation, landscape degradation, drainage problem, impact the health and safety of the workers & local population and damage to road embankments. Borrow/ Open pits may also result in potential sources of mosquito breeding and may prove hazardous to human beings, livestock and wildlife. This will also degrade hygienic condition of the project area.

Impact: Improper location and Mismanagement of borrow areas will lead to Soil erosion; Loss of fertile soil; obstruction in natural drainage and dust pollution			
Applicable Project Phase	*Construction*		
Initial Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	Likely	Moderate	Medium
Mitigation Measures: ▪ Preferably no private land will be used for borrow area. Contractor will excavate the material from the specified and demarcated borrow area and restricted to specified depth. Private land acquisition will require compensation in accordance with OP 4.12. Rental agreements will be needed if land is rented for borrow area. ▪ Contractor will maintain photographic record of the site before and after the restoration of the borrow site and also contractor will get approval from the land owner prior to start excavation.\ ▪ Contractor will ensure that the surface drainage is provided to control the surface run off ▪ Contractor will ensure that the movement of earth moving machinery is limited to the work area ▪ Contractor will ensure that erosion protection measures are taken, such as retaining wall (if required), avoidance of steep cut ▪ Contractor will level the borrow and the edges of the pits be given flat slopes as far as possible and as per the satisfaction of the land owner and top soil restored after the completion of the excavation activity ▪ Contractor will maintain the complete documentation for the borrow areas i.e. volume excavated, date of excavation, leveling date after completion of excavation. ▪ Contractor will carry out regular water sprinkling during executing of excavation to mitigate the dust pollution ▪ Contractor will ensure that the movement of excavating machinery and vehicles is limited to the work area. ▪ The Contractor will prepare Borrow Area Restoration Plan			
Residual Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	Rarely	Low	Low

8.4.3 Installation and operation of batching plant, Asphalt Plant

Concrete and asphalt have limited usable life, after which they become waste. If not used within the time span, their wastage will have major financial implications. Further, their disposal will become very difficult because of the large quantities involved. Contractor may establish the batching plant & asphalt Plant on private land or close to villages of the project area that will lead to social issues. Land may be contaminated from the batching plant, during transportation and dumping of the waste fresh concrete. If Raw material is not stocked at designated area, it may block surface drainage.

Impact: Social issues, land contamination and blockage of surface drainage during installation and operation of Batching plant and Asphalt plant			
Applicable Project Phase	*Construction*		
Initial Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	Likely	Major	Medium
Mitigation Measures			

- Preferably no private land is used to establish the batching plant & asphalt Plant. Contractor needs to get approval from SC and NHA if he uses any private land for this purpose. Contractor will pay for the use of private land. Private land acquisition will require compensation in accordance with OP 4.12. Rental agreements will be needed if land is rented for borrow area.
- The location of the batching plant & Asphalt plant needs to be at least 500 m from the villages (main settlement) and out of phase with the prevailing wind direction. If the selected location is less than 500m from the residential area, then it must be emission-controlled plant i.e., equipped with wet scrubber.
- Contractor will ensure that land contamination from the batching plant, during transportation and dumping of the waste fresh concrete is controlled through careful working of the Contractor's crews to avoid spillage of concrete and dumping of waste concrete on private land. Carry fresh concrete in mobile concrete drums only
- Contractor will maintain leak / spill record for each incident of spill or damaged vehicles. Damaged / defective vehicles will not be operated unless repaired
- Contractor will ensure that the material is stock piled at the designated area only.
- Contractor will ensure that surface drainage is not blocked due to the piling of the raw material
- Contractor will store material on site with care and suggestions provided in EIA, in order to minimize the risk of spill or leakage into the river or control water body

Residual Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	Rarely	Low	Low

8.4.4 Construction Camps/Camp Sites

Improper construction camp location and mismanagement of construction camp activities can lead to various social and environmental impacts which include health and safety, traffic problems, soil degradation, loss of vegetation and assets on the selected land, solid waste and water pollution. Furthermore, cultural differences, behavior of construction workers, potential disregard for local cultural norms can lead to increased tension between local communities and workers residing in the construction camps. This impact is temporary and moderate negative in nature.

Impact: Community health and safety issues, Traffic problems, vegetation loss, solid waste and water pollution due to improper construction camp location and mismanagement			
Applicable Project Phase		Construction	
Initial Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	Certain	Major	High

Mitigation Measures:

- The project will seek to avoid sitting camps where their presence might contribute to any conflicts with locals;
- Employment policies which aim to maximize job opportunities for local people will help to minimize tensions caused by different socio-cultural values;
- Camps will be designed to be self-contained to reduce demand on infrastructure and services of nearby communities;
- A comprehensive safety and security plan for the camps will be prepared which will comprise of a training manual, use of safety equipment and emergency preparedness;
- Training will be provided to all staff on camp management rules and overall discipline and cultural awareness;
- Waste Management Plan will be implemented to ensure safe handling, storage, collection and disposal of construction wastes and the training of employees who handle waste;
- Individual trees and shrubs of high conservation value to be marked and preserved wherever possible or transplanted if the root conditions are suitable for such an operation;

• Site for construction camp will be selected to minimize the removal of existing macro- plants at camp sites; • Photographical and botanical inventory of vegetation before clearing the site; • Compensatory plantation to be done when construction work near ends; and • The contractor(s) shall ensure removal & rehabilitation of site upon completion.			
Residual Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	likely	Moderate	Medium

8.4.5 Wastewater Generation at Construction Camps

Wastewater will be generated at the construction camp by the workers. If the generated wastewater is not properly treated or disposed of, this may contaminate the surface water sources such as nullahs, streams, Bara River etc. apart from soil contamination. The **Table 8.4** below shows anticipated composition and estimate of the wastewater to be generated from construction camp assuming that on average the water demand per person is 40 liters per day and that 80% of the water demand will become wastewater.

Table 8.4: Estimated Wastewater Generated by Workers in Construction Camps

Sr. No	**No. of workers***	**Estimated Total Water Demand** (litters/Day)**	**Estimated Wastewater Generated*** (Litters/day)**
1	150-160	20,000	16000

* "Tentative Work Force Requirements Including Client and Contractor Staff"

**= (500) x (40) =20,000 litres/day

*** = (20,000) x (80%) =16,000 litres/day

This impact can be categorized as direct, moderate, site-specific, short term, temporary, Medium probability and reversible.

Impact: water pollution due to improper treatment or disposing of wastewater			
Applicable Project Phase	*Operations*		
Initial Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	Likely	Moderate	Medium
Mitigation Measures: To dispose the liquid waste generated from the construction activities, the following steps will be taken by the Contractor: • Domestic and chemical effluents from the construction camp will be disposed by the development of on-site sanitation systems i.e. septic tanks. • Proper monitoring to check the compliance of NEQS will be carried out; • Sewage from construction camps will be disposed of after proper pre-treatment and processes such as soakage pit; and • The Contactor(s) will be responsible to submit details of site-specific wastewater management plan along with details of wastewater collection, transportation and its disposal.			
Residual Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	Unlikely	Low	Low

8.4.6 Solid Waste (Construction, Municipal and Hazardous Waste)

Considering the workers (about 150-160 in numbers) residing in the construction camp and the locally available Labor, an average solid waste generation rate of 0.5 kg/capita/day[10] is adopted for the estimation of solid waste generation. Based on this assumption, a total of about 250 kg of solid waste will be generated from construction camps on daily basis.

Different type of waste is likely to be generated during the construction phase of the project. The municipal waste will be in the form of food, cans, paper and wastewater from construction camps toilets and washing yards. Construction waste will include excavated soil, sand, gravel, rocks, pieces of concrete, bricks, wood, metal pieces and electrical wires. Whereas hazardous waste can be comprised of paints and construction chemicals. All these, if left unattended, can become a source of nuisance and environmental pollution in the project area.

Insecure and unhygienic disposal of the solid wastes particularly garbage and trash may cause degradation of soil and land. Insecurely disposed of heaps of wastes containing kitchen garbage and food waste can serve as breeding grounds for the disease spreading vectors and rodents. Throwing away of solid wastes into streams/Nullahs can result into choking of the latter.

<table>
<tr><td colspan="4">Impact: Mismanagement of solid waste will result in water pollution, soil degradation, health issues and choking of nullahs of the project area</td></tr>
<tr><td>Applicable Project Phase</td><td colspan="3">Operations</td></tr>
<tr><td rowspan="2">Initial Impact Rating</td><td>Likelihood</td><td>Consequence</td><td>Impact Score</td></tr>
<tr><td>Likely</td><td>Major</td><td>Medium</td></tr>
<tr><td colspan="4">• The demolition waste and excavated material’s disposal site will be agreed with the Supervision Consultant and Contractor and marked on site before starting the work
• Solid Waste generated during construction and camp sites will be safely disposed in demarcated waste disposal sites and the contractor will provide a proper waste management plan;
• Training of work force in the storage and handling of hazardous materials and chemicals construction workers and supervisory staff should be encouraged and educated to practice waste minimization, reuse and recycling to reduce quantity of the waste;
• Proper labelling of containers, including the identification and quantity of the contents, hazard contact information etc.;
• Waste disposal plan must be reviewed during the entire construction phase in the light of changing weather conditions
• Emergency Response Plan shall be prepared to address the accidental spillage of fuels and hazardous goods;
• Immediate collection of spilled oils/fuels/lubricants by collection of contaminated soils and skipping oils from surface water by applying appropriate technologies;
• Reusing bitumen spillage; and disposing non-usable bitumen spills in a deep trench providing clay linings at bottom and filled with soil at the top (for at-least 0.5 m);
• Used oil shall be collected in separate containers stored on impervious platform with restricted access and shall be sold to licensed contractor and the burning of waste oil shall be strictly restricted;</td></tr>
<tr><td>Residual Impact Rating</td><td>Likelihood</td><td>Consequence</td><td>Impact Score</td></tr>
</table>

[10] Source: 7fie Word Bank Report 2012 — What a Waste: A global rev’/ew’ of solid waste management. Based on UNEP estimates for waste generation in the Asia Pacific. Average is 0.45 kg/capita/day.

	Unlikely	Low	Low

8.4.7 Ambient Air Quality

The project corridor is quite congested in certain segments where a high level of traffic volumes and commercial activity takes place, particularly the segments such as Kohat Road near Badaber. Bara Road in Bara Qadeem and Shah Kass Road in Nogazi Baba, where a high level of heavy traffic flows towards Torkham Afghanistan and commercial activities takes place. Location and name of Road crossing SLR alignment are listed under **subsection heading 5.6.13.**

A vast variety of construction plant and machinery including but not limited to bulldozers, dumpers generators, Batching Plant and vehicles will be used during the construction phase. These construction activities will generate dust, smoke and other potential pollutants in the air**.**

Workers may burn wood as fuel. Burning special waste (clinical waste, packing waste etc.) may emit poisons or hazardous emission. The efficient management of traffic once the construction activity commences will be critical in order to minimize the risk of possible road accidents and construction related hazards

Impact: Increase in ambient and ground level concentration of air pollutants from construction activities and vehicular movement may cause health impacts to the community			
Applicable Project Phase	*Construction*		
Initial Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	Certain	Major	High

Mitigation Measures:

Dust, smoke and other potential pollutants from Plants & equipment's

- All vehicles, machinery, equipment and generators used during construction activities should be kept in good working condition and be properly tuned and maintained in order to minimize the exhaust emissions;
- If the selected site for batching plant is closer than 500m from the build-up area than ensure that zero emission plant is installed.
- Ensure that dust emissions due to vehicular traffic are minimized by reducing speed, vehicular traffic minimized through good journey management and water sprinkling on non-mettle road when required.
- Ensure that periodic Ambient air quality is monitoring to assess the concentration of Carbon Monoxide (CO), Carbon Dioxide (CO2), Nitrogen Dioxide (NO2), Sulphur Dioxide (SO2) and Particulate Matter / (PM10) in the atmosphere,

Smoke from burning of waste material or burning of firewood in the labor camp

- Contractor's obligations to provide gas as clean source of energy at contractor's camp and not allow them to use wood as fuel.
- Ensure that all the combustible non-hazardous waste material should be burnt in the burn pit only.
- Ensure that the quantity of waste burnt at one time is managed so as to minimize smoke emission
- Control fuel consumption and minimize its waste or leakage by regular monitoring

Residual Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	Unlikely	Low	Low

8.4.8 Noise and Vibration

The noise and vibration will be produced due to the operation of construction machinery, and equipment. Sources of noise and vibration during construction are heavy machinery such as bulldozers, excavators, stabilizers, pneumatic drills, and other equipment. The above machinery is expected to generate noise levels that would be severe in the project area. Villages identified during field surveys which are present along the alignment and may be affected by Noise during construction period are listed in **Table 5-15.**

The cumulative effects from several machines can be significant and may cause significant nuisances. However, these increased noise levels will prevail only for a short duration during the preconstruction and construction phase.

The likely impacts due to noise and vibration are:

- Psychological effects of distraction of attention, irritation and short temperedness in the exposed persons due to persistently higher noise levels;
- Noisy settings and higher background levels can cause temporary threshold shift;
- Potential impact from vibration during the construction period may affect structure stability of structures in close vicinity; and
- Moreover, vibrations from machinery and equipment such as handheld compactors and concrete vibrators can produce easy fatigability and generalized aches in the persons operating these machines.

<table>
<tr><td colspan="4">Impact: Increase in ambient noise levels due to operation of construction equipment, movement of construction traffic may create nuisance for nearby communities and affect health of workers</td></tr>
<tr><td colspan="2">Applicable Project Phase</td><td colspan="2">Construction</td></tr>
<tr><td rowspan="2">Initial Impact Rating</td><td>Likelihood</td><td>Consequence</td><td>Impact Score</td></tr>
<tr><td>Likely</td><td>Major</td><td>Medium</td></tr>
<tr><td colspan="4">Mitigation Measures:
Noise will be controlled by monitoring at a distance of 100m from the boundary wall of any residential unit and while following the NEQS of 45 dB (A).
It is recommended that construction should be minimized during nighttime.
Construction Machinery that produces less noise and vibration should be used in sensitive areas.
The contractor should make arrangements to minimize the vibration, and noise pollution through good engineering practices.
Before the commencement of the work in sensitive/highly populated areas, the HSE team shall conduct a survey. Earth retaining walls should be constructed to minimize the vibrations in highly populated & sensitive area.
The physical effect of piling should be assessed before construction and measures should be discussed with the local population as well as the timing of the works to serve as a vehicle for further public consultation at the implementation stage and to assist in public relations.
Noise barriers should be installed for the workers working more than 8 hrs. /day during construction activities. The noise level from construction activity can be reduced by regular maintenance of machinery. Noise can be controlled through engineering control e.g. hammering actions can be substituted by hydraulic. Ensure that the workers are wearing necessary personal protection equipment (PPE) such as earplugs, earmuffs, etc. where engineering control is not applicable to reduce the impact of noise. Equipment emitting excessive noise in comparison with other similar equipment will not be allowed to operate.
Equipment under use will be regularly maintained, tuned, and provided with mufflers to minimize noise levels.</td></tr>
</table>

• Prohibit blowing horns on all access roads except under emergency conditions. • Use muffled breakers and silenced diesel generators and compressors to reduce construction noise.			
Residual Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	Unlikely	Low	Low

8.4.9 Impact on Water Resources (Surface and Groundwater Contamination)

The proposed Project will traverse through Bara River and various Nullahs/ Streams at different locations (**see section 5.3.10**). These surface water resources may get contaminated by the fuel and chemical spills, or by solid waste and effluents generated by the kitchens and toilets at the construction camp sites. Moreover, runoff from the chemical storage areas may also contaminate the surface water bodies.

Surface water might get contaminated due to the disposal of construction waste generated due to the Project activity and also result in jeopardizing the health of natives that use this water for meeting domestic requirement. The impact on these water bodies will be only for the period of construction and will vanish as the construction work is over. In addition to that, construction waste, if left unattended will result in forming leachate which will percolate through the soil strata and will reach groundwater and hence, will end up contaminating it. This impact can be categorized as medium adverse in nature.

Impact: Contamination of surface and groundwater due to improper handling of materials, leakage of oil and fuels and discharge from construction activities and machinery/vehicles			
Applicable Project Phase	*Construction*		
Initial Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	Likely	Major	Medium
Mitigation Measures: As a mandatory step, all the effluents will be disposed as per the requirements of NEQS. Moreover, to reduce the risk of surface and groundwater contamination, good management practices will be adopted to ensure that fuels, chemicals, raw sewage and wastewater effluent are disposed of in a controlled manner. These measures are described below: • Construction camps will be established in areas with adequate natural drainage channels in order to facilitate the flow of the treated effluents after ensuring that NEQS are met; • The surface and groundwater reserves will be adequately protected by installing screens and barriers to protect the source of contamination such as construction and oily waste that will degrade its potable quality; • The proponent will ensure that the construction work is confined within the RoW and water bodies are prevented from pollution during construction; • The solid waste will be disposed of in designated landfill sites to sustain the water quality for domestic requirements; • Regular water quality monitoring according to determined sampling schedule; • The contractor will ensure that construction debris do not find their way into the drainage or streams which may get clogged; • To maintain the surface water flow/drainage, proper mitigation measures will be taken along the alignment, like drainage structures in urban areas; • Prohibit washing of machinery and vehicles in surface waters, provide sealed washing basins and collect wastewater in sedimentation/retention pond;			

• Construction work close to the streams or other water bodies will be avoided, especially during monsoon period; • Wastes will be collected, stored and taken to approve disposal site. • Wastewater effluent from the Contractors' workshops and equipment washing-yards will be passed through gravel/sand beds to remove oil/grease contaminants before discharging into the natural streams. According to the NEQS, the BOD concentration in sewage must be brought down to less or equal to 80 mg/l before being discharged into a natural stream having capacity to dilute the effluent. For wastewater apart from BOD, COD of 150 mg/l will also be checked; and • Similarly, if the sewage after treatment is to be discharged on to the land it will meet the requirements of the NEQS for disposal of wastewater.			
Residual Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	Unlikely	Low	Low

8.4.10 Biological Resources

This section assesses the impacts on biological resources in and around the project site and outlines the mitigation measures recommended for the management of those impacts.

The flora and fauna species are common and widespread in the wider area around the project. No critical habitat threatened, or a unique ecosystem was identified in this area.

Flora

Trees are vital ecosystem, which perform variety of functions for the improvement of environment such as reduction in air pollution, noise abatement, cooling effect on earth, supply of oxygen etc.

Due to the proposed Project, total 11,140 trees including Fruit Trees 9420 & Forest Trees 1720 of different species will be cut due to the proposed Project. Fruit trees compensation will be provided to the PAPs before the commencement of the project so they can restore their livelihoods. These trees will be removed by the owners themselves.

The loss of trees will be compensated through cash compensation to the Forest Department for the loss of trees and replantation of trees (a mandatory requirement of planting

So, 10 new trees of indigenous species per each tree cut will be planted, therefore (11,140x 10) 111,400 new trees will be planted. NHA Tree Plantation campaign on National Highway and Motorway Policy 2002 will be followed.

Tree Cutting

The total number of expected Forest Trees to be cut are 1720. The detail of Forest tree cutting is given below:

- Poplar (Safaida) 695 Nos
- Eucalyptus 350 Nos
- Ailanthus 180 Nos
- Robinia (Kikar) 170 Nos
- Mulberry 80 Nos
- Others i.e., Bakain, Shisham, Willow, Phallai, etc. 245 Nos

Poplar Trees are also grown as a crop in the area, about 96.77 Acres Poplar orchards to be affected in the Project area. This crop is generally used in the Tobacco Kiln and Match factory. The compensation details have been given in Resettlement Action Plan.

Fruit Plants (Orchards)

The total number of expected Fruit Trees to be cut is 9,420. The proposed project nearly half alignment passes through the green agricultural lands of Peshawar valley, which also affect the orchards. The affected trees are peach, plum, and persimmon and so on. In addition to that the removal of fruit trees will have negative impacts on the economics of local community as many of them depend on orchards. Fruit trees in Project Area include Pear, Peaches, Persimmon and Guava.

The numbers of fruit trees to be cut are given below:

- Plum 7035
- Peach 1430
- Sweet Orange 480
- Others, i.e., Apricot, Guava, Persimmon, Pomegranate and Lemon 475.

Establishment of Contractor's camps and warehouses for storage of equipment, material etc. shall involve clearing of vegetation from the area causing a negative impact. During the entire construction period, dust laden polluted air will form a dust film on the leaves, thus blocking sunshine and stomata, thereby hindering photosynthesis process and cause quaintly causing detrimental effect on the plant health. Also, during the construction activities, the Contractor's workers may damage the vegetation including trees (for use as firewood to fulfill the camp's requirements).

Fauna

During construction phase the existing population of mammals and reptiles of the construction areas will be affected due to disturbance arising from construction activities involving excavation, movement of machinery and vehicular traffic, movement of labor, camping, etc. The existing animals will leave the directly affected areas due to construction activities and human intervention. Some animals particularly reptiles may get killed during the earthwork's operations. Moreover, the movements of the mammals and reptiles will be restricted during the construction phase.

Birds as well will tend to move away from the construction areas and find shelter and food elsewhere due to the activities mentioned above for fear of being hunted / trapped.

Noise generated from machinery particularly during the night hours will even scare the wildlife residing in habitats located at some distance from the construction areas. Pneumatic drills and rock cutting activities may even disturb the wildlife of the Project Areas. Food and refuse at the Contractor's camps may attract animals that might in turn be hunted by the workers. This impact is Indirect, Site-specific, Temporary, Reversible, Possible and Medium Significant.

Impact: Decline in abundance and diversity of terrestrial flora and fauna caused by construction related Activities			
Applicable Project Phase	*Construction*		
Initial Impact Rating	**Likelihood**	**Consequence**	**Impact Score**

	Likely	Major	Medium

Mitigation Measures:

- When aligning the access tracks ensure that the chosen route requires minimum vegetation loss and no tree cutting. Every tree cut on site for the execution of work will be replaced with the plantation of a minimum of five new trees
- Contractor will ensure that no fire arms are carried out by any of the employees or laborer, except designated security staff if required
- Ensure that no-hunting, trapping and/ or harassing wildlife takes place at site. The wildlife protection laws should be strictly implemented
- Ensure that the camping sites should be located away from the wildlife hot spots, but site there is no such area.
- Ensure that the general awareness of the crew is enhanced regarding the wildlife, through environmental training and notice boards provided by the contractor
- Contractor will provide clean source of energy at laborer camp and ensure wood and shrubs are not used as fuel during construction phase
- Ensure camp waste/food waste is disposed of in such a way that animals are not attracted
- Contractor will monitor the noise level near the noise producing activities and use silencer or cordon off the work area with the noise absorbing panels to make sure the noise level within the is acceptable.
- Ensure that safe driving practices is observed so that accidental killing of human being and animals crossing the road could be avoided.
- Contractor will establish Green belts at Proposed interchanges in consultation with RE, NHA and KP Forest department

Residual Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	Likely	Moderate	Low

8.4.11 Traffic Management

The project corridor is quite congested in certain segments where a high level of traffic volumes and commercial activity takes place, particularly the segments such as Bara Road, Khyber Bazaar, Soekarno Square and Saddar Bazaar etc.

On the tracks leading to villages, there will be an increase of traffic during project construction period due to the supply of construction materials and the movement of personnel and equipment.

The potential impacts due to increased vehicular traffic and movement of heavy equipment are:

- Traffic congestion due to construction material transport and activities.
- Wear and tear and damage to existing infrastructure.
- Community health and safety issues

The efficient management of traffic once the construction activity commences will be critical in order to minimize the risk of possible road accidents and construction related hazards

Impact: Traffic congestion due to construction and material transport activities and wear and tear and damage to existing infrastructure.			
Applicable Project Phase	Construction		
Initial Impact Rating	**Likelihood**	**Consequence**	**Impact Score**

	Likely	Major	Medium
Mitigation measures Contractor will prepare and implement detailed traffic management plan in true letter and spirit. As part of this plan, Contractor will implement following measures • Submit temporary haul and access routes plan one month prior to start of works. • Formulate and implement of an alternate route plans for heavy vehicles. • Initiate public awareness campaigns through radio and newspaper ads to educate public and sensitize them to cooperate with project staff and to make them aware of potential risks of accidents and necessary precautions. • Install traffic warning signs, and enforce traffic regulations during transportation of materials and equipment and machinery. • Employ flag persons to control traffic at work sites for safety reasons when construction equipment is entering or leaving work areas. • Create lanes through work site using rope or flagging to minimize risks and injuries from falling objects. • lift and place pre-cast sections at night to minimize traffic congestion. • Provide road signs indicating lane is closed 500 meters before work site. • Use traffic cones to direct traffic to move to open lane. • Provide sufficient lighting at night within and in vicinity of construction sites. • Monitor regularly traffic conditions along access roads to ensure that project vehicles are not causing congestion. • Define and observe schedules for different types of construction traffic trips. • Install temporary accesses to properties affected by disruption to their permanent accesses. Reinstate good quality permanent accesses following completion of construction.			
Residual Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	likely	Low	Low

8.4.12 Occupational Health and safety

Occupational Health and Safety (H&S) related impacts will arise during construction stage activities including clearing of earth, levelling, compaction, pavement finishing and testing & commissioning. The falls during inspection or maintaining pile rigs, steel fixing bridges, erection of framework and other related activities may also occur. Eye injury can be caused by stone or metal particles. Hazard of being hit by falling objects, major hand-arm and whole-body vibration hazards, skin and respiratory tract irritation from exposure to cement dust, overexertion and awkward postures etc. will be another impact. Welding hazards include electric shock, fumes and gases, fire and explosions, falls from height, eye and head injuries etc.

Other impacts will be fall from height, contact with heavy electrical and mechanical equipment, equipment failure, uncontrolled movement, unguarded moving mechanical equipment parts, fatigue, unbalanced load, falling objects, hand injury, slip and trip hazards, wind / storm activity, injury from releasing load too soon etc. Operating mechanical and electrical equipment will trigger the H&S issues e.g., struck by moving vehicles or other equipment, slips or trips, struck by flying objects, such as dirt or splashed fluids, caught in pinch points, shear points, falling from machine etc. The proposed Project area is also sensitive from the law and order point of view and the security as well as the safety of the Contractor and Consultant staff will be a major issue. Considering these consequences, this impact can be categorized as direct, moderate, site-specific, medium term, temporary, medium probability and irreversible.

The generic site HSE plan is attached as **Annexure V** in volume II of this ESIA report.

Impact: Occupational Health and safety issues due to construction activities

Applicable Project Phase	*Construction*		
Initial Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	Certain	Major	High

- Health, Safety and Environment (HSE) plan will be developed and implemented by the contractor.
- The contractor will ensure that medical dispensary having, first aid equipment has been established at his camps. Contractor will have to specified work staff and basic medical service and supplies to workers. Suitable ambulance service is available at the camps all time.
- A proper screening of labours should be done at the time of recruitment. Ensure that periodic awareness campaigns for HIV/AIDS are undertaken for the project staff.
- Contractor will provide potable water and also shadow area to the workers at work place area for short breaks.
- The Contractor will depute guards at all entry points into construction sites 24 hours a day.
- The Contractor will provide PPEs to all workers working at site for their safety.
- Contractor will ensure no machinery is left unattended in the project area.
- The medical staff ensure periodical checks of the cooking staff and cooking practice particularly for symptoms of hepatitis A.
- Contractor will ensure that use of horns is prohibited, except when necessary
- Timely public notification on planned construction works.
- Trained first aiders and medical staff to be available at project site.
- Use of safety signs at the construction site, as shown below.

Residual Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	likely	Moderate	Low

8.4.13 Community Safety

Impact: Community health and safety issues			
Applicable Project Phase	*Construction*		
Initial Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	Likely	Major	High

Mitigation Measures:

- Impose a speed limit of 20 km/h on unpaved roads and link roads for reducing traffic accident risks and dust generation.
- Place Traffic warning signs at community roads used for the movement of project vehicles.
- Fence the camping sites and work sites before the commencement of any construction activities.
- Control the site for not allowing unauthorized people and children to enter the site under any circumstances.

• Enforce the speed limit to minimize dust emissions due to vehicular traffic and sprinkle water on unpaved surfaces where necessary. • Ensure all vehicles undergo regular maintenance and will be tuned in accordance with the requirements of the NEQS. • Train laborers regarding Pukhtunwali code of honor and cultural norms to avoid any social conflict with the local population. • Train workers regarding SEA/SH/GBV and make it mandatory for all workers. • Use barriers and appropriate signage around all construction areas and excavations during construction phase to ensure community safety.

Residual Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	likely	Low	Low

8.4.14 Chance of Finding Artifacts, Religious, Cultural and Historical Sites

During excavation, in case of finding any artifact, cultural and historical site, the contractor will immediately stop the activities and report through Supervision Consultant to Directorate General (DG) of Archeology and Museums, Government of KP to take further appropriate action to preserve those antiques or sensitive remains. Chance Finds Procedure (as given in **Annex-XVI**) will be adopted in case of any accidental discovery of cultural heritage.

During the construction activities, any archeological or religious sites (such as graves or sensitive remains) may be found, then contractor will stop work, and will report to Supervision Consultant and NHA.

Impact: Chance of Finding Religious, Cultural and Historical Sites			
Applicable Project Phase	*Construction*		
Initial Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	Likely	Moderate	Medium
Mitigation Measures: • Inform relevant authorities if any archaeological site or artifact are found, in consultation with Supervision Consultant / NHA. • Apply chance find procedures for cultural or historical sites & Cultural heritage sites.			
Residual Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	likely	Low	Low

8.4.15 Nuisance/ Disturbance to Social Sensitive Areas (Educational, Health and Religious Places)

Since the proposed SLR project alignment crosses some villages, therefore, the socially sensitive sites/places including schools, hospitals and religious centers will be temporarily affected due to dust, noise and the community will face accessibility issues due to open trenches. Dust due to earthworks will create health hazard to children and people with ailments.

Impact: Nuisance/ Disturbance to Social Sensitive Areas			
Applicable Project Phase	*Construction*		
Initial Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	Likely	Moderate	Medium
Mitigation Measures:			

• Transport material to the site will be scheduled considering school timings; • Notify concerned schools, hospitals/dispensary etc. 2 weeks prior to the work; • Conduct a 30 minutes' awareness program on nature of work, likely disturbances and risks and construction work, mitigation measures in place, entry restrictions and dos and don'ts; and • Implement all measures suggested elsewhere in this report – dust and noise control, public safety, traffic management, strictly at the sites.

Residual Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	likely	Low	Low

8.4.16 Influx of Labor

For the implementation of proposed project activities, skilled and unskilled labor is required by the Contractor. Mostly, contractors bring their own skilled and unskilled workers that have been associated with the Contractor. Additional workers are also hired from the different areas that belong to different cultural backgrounds. Social problems and conflicts that are associated with Labor Influx may include risk of social conflict; increase risk of illicit behaviour and crime; increased burden on and competition for public service provision; increased risk of communicable diseases and burden on local health services; and increase in traffic and related accidents.

Impact: Social conflicts with local communities due to influx of Labor.			
Applicable Project Phase	*Construction*		
Initial Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	Certain	Major	High

• Establish labor camp(s) away from residential population at least 2 Km, keeping in view the cultural differences and social issues; • Recruit labour according to the provisions outlined in the Labour Influx Management Plan and WB guidance. • Prefer local people to work with contractor, and hire maximum labor force from the project area because this will reduce the Labor influx; • Orient and make the work force to ensure respect for local norms, customs and Pakhtunwali; • Complete construction within the stipulated time to move workers to next location; • Establish an effective GRM to resolve all issues related to the community and ensure close monitoring; • Create awareness among workers on proper sanitation and hygiene practices to endorse proper health and maintain good housekeeping practices at all project sites; • Develop and enforce a strict code of conduct for workers to regulate behaviour in the local communities; • Take all sensible precautions to avert illicit, vicious conduct by or amongst the Contractor's personnel, and to preserve unity and harmony, and protection of people and property on and near the sites; • Prohibit drugs, alcohol, weapons, and ammunition on the worksite among personnel; • Appropriate fencing, security check points, gates and security guards should be provided at the construction sites to ensure the security of all plant, equipment, machinery and materials, as well as to secure the safety of site staff; and • Maintain good relations with local communities and their leaders to help reduce the risk of vandalism and theft.

Residual Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	likely	Low	Low

8.4.17 Communicable Diseases

The Laborers in the Contractor Camp, truck drivers and personnel who interact with each other have the potential for the spread of HIV/AIDS. Majority of the people living in the surrounding of the Project, and potential labor may not be aware of the source, mode of communication or consequences of HIV/AIDS. Although their religious and cultural value system, to a large extent excludes the outbreak or rapid communication of HIV/AIDS, yet its occurrence in such a situation cannot be precluded. These issues have also been discussed in detail in Security Management Plan and Labor Influx Management Plan. Further it will also be part CESMP to be prepared by the contractor.

Impact: Communicable diseases in workers			
Applicable Project Phase	*Construction*		
Initial Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	Likely	Moderate	Medium
Mitigation Measures: The Contractor shall: • Arrange to run an active campaign, in the Labor camp, to make people aware of the cause, mode of transmission and consequences of HIV/AIDS. • Strengthen the existing local health & medical services for the benefit of Labor as well as the surrounding villages. • Ensure cleanliness and hygienic conditions at Labor camp by ensuring proper drainage and suitable disposal of solid waste. Inoculation against Cholera will be arranged at intervals recommended by Health Department. • Keep all the camps, offices, material depots, machinery yards and work sites open for the inspection of health and safety measures and related documents.			
Residual Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	Unlikely	Low	Low

8.4.18 Sexual Exploitation and Abuse/Sexual Harassment and Gender Based Violence (SEA/SH/GBV)

During construction phase, SEA/SH/GBV cases might arise due to discrimination made against women by unequal work distribution and unequal pay structure among others. Sexual harassment and gender-based violence against women might occur because of co-working of men and women at the construction site, and moving on the roads and markets.

According to social norms and traditions of the project area, the project might not employ women in the construction activities. However, if so, especially in the office work, educated women will be employed, the Labor Influx Management Plan and WB guidance will be appropriately followed. A GBV Service Provider (Local Firm) will be hired to provide support to the Client on awareness-raising, training, and case management of GBV/SH cases and issues in and around the project area, including issues, related to project, of local women as well.

Impact: SEA/SH/GBV			
Applicable Project Phase	*Construction*		
Initial Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	likely	Moderate	Medium
Mitigation Measures:			

• Hire a GBV Service Provider (Local Firm) prior to Contractor mobilization to provide support on awareness-raising, training, and case management of GBV/SH cases and issues. • Raise awareness among the communities of the potential risks of GBV and harassment, and establish response services in the communities that can respond to instances of GBV (particularly those connected to Labor influx); • The contractor should make sure that no discrimination is made based on gender while hiring of workers. • Provisions of gender disaggregate rest and sanitation facilities; and • Contractor should have clear GBV GRM protocols and assign personnel responsible for managing a GBV GRM to address and resolve issues relating to harassment, intimidation, and exploitation, especially in relation to women. • The propagation regarding GBV and SH will be widely carried out through banners and Pana flexes in and around the vicinity of the project.			
Residual Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	Unlikely	Moderate	Low

8.4.19 Child labour

In KP, the labour force participation rates of children between 10-14 is 5% whereas the labour force participation rates for those between 15-19 is 28 %.[11] The most common sectors where children are employed in KP include domestic labor, brick kilns,begging, rag picking/ scavenging. Child labour is also common in restaurants, roadside hotels, auto-workshops, transport industry, and smuggling . Local organisations in the former FATA districts report that internally displaced boys are working in marble quarries, mining, agriculture, and smuggling.[12]

In the context of the project, child labour risks can arise due to the employment of children in the hospitality facilities set up by the Contractor for workers e.g canteens or restaurants. Children may also be employed in repair shops set up by the Contractor for automobile and mechanical works. Moreover, child labour may also be employed in quarrying activities carried out by the Contractor.

To mitigate these risks, the PMU and the Contractor will monitor these locations to ensure that child labour is not employed. Child labour can also be employed by subcontractors hired by the Contractor for construction activities. The Contractor and the PMU will monitor these subcontractors to ensure that children are not employed as a part of their labor force. Moreover, the Contractor and PMU will monitor campsite collections of garbage to ensure that no children are present during the process.'

Based on current conditions in the infrastructure sector it is assessed that the risk of a child or forced labor is not significant, and is prohibited by national legislation. Workers below the age of 18 will not be hired to work on the project. Workers will need to provide legally recognized documents such as Citizenship Card or Birth Certificate for age verification purposes. Further, awareness- raising sessions will be conducted regularly to the communities to sensitize on prohibition and negative impacts of child and forced Labor. However, in practice in some sector of works there might be the risk of the non-compliance. As per the labor act special work permit need to be taken from Labor Office for using any migrant workers to prevent the risk of child labor and forced labor. Requirement of valid CNIC as proof of age as a child labor risk will be mandatory.

[11] Pakistan Bureau of Statistics ,2021, Pakistan Labour Force Survey 2020-21, Ministry of Planning, Development and Special Initiatives

[12] Federal Ombudsman Office and UNICEF, 2015.The State of Children in Pakistan.

8.5 OPERATION PHASE IMPACTS

The anticipated environmental impacts related to the proposed Project have been studied for the operational stage of the Project as discussed hereunder. Moreover, during operation phase, the project/NHA will maintain GRM for community members and users to file grievances related to air quality, noise, etc. as a mitigation measure.

8.5.1 Air Pollution

Construction of new road in the project area, traffic levels and congestion will result in the rise of vehicular emissions (CO, NO2, PM2.5, PM10) associated with the adverse effects on the environment and human. This impact is permanent and positive, in case of improvement of road conditions and minor negative, when traffic volume increased in the project area that may result in causing public health risks, nuisance and other impacts on bio-physical environment.

Impact: Air Pollution from Traffic			
Applicable Project Phase	*Construction*		
Initial Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	likely	Moderate	Low
Mitigation Measures: • Proponent with the help of EPA KP shall set up system to monitor air quality along project area in accordance with PEQS, 2016 and WHO/IFC guidelines (whichever is stringent) for a specific period to record the quality of air during the operation phase; • Implement a tree plantation plan to reduce the pollutant propagation to the receptors as an additional advantage of road aesthetics. • Regular road maintenance to ensure good surface condition; • Regular vehicle checks to control/ensure compliance with PEQS; • Speed limits at sensitive locations; and • Enforcement and penalties against traffic rules violators			
Residual Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	likely	Moderate	Low

8.5.2 Noise Quality

During the operational phase, the noise levels are anticipated to increase due to traffic related noise pollution; vibrations from engines and tires and mainly use of pressure horns. This impact is permanent and moderate negative in nature.

Impact: Noise pollution from the traffic			
Applicable Project Phase	*Operations*		
Initial Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	Likely	Moderate	Medium
Mitigation Measures: • Provision of adequate noise barriers such as hedges and indigenous tree species to reduce the noise.			

• Signs for sensitive zones (health centers / educational institutions etc.) to prohibit the use of pressure horns; and reducing speed limits in sensitive locations • Vegetation, if it is high enough, wide enough, and dense enough that it cannot be seen through, can decrease highway traffic noise. • National Environmental Quality standards WHO **(Attached as Annexure IX)** will be adopted as performance indicators. • Enforcement and penalties against traffic rules violators.			
Residual Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	Unlikely	Low	Low
Remarks: These issues will be reduced after implementing the above mitigation measures.			

8.5.3 Impact in Drainage Pattern

During the operational phase, poor maintenance of the road drainage system, particularly during the monsoon season can cause nuisance to the travelers and public due to flooding in the existing drainage line. In case of chocking of road drainage, the increased surface runoff due to heavy rains will accumulate at the start and end point of the proposed project and can cause traffic jams

Impact: Choking of Drainage system			
Applicable Project Phase	*Operations*		
Initial Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	Likely	Moderate	Medium
Mitigation Measures: • The impact can be controlled/reduced by timely and continuous maintenance/ cleaning of the drainage system; and • Placement of sign boards instructing not to dispose of solid waste to avoid chocking of Drain around the bridge and at grade road alignment. • Construct contour trenches along slopes and embankments along proposed road routes to slow down the flow of rainwater. These structures will help reduce erosion, promote water infiltration, and encourage the formation of Storage Tanks and Cisterns.			
Residual Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	Unlikely	Low	Low
Remarks: These issues will be reduced after implementing the above mitigation measures.			

8.5.4 Flora

No negative impacts are envisaged on the flora of the area during the operation phase. However, improper maintenance of the saplings planted against the trees cut for the proposed project may adversely affect the growth of those saplings which were planted to improve the environmental aesthetics of the project area. Raising of new trees in two rows on either side of the Link Road, shall render a positive impact on the flora of the area and will also cause a positive impact on the landscape of the area, which shall be of permanent in nature. Presence of adequate flora will absorb CO_2 gas, through photosynthesis, emitted from an expected large number of cars, vehicles and public transport, thus purifying air of hazardous particles.

Mitigation measures will include planting of 111,400 forest trees (1:10 ratio) along both sides of the link road, in accordance with the tree plantation plan. NHA Tree Plantation on National Highway and Motorway Policy 2002 will be referenced and followed. Although it shall take 10-15 years, before these plants become trees, this planting on link road, shall not only

compensate for the loss of trees, but shall contribute towards improvement of flora and environment of the tract. These fruit plantations will be carried out at private owned land will the help of Agricultural Department and local community. The budget allocation has been made for new plantation and attached as **Annexure III.**

Slope and aspect being some of the determining factors for selection of appropriate plant species for afforestation shall be recognized. Whilst planting of suitable tree species like *Acacia modesta* (Phulahi), *Acacia nilotica* (Kikar), *Ailanthus altisimma* (English Bakain), *Albezzia lebbek* (Siris) and Chirpine shall be carried out at 10 feet x 15 feet spacing on gentle to moderate slopes (10-40%). The most popular fast-growing species in the area are Hybrid Poplar Sufeda / Poplar (Salicaceae) and Eucalyptus Sufeda, Lachi (Myrtaceae).

Preference shall be given to the local species for its easier and better acclimatization with the locality factors like soil, precipitation, temperature, humidity and frost etc. Choice of the people for quick growing species to ensure early return to the community in view of its adaptability with the local climatic and edaphic dynamics shall also be respected. Biodiversity shall be imperatively considered for all intents and purposes to help develop and ensure proper habitat for compatible life forms (Flora, Fauna, Fish, Wildlife and Insects). Whilst Olea (Kao) and Shisham (Rose wood) planting shall be done in niches of deep soil on relatively colder aspects, Chirpine shall be planted sporadically for aesthetic purpose. Poplar, Toot and Robinia shall be distributed among the people to broaden the vegetation cover in the area under Farm Forestry on their farmlands in designs favoring their agricultural production. These quick-growing species shall substantially increase their income.

Poplar Trees are also grown as a crop in the area, about 96.77 Acres Poplar orchards to be affected in the Project area. This crop is generally used in the Tobacco Kiln and Match factory. The compensation cost for this forest crop has been estimated in the Resettlement Action Plan.

The Project activities will bring some negative impacts on the fauna of the project area such as the uneasiness of movement and increased probability of accidents, if the animals/livestock approach the proposed road. This impact is permanent and minor negative in nature. Noise and air pollution caused due to heavy and fast traffic on road, shall be a source of disturbance to the fauna of the area and especially to the avifauna of the area, which is another minor negative impact. Raising of dense plantation of shady trees on both sides of the road shall provide resting, nestling and roosting habitat to the fauna and especially to the avifauna which is a major positive impact.

<table>
<tr><td colspan="4">Impact: Impact on Flora</td></tr>
<tr><td>Applicable Project Phase</td><td colspan="3">Operations</td></tr>
<tr><td rowspan="2">Initial Impact Rating</td><td>Likelihood</td><td>Consequence</td><td>Impact Score</td></tr>
<tr><td>Likely</td><td>Major</td><td>Medium</td></tr>
<tr><td colspan="4">Mitigation Measures:
The saplings planted in the project area against the trees cut should be properly maintained throughout their initial growth period in terms of water requirement and necessary nutrients. Therefore, proper care of newly planted trees should be done;
An awareness campaign targeted on the neighborhood farmers will be carried to popularize the planting of trees, and saplings should be provided on subsidized costs;
Organic farming will be encouraged to minimize the use of chemical fertilizers and pesticides; and Raising of dense plantation on both sides of the SLR will not only mitigate the ill effects of construction of SLR on flora, but it will also improve the landscape of the area and enhance its aesthetic beauty.</td></tr>
</table>

Residual Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	Unlikely	Low	Low
Remarks: These issues will be reduced after implementing the above mitigation measure.			

8.5.5 Faunal Species Conservation

The Project activities will bring some negative impacts on the fauna of the project area such as the uneasiness of movement and increased probability of accidents, if the animals/livestock approach the proposed Construction of SLR. This impact is permanent and minor negative in nature.

Noise and air pollution caused due to heavy and fast traffic on SLR, shall be a source of disturbance to the fauna of the area and especially to the avifauna of the area, which is another minor negative impact.

Impact: Impact on Fauna			
Applicable Project Phase	*Operations*		
Initial Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	Likely	Major	Medium
Mitigation Measures: • Raising of dense plantation of shady trees along available suitable places along SLR shall provide resting, nestling and roosting habitat to the fauna and especially to the avifauna which is a major positive impact. • Mitigation measure will include provision of animal/livestock under road crossings after every 2 to 3 kilo meters to facilitate their movement			
Residual Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	Unlikely	Low	Low
Remarks: These issues will be reduced after implementing the above mitigation measure.			

8.5.6 Pedestrian and Commuter Safety

Improvements to the road surface will be conducive to safe vehicle travel at higher speeds. Such speeds may increase the incidences of accidents. Incorporating the following measures could offset this negative impact.

Impact: Pedestrian and Commuter Safety			
Applicable Project Phase	*Operations*		
Initial Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	Likely	Moderate	Medium
Mitigation Measures: • Provide center line road marking edge delineation where possible. • Provide clearly marked signing at townships, sensitive areas such as schools, mosques and health centers. • Enforce speed limits and other traffic rules, especially near schools, hospitals, mosques and built-up sections			

• Ensure safety of road users during repairing of carriageway and hydraulic structures by placing standard sign boards and barricading of the repairing site.			
Residual Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	Unlikely	Low	Low
Remarks: These issues will be reduced after implementing the above mitigation measure.			

8.5.7 Wastes/ Hazardous Waste

During operation phase Non-hazardous waste may be road sweepings or small quantities of municipal waste from highway offices. No hazardous waste is expected to generate in operation phase except during road maintenance works. Transportation of hazardous waste is also expected and must be regulated.

Impact: Wastes Generation			
Applicable Project Phase	*Operations*		
Initial Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	Likely	Moderate	Medium
Mitigation Measures: • Solid Waste generated during from offices will be properly disposed-off through local solid waste management system; • Proper labelling of containers, including the identification and quantity of the contents, hazard contact information of containers will be checked at toll plazas or interchanges; • Providing the necessary means for emergency response on call 24 hours/day; and • Management of hazardous waste during road maintenance works will be similar as given for construction phase.			
Residual Impact Rating	**Likelihood**	**Consequence**	**Impact Score**
	Unlikely	Low	Low
Remarks: These issues will be reduced after implementing the above mitigation measures.			

8.6 POSITIVE IMPACTS & BENEFITS

This link road will have the following localized and regional positive impacts:

- Reduction in Traffic Congestion on existing roads.
- Reduction in Travel Time and transportation cost through Short Access to and from Torkham by 60 minutes.
- Travel time for goods transport will decrease substantially.
- Promotion of Trade between Pakistan – Afghanistan.
- Direct Access to Communities of lying adjacent to the proposed project.
- Provision of a standardized road with good ride quality, reducing vehicle operating costs (VOC's) with direct impact on country's microeconomics in general.
- Presently, construction of this road could be accomplished ensuring minimal possible displacement of local people due to land availability.
- The locals will immensely benefit from this project. More employment opportunities, access to better facilities such as hospitals, schools, colleges, small to medium industries, and general improvement in lifestyle are some of the benefits they will get from this project.

8.7 CUMULATIVE & INDUCED IMPACT ASSESSMENT

8.7.1 Introduction

The cumulative Impact Assessment can be defined as, the process of (a) analyzing the potential impacts and risks of proposed developments in the context of the potential effects of other human activities and natural environmental and social external drivers on the chosen valued component over time, and (b) proposing concrete measures to avoid, reduce, or mitigate such cumulative impacts and risks to the extent possible.

Cumulative impacts to resources in the project area may result from residential, commercial, industrial, and highway development, as well as from agricultural development and the conversion to more intensive agricultural cultivation. These land use activities can degrade habitat and species diversity through consequences such as displacement and fragmentation of habitats and populations, alteration of hydrology, contamination, erosion, sedimentation, and disruption of migration corridors, changes in water quality, and introduction or promotion of predators. They can also contribute to potential community impacts identified for the project, such as changes in community character, traffic patterns, housing availability, and employment.

8.7.2 Identification of Cumulative Projects

The foreseeable projects considered in this analysis are presented in **Table 8-5 and Figure 8.1 below**. It includes commercial projects, residential projects, and transportation facility projects. Residential housing societies are under-construction, while the roads are all along existing facilities**.**

Table 8.5: Identification of Cumulative Projects

Sr. No	Existing and Proposed Projects
01	**Peshawar Northern Bypass at a distance of 10 Km**
02	**Marble Cities at a distance of 5.5 Km**
03	**Mining Activities along the Project Area at different location in the surrounding**
04	**Torkham Border Improvement Project at a distance of 50 Km**

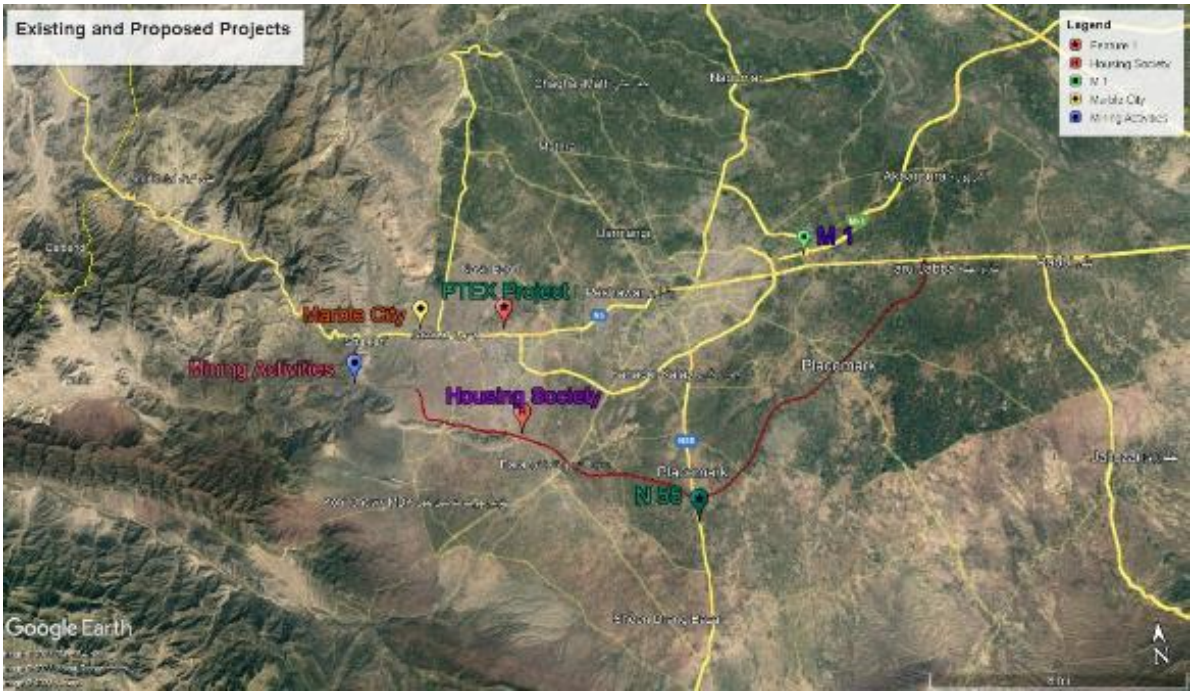


Figure 8-1: Identification of Cumulative Projects

Not all of the projects listed above would contribute to cumulative effects related to every environmental topical area. For example, not all of the projects would result in effects on biological resources. In addition, not all effects of an individual project listed above would contribute to a cumulative effect. Some effects are very site-specific and would not contribute to cumulative effects associated with other projects. In other cases, short-term effects would not contribute to cumulative effects because construction of the cumulative projects and Peshawar Southern Link Road project, and the short-term effects of those construction activities would not occur in the same time period and/or in the vicinity of each other.

The identification and/or quantification of the potential effects of the individual projects and, as a result, potential cumulative effects, were not feasible for some effect topics. This is because either no environmental document has been prepared for those projects and, therefore, the potential effects of those projects are not known at this time, or the environmental documentation was not available at the time these cumulative impacts analysis was conducted. As a result, identification of potential effects of those projects would be speculative. Therefore, the cumulative impacts analyses include some qualitative judgments regarding the potential combined effects of the relationships among the projects. In some cases, avoidance, minimization, and/or mitigation of possible effects of other projects could reasonably be anticipated, based on the assumption that those projects would include measures similar to the measures included in this environmental document conducted for compliance with PTEX. Construction of the proposed project scheduled to begin in 2024 and be completed in 2026 as per Project PC-1.

8.7.3 Cumulative/ Induced Impacts Analysis

Cumulative impacts to resources in the project area may result from residential, commercial, industrial, and highway development, as well as from agricultural development and the conversion to more intensive agricultural cultivation. These land use activities can degrade habitat and species diversity through consequences such as displacement and fragmentation of habitats and populations, alteration of hydrology, contamination, erosion, sedimentation, and disruption of migration corridors, changes in water quality, and introduction or promotion of predators. They can also contribute to potential community impacts identified for the project, such as changes in community character, traffic patterns, housing availability, and employment.

- **Development Projects along the Alignment**

As the project alignment will link with PTEX near Sathi Khel towards N-55 and end near village Dheri N 5, there are several other development projects occurring in the adjacent area, some of which are being planned and some are in the construction phase, all these projects will have environmental and social impacts individually. The individual impacts from all the projects will cumulatively affect the environment. Details about all these adjoining development activities along the alignment are given below:

- **Peshawar Northern Bypass**

The proposed Peshawar Northern Bypass, a four-lane dual carriageway takes off from Peshawar toll plaza of M-1 and ends near Jamrud on N-5 passing through North of Peshawar City. It is being constructed in three phases. The Phase-1 has been completed while Phase-2 is currently under progress. The project is aimed to reduce traffic congestion in the city of Peshawar and time reduction for Torkham. This as ring road as shown in figure below serves as a bypass for heavy transport vehicles and facilitates Afghanistan bound traffic. It also serves as the terminal for the Peshawar-Charsadda Road, Peshawar-Bara Road, Peshawar-

Dalazak Road and Jamrud-Warsak Road. This project and allied developments will have several positive and negative impacts.

- **Marble Cities**

The KP Department for Mineral Development estimates that KP accounts for almost 78% of the marble production in Pakistan. The marble and granite sector in merged area has considerable potential for growth as huge reserves of highly valued marble (including white marble in Khyber Agency and Mohmand Agency) have already been identified and work has been started in Mohmand agency. In merged area, quarrying/mining industry has provided jobs to an estimated 25,000 persons. Currently, there are around more than 1700 marble factories in Khyber Pakhtunkhwa and merged area as compared to six marble factories in 1990. Around 30 – 40 percent of the marble produced is exported to Afghanistan while the rest is consumed domestically. Hike in demand both in the local as well as foreign markets has created a need for fully equipped Marble Processing Plants in the area. Government of KP, in collaboration with Pakistan Stone Development Company (PASDEC), is taking steps for the development of Marble Cities in merged area (Landi Kotal and Mohmand Agency). During construction and operational phase, the marble cities are likely to have impacts on the area of influence of the Peshawar SLR.

- **Mining Activities along the Project Area**

There are abundant natural resources prevalent in merged area such as marble, copper, limestone and coal, although the current socio-economic situation has partly hindered their profitable exploitation. A bastnasite mineral extracted from Khyber Agency and trade with neighboring Afghanistan plays an active role in merged area economy, and items imported and exported to the country via trucks pass through supply routes in merged area. The environmental impacts of mining include erosion, formation of sinkholes, loss of biodiversity, and contamination of soil, groundwater and surface water by chemicals like such as lead and cadmium leaked into local groundwater, contaminating it from mining processes. Mine drainage can modify water pH. Effects of blasts, vibrations, stone missiles, loosening of earth thereby increasing the chances of landslides and siltation rates, aesthetics decay etc. Erosion of exposed hillsides, mine dumps, tailings dams and resultant siltation of drainages, creeks and rivers can significantly impact the surrounding areas. In subject areas uncontrolled mining may cause destruction and disturbance of ecosystems and habitats, and in areas of farming it may disturb or destroy productive grazing and croplands.

- **Torkham Border Improvement Project**

The Improving Border Services project is primarily focused on existing Border Crossing Point (BCP) that is used for transit trade with Afghanistan and potentially the Central Asian Republics. Construction of new infrastructure is planned under the project, including:

- Import export processing zones,
- Passenger terminal with separate parking areas.
- Integrated administrative office buildings.
- Widened approach roads, and new multi-approach traffic lanes with checking booths,
- New equipment such as cargo x-ray scanning, truck weighing and pedestrian multi entry and exit lane scanning and detection equipment's.
- New information and communication technology hardware and software as part of the transition to a single window system.

During construction period along with other projects and developmental activities area may be affected for movement, water scarcity, movement and residences of labor and relevant machinery but during operation social aspect of the area will be improved. Improving the border clearance processes will promote traffic coming to point of entry will strengthen the economy and supports jobs for border communities. Standardization by normalizing data requirements and partnering across borders and e-information-sharing can result in benefits for all region involved. With improved border management, insurgent groups will not be able to take advantage of crossing points that lack surveillance.

- **Peshawar Green City Housing Society**

Peshawar Green City is a modern housing society in Peshawar. The society is located in Behlol Zai Canal, Main Kohat Road, Peshawar which is near SLR project. This society will have all the facilities and amenities. The major environmental impact will arise from road access, solid waste management, and drinking water and most important security.

The cumulative impacts of the proposed SLR project are summarized in below **Table 8.6.**

Table 8.6: Cumulative Impact Analysis

Aspects	Potential Cumulative Impacts
Land Acquisition, Displacement, and Relocation	New construction and operation of facilities and industrialization of the area and up gradation activities for existing facilities will require land acquisition which may trigger involuntary resettlement for affected people.
Loss of Agricultural Land	Majority of the available patches of lands are used for agriculture purpose and development of other physical facilities will result in loss of agricultural lands, if the new road stimulates industrial development in the area in addition to above said projects.
Change in land use	Change in land use will primarily be from loss of agricultural lands and secondly from roadside development induced after development. The impact is perceived as potential significant negative as unplanned and haphazard development will have significant negative impact on land use.
Historic and Cultural Resources	No known additional public or private actions are proposed that would affect historic and cultural resources in the study area
Air Quality	Construction activities associated with the proposed motorway Project together with construction and operation activities from other developments have the potential to create significant cumulative impacts associated with the generation of total dust. For the traffic generated during both the construction and operational phases, significant cumulative impacts can arise due to emissions from vehicle exhausts and from dust dispersion lifted from unpaved road surfaces and other development activities pertaining to different land use patterns along the corridor. For the provincial and rural roads, the environmental benefits will come from lower dust levels due to sealing of local roads and from reduced vehicle emissions.
Noise	In the event that construction activities of other projects for development be in parallel with the construction phase of the proposed Project, it is possible that the cumulative noise impact of activities carried out in phases may increase from the direct impact. However, this is dependent on how the impacts from other developments combine with the impacts from the proposed Project, and the respective timing of these impacts.
Energy and Climate Change	The project would improve mobility and reduce congestion, thereby reducing GHG emissions and helping work toward regional, state, and federal air quality improvement initiatives.
Water Resources	The establishment of infrastructure has the potential to interrupt run-off channels and result in cumulative negative impacts to ecology that depend on small drainage lines that transport surface water during flash flood events. Moreover,

Aspects	Potential Cumulative Impacts
	with further developments in the area, increased accessibility made possible by the construction of the proposed expressway and possible influx of further people attracted to the broader Project Area by job opportunities, these stream systems may possibly come under increased pressure, not only in terms of water abstraction, but also in terms of the potential contamination of these streams by diffusing sources of pollution.
Ecology & Natural Habitat	The narrow fringe of ecologically important habitat could be impacted through habitat loss, construction activities and fragmentation in various places. Most of the faunal species present in the area are partially or wholly dependent on this habitat, and will be subjected to regular disturbances as a result of the cumulative effect of adjacent other operations. This will lead to increased pressure on ecosystem services such as the harvesting of fire wood and greater disturbance effects on wildlife. There may also be an increase in numbers of livestock due to better trade situations. The mountainous environment has a limited grazing capacity and has a slow recovery following degradation through overuse.

The cumulative impacts of the proposed SLR project are summarized in below **Table 8.7.** The complete cumulative impact analysis is presented in **Annexure VI.**

Table 8.7: Cumulative Impact Analysis

Resources	Potential Adverse Effects	Potential Cumulative Effects
Transportation	No Adverse Impacts	No Cumulative Effects
Community Character	No Adverse Impacts	No Cumulative Effects
Land Acquisition, Displacement, and Relocation	Acquisition of land, residential properties	Cumulative effects of loss of productive resources and involuntary resettlement would contribute to cumulative adverse impacts related to physical and economic displacement.
Recreational Resources	No Adverse Impacts	No Cumulative Effects
Socioeconomics	Positive Impacts	No Cumulative Effects
Visual and Aesthetic Resources	Obstruction of existing scenic views of Agricultural fields and Fruit Gardens	No Cumulative Effects No other known projects are planned that would alter the existing views cape in the study area
Historic and Cultural Resources	No impact on Historical and cultural sites	No Cumulative Effects No known additional public or private actions are proposed that would affect historic and cultural resources in the study area
Air Quality	The project would exceed Ambient Air Quality at construction sites. Mitigation measures would be implemented to the extent feasible and practicable to minimize any adverse impacts.	No Cumulative Effects
Noise	The project would result in Noise exceeds	No Cumulative Effects

Resources	Potential Adverse Effects	Potential Cumulative Effects
	at construction sites. Mitigation measures (such as noise barriers) would be implemented To the extent feasible and practicable to minimize any adverse impacts.	
Energy and Climate Change	No Adverse Impacts	No Adverse Cumulative Effects The project would improve mobility and reduce congestion, thereby reducing GHG emissions and helping work toward regional, state, and federal air quality improvement initiatives
Topography, Geology, Soils	No Adverse Impacts	No Cumulative Effects
Water Resources	No Adverse Impacts	No Cumulative Effects
Ecology	Loss of Forest and fruit trees	No Cumulative Effects No other known projects are planned that would result in loss of oyster habitat in the study area
Hazardous Materials	No Adverse Impacts	No Cumulative Effects
Environmental Justice	No Adverse Impacts	No Cumulative Effects

9 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

The main objective of the environmental and social management plan (ESMP) is to manage adverse impacts of proposed project interventions on both the environment and the people in the project area. The purpose of the ESMP is to ensure that environmental and social impacts and or risks identified during the ESIA process are effectively managed during the construction, operation and closure of the proposed project. The ESMP specifies the mitigation measures, which are to be implemented by the contractor's environmental team.

The SLR under KPEC is a design-built contract project. Current ESMP is a part of ESIA study carried out by the Consultant and shall not be considered final, unless its design and or alignment is unchanged. ESMP needs to be revised along with the change of design at any stage.

This ESMP not only specifies mitigation measures but also describes institutional arrangements for the ESMP, human resource requirement in the contractor's team to ensure the safeguards implementation. ESMP includes environmental mitigation, testing, monitoring, reporting and budgeting requirements, along with recommendations on Environmental training.

9.1 ENVIRONMENTAL OBJECTIVES OF ESMP

The specific objectives of this document are to highlight the Environmental objectives and targets to ensure a sustainable and climate resilient approach towards the construction of SLR-KPEC. Stepwise environmental objectives, which are contractual obligations of contractor are as under:

- **Design & Alignment Selection:** As this is a design-built contract, while designing the SLR KPEC, contractor must be familiarized with WB safeguards policies and guidelines. Contractor needs to be guided to select an alignment, which is most climate resilient and has the least environmental and social impacts while fulfilling project objectives.
- **Site Selection for Facilities:** To ensure the environmental performance, site selection for different project facilities e.g., campsites, asphalt, batching and or crushing plant, workshop and or machine yard need to be carefully selected as per the guidelines. All the activities within these facilities along with construction work on site also need to be in line with the WB safeguards guidelines and EPA's approval.
- **Human Resource**: This identifies the human resource required to ensure environmental compliance, quality of reporting and enhanced environmental performance.
- **Mitigation Measures**: Mitigation measures identified against each activity will maximize potential project benefits and control negative impacts.
- **Climate Resilient and Environment enhancement/ friendly infrastructure:** To ensure a climate resilient road infrastructure, green infrastructure e.g., urban forest also incorporated to serve for climate regulations.
- **Defining roles and responsibilities of Project Team:** ESMP also defines responsibilities of contractor team, supervisory consultant, and other members of the project team for the environmental and social management of the project.
- **Defining environmental monitoring and management Plans:** This document also emphasized on environmental monitoring and management plans. These plans are

related to Health & Safety, Emergency response, Traffic safety, Noise & dust, Air Quality, Solid Waste, Liquid waste, noise and Flora & fauna and all natural resources management.

- **Environmental Trainings**: Need and frequency of Environmental trainings to the contractor and other project staff is also comprehended and included in the plan.
- **Environmental Budgeting:** ESMP also calculates overall budget estimate along with its breakup for a sustainable and a resilient infrastructure.
- **Inspection and Supervision**: This document also mentions inspection and monitoring frequency by SC and Client to make sure Contractor's compliance to ESMP document.

9.2 INSTITUTIONAL RESPONSIBILITIES

Following functionaries will be involved in the implementation of ESMP:

1) National Highway Authority
2) Supervision Consultant
3) Contractor of project

9.2.1 Project Management Unit

NHA will establish Project Management Unit (PMU) and Project Implementation Unit (PIU) of KPEC in NHA North Headquarter (HQ) at Peshawar and project's site for implementation of project. PIU will be comprised of Environmental Specialist, Social Development Specialist and Gender Specialist for dealing with E&S activities on site. However, Focal Persons on Environment and Social have already been deputed at NHA-HQ.

NHA in the past has executed E&S activities on a number of donors funded projects. Post Flood National Highway Rehabilitation Project (PNHRP) funded by Asian Development Bank (ADB) in 2018, a successor of Flood Emergency Response Project (FERP) of 2012 is an example where NHA has practiced and implemented E&S activities in line with national and ADB's Environmental & Social Safeguard requirements under Environment & Social Safeguard Unit (ESU) in NHA-HQ.

The Focal Person (Environment) on KPEC at NHA-HQ and Social Development & Resettlement Specialist, Gender Specialist at PIU will be responsible for managing the overall ESMP/CESAP activities by monitoring, advising and visiting the project site in coordination with the ES of CSC and ES of Contractor.

Table 9.1: Institutional Responsibilities

Functionaries	Responsibilities
PMU/PIU, NHA **PD PIU**	• Project Director under PIU is overall responsible for the project management and supervision along with the related E&S management. PD has to handle civil work along with managerial aspects of project during construction phase through RE and PM; and E&S management through FPE and ES KPEC.
Focal Person Environment (FPE) PMU	• FPE will be overall in-charge of Environment and will handle the management issues of the contract in lieu of WB guidelines and KP-EPA NOC's requirements. • FPE will be assisted by the Environment Specialist KPEC to implement and ensure compliance of ESMP.

Functionaries	Responsibilities
Environment Specialist (ES) KPEC	• ES KPEC will be responsible for the technical compliance of ESMP implementation through SC and contractor Environment team. • NHA PMU will carry out internal audits on quarterly basis for ESMP implementation. • All technical hiring, (i.e., human resource) related to ESMP need recommendation & approval of ES KPEC and FPE respectively. • All management plans as mentioned in ESMP below will need recommendation and approval of ES-KPEC and FPE. • A minor to major penalty based upon non-compliance to ESMP can be recommended by ES KPEC. Matter will be reported to GM and Member concerned and to the WB as well by the FPE. • In case of regular noncompliance of ESMP warning may be issued to the contractor along with recommendation of due deductions. • All administrative and technical payments related to ESMP needs recommendation from ES KPEC and comments /verification from FPE before their approval from the competent authority. • In case of bogus claim from any head of ESMP ES KPEC will immediately report to the competent authority. • In case of non-compliance of ESMP first time verbal then written warning may be issued to the contractor on the recommendation of ES KPEC. • Maintaining interfaces with the other lined departments and stakeholders • ES KPEC and FPE will facilitate WB safeguard mission and other required presentations to the WB on status of ESMP implementation and timely submission of ESMP compliance documents • ES KPEC will look after the Environment team of CSC on site in line with the specifications and requirements of ESMP and CESAP/SSEMP in order to ensure compliance in close coordination and cooperation with the PIU and PMU to ensure that the project complies with the World Bank Safeguard Policies as well as national environmental frameworks. • Ensure compliance and adherence to World Bank Safeguard policies and KPK-EPA standards through on-site visits, consultations, trainings of key project staff and contractors, supervision of on-site activities, ensuring preparation, updating and timely submission of requisite Environmental Safeguard Compliance Reports to WB through FPE-KPEC-NHA.
Supervision Consultant **Environmental Expert /Specialist** **Resettlement/Social Expert** **Gender Expert**	• SC through its team of environmental management will ensure implementation of ESMP on project site. • He/she will Inspect, supervise and monitor all the construction and allied activities related to ESMP • He/she has to ensure Site Specific Environmental Management Plan get approved from NHA and WB one-month prior construction is started. • He/she will be responsible to prepare corrective action plan if and when required.

Functionaries	Responsibilities
M&E Specialist	• EE/ES of SC will facilitate and cooperate ES KPEC and FPE in the implementation of ESMP. • Visiting construction sites including incomplete construction work sites, where there are no contractor's activities, active construction work sites, completed areas of work sites as well as ancillary sites such as burrow areas, quarries, asphalt and crusher sites, construction camps and workshop to ensure contractors' compliance with ESMP stipulations and conditions of legal authorities. • Preparing monthly and quarterly environmental compliance reports
Contractor of Project **Environmental Specialist** **Environmental Engineer**	• Environmental Specialist (ES) of contractor will prepare site specific ESMP (before commencement of construction work), environmental testing and monitoring plan, traffic control/diversion plan, plantation plan, camps site management plan and other social and environmental plans as part of SSEMP. • ES will be responsible to supervise and manage day to day activities of Environmental Engineer (EE) • EE of contractor will be responsible for the implementation of ESMP and to take effective measures against corrective actions plan • EE will prepare the compliance reports as per schedule and will submit it to SC • ES will ensure provision and usage of proper Personal Protective Equipment (PPE) to the workers and train them for their proper use • ES and EE will conduct environmental trainings for project staff and Labor • This personnel will also be responsible for liaising with the community.
Forester or Botanist or Horticulturist	• Contractor will hire and engage professional resource for designing sustainable green infrastructure plan. Technical resource will prepare plantation plan and get its approval from NHA and World Bank before execution. A self-resilient roadside plantation plan based upon rainwater harvesting, solar lights and pumps with smart irrigation through drip irrigation along with native and or most beneficial specie will be proposed by his technical resource.
Health and Safety Manager (IOSH/NEBOSH)	• H & S officer will ensure the safety of project staff. H & S will ensure the availability of PPEs on site. • H & S officer will Conduct training of the staff • H & S officer will be responsible to ensure compliance of health and safety of WB guidelines. • H & S officer will ensure no child Labor in the project site. • H & S officer will prepare the reports on monthly basis based upon his record

9.3 MITIGATION MANAGEMENT MATRIX

The Mitigation Management Matrix (MMM) provides the framework for the implementation of the mitigating measures and environmental management during construction and operation phases of the project.

Table 9-2, 9-3 and **9.4** reflect the impacts arising from project activities, their mitigation measures and responsibilities for the implementation of ESMP during design, construction and operation phases respectively.

Table 9.2: Design/Planning Phase ESMP

Sr. No.	Potential Impact/Project Activity	Mitigation Option/Action	Performance Monitoring Indicators	Responsibility	
				Implementation	Supervision
		Design/Planning Stage			
1.	**Improper route selection and Incompatible Engineering design**	▪ Consider the social and resettlement issues in the layout plan, engineering design keeping in view the future needs in line with the local and international standards; ▪ Review and validated all the design possible impacts before the start of construction of the proposed Project. ▪ Minimize the significant social/resettlement impacts by design team after social/resettlement survey of the project area and for the proper route realignment. ▪ Design number of bridges and pedestrian access points to facilitate the local population so that they can access their land. ▪ Provide information about project to the community through awareness programs, distribution of Executive summary of ESIA in Urdu, and joint public consultation/hearing by EPA and NHA during the ESIA approval process and disclosure of RAP and ESIA after its approval on NHA website. ▪ Ensure to adhere all land acquisition procedures as outline in the Resettlement Action Plan (RAP – a separate document) is followed in a transparent manner. ▪ Maintain complete records, particularly for asset valuation and compensation payment. ▪ Address communities' grievances associated with the land acquisition and compensation on	Confirmation of design incorporation. Audits and Checks	DC, NHA	PMU/PIU NHA

Sr. No.	Potential Impact/Project Activity	Mitigation Option/Action	Performance Monitoring Indicators	Responsibility	
				Implementation	Supervision
		priority basis, in order to avoid any unrest/mis-trust among the communities towards the pro-ject.			
2.	**Land Acquisition/ Resettlement**	▪ Implement the mitigation measures of project in compliance with RAP. ▪ Propose a District Compensation Committee to determine compensation amount while in Khyber District constitute the Qaumi Commission will be performing this function. ▪ Calculate the compensation amount for damages based on replacement costs as per the OP/BP 4.12 policy provisions. ▪ Consult and inform through sending notices to the local government as well as the people affected by the project before implementing site clearance procedures. ▪ Determine exactly route direction of travel as well as works and assets that will be moved according to the design by using measures such as measuring machine and marking etc. ▪ Provide compensation prior to taking possession of land/assets. ▪ Obtain No Objection from World Bank prior to start of civil works. ▪ Avoid conflicts with local people during the clearance process by client and district bodies. ▪ Define clearly the boundary of clearance area. ▪ Resolve all type of complaints through grievance redress mechanism (GRM)	Compensation and land records Confirmation of design incorporation	ESIA Consultant, NHA	PMU/PIU NHA

Sr. No.	Potential Impact/Project Activity	Mitigation Option/Action	Performance Monitoring Indicators	Responsibility	
				Implementation	Supervision
	Temporary Land Acquisition	▪ Compensate vulnerable persons as per WB OP-4.12. ▪ Avoid conflicts with local people during the land clearance process by client and district bodies. ▪ Define clearly the boundary of clearance area/RoW. ▪ Ensure to assign the contractor's responsibility to have written lease or rent agreement made between the Contractor and owner of the land. ▪ Monitor the lease or rent agreement to be monitored by the Supervision Consultant and NHA.	Compensation and land record	Supervision Consultants & NHA	PMU/PIU NHA
3.	**Seismicity**	▪ The proposed road and the associated structures will be designed and constructed as per Seismic Building Code of Pakistan 2007 (SBC-07) to comply with minimum requirements for seismic safety of structures. ▪ Geotechnical investigations will be carried out prior to the construction of bridges and culverts keeping in view the seismic hazards of the Project Area	Confirmation of design incorporation; Check Geological Investigation results	DC, NHA	PMU/PIU NHA
4.	**Change in Hydrologic Regime**	▪ As per findings of the Hydrological Study, estimation of the discharge of Bara River and streams/Nullahs of the project area has been calculated against 25 and 100 years return period. ▪ A pre-construction visit is recommended to be conducted by a team comprising Route Engineer, Hydrologist and Hydraulic Engineer to validate the crossing locations and design.	Confirmation of Design incorporation. Audits and Checks	DC, NHA	PMU/PIU NHA

Sr. No.	Potential Impact/Project Activity	Mitigation Option/Action	Performance Monitoring Indicators	Responsibility	
				Implementation	Supervision
		▪ The side drains at the toe of embankment in the form of natural side ditch will be provided to protect the embankment area, if required. The side drains will be designed such that flooding of the pavement and the resulting flow towards embankment slope does not damage the embankment. ▪ For the crossing of drains and water courses, small bridges and culverts have been incorporated in the design. ▪ To reduce impact of flooding, Design contour trenches along slopes and embankments along proposed road routes to slow down the flow of rainwater. And design Underground or above-ground storage tanks and cisterns to collect& store water of Contour Trenches.			
5.	**Flora**	▪ The camps, mobility of machinery and construction of temporary road should be proper planned and well designed to avoid any loss to local green cover ▪ The alternate routes for roads and points for camps are recommended where no loss of vegetation is expected. ▪ The location of construction camp should be selected so as to have limited environmental impact during construction phase and to reduce the cost and land requirement	Confirmation of design incorporation Checks and audits of suitable place Tree compensation record	CC/Design Consultant	PMU/PIU NHA
6.	**Community Sensitive Religious Sites/ Structures**	▪ Minimize the adverse impacts on the religious and community structures and places by making changes in design (where possible).	Confirmation of design	DC, NHA	PMU/PIU NHA

Sr. No.	Potential Impact/Project Activity	Mitigation Option/Action	Performance Monitoring Indicators	Responsibility	
				Implementation	Supervision
		▪ Develop a mechanism for shifting of graveyards with the community consultation and coordination. ▪ Provide alternative access routes in case the access has to be restricted during execution period.	incorporation. Audits and Checks		
7.	**Biodiversity Conservation and NRM**	▪ Incorporate technical design measures to minimize removal of trees and plan for compensatory planting for more trees against each fallen tree of similar floral function. ▪ Disallow introduction of invasive/ exotic species and native species should be recommended for plantation. ▪ Provision of animal corridors for the free movement of faunal species, especially, near the attractive sites such as grazing lands and water bodies.	Confirmation of design incorporation. Audits and Checks	DC, NHA	PMU/PIU NHA
8.	**Public Utilities**	▪ Consult concerned department for the design and budget to relocate the existing utility infrastructures; and ▪ Relocate all public utilities likely to be affected by the proposed Project ahead of time before the actual commencement of the construction work.	Confirmation of design incorporation. Audits and Checks	NHA	PMU/PIU NHA
11.	**Public Disclosure of Final Design**	▪ Share the route alignment with the identified stakeholders and local public through meetings and detailed presentations.	Audits and Checks	NHA	PMU/PIU NHA

Sr. No.	Potential Impact/Project Activity	Mitigation Option/Action	Performance Monitoring Indicators	Responsibility	
				Implementation	Supervision
		▪ Continue stakeholder engagement and timely public disclosure to ensure uninterpreted project implementation.			

Table 9.3: Construction Phase ESMP

Sr. No.	Potential Impact/Project Activity	Mitigation Option/Action	Performance Monitoring Indicators	Responsibility	
				Implementation	Supervision
		Construction Stage			
1.	**Soil Erosion and Contamination**	▪ The Contractors will be required to instruct and train their workforce in the storage handling and management of materials and chemicals that can potentially cause soil contamination;	Compliance; evidence of Training	Contractor	CSC/NHA
		▪ Material Safety Data Sheets (MSDS) will be strictly followed during handling and storage of chemicals;	Record		
		▪ Soil contamination by asphalt will be minimized by placing all containers in a bonded area away from water courses;	Compliance; site inspections		
		▪ Provision of impervious platform with oil and grease trap for collection of spillages during equipment and vehicle maintenance;	System in place		
		▪ In areas with strong sheet flow, high embankments will be provided with chutes and drains/culverts to minimize soil erosion. Stone pitching and retaining walls will be made at high embankments in critical areas;	Compliance with Drawings		
		▪ As applicable and needed, plantation of grasses and shrubs will be done for slope protection;	Site inspection; Photographic record		
		▪ Productive land or land adjacent to agricultural / irrigated land may not be preferred for excavation;	Compliance; site inspection		
		▪ Non-productive, barren lands in broken terrain, nullahs and publicly recognized waste lands			

Sr. No.	Potential Impact/Project Activity	Mitigation Option/Action	Performance Monitoring Indicators	Responsibility	
				Implementation	Supervision
		should be given preference for borrowing materials; ▪ Aggregate required for construction procured from quarries and river beds will need approval from authorities; ▪ If any contaminated soils are found, they shall be removed and deposited in a sealed pit in an area agreed with the concerned; ▪ Use of modern, well-maintained machinery and vehicles by the contractor to avoid leakages; and ▪ Soils removed during construction would be stockpiled for reuse where possible.	Compliance with Drawings; site inspections Written approval Compliance, Site Inspections Compliance, Record check Compliance		
2.	**Borrow Materials from Earth Borrow Site**	▪ Preferably no private land will be used for borrow area. Contractor will excavate the material from the specified and demarcated borrow area and restricted to specified depth ▪ Contractor will maintain photographic record of the site before and after the restoration of the borrow site and also contractor will get approval from the land owner prior to start excavation.\	Records of clear boundary marker demarked in Place Photographs records and SFA signed by the land owner Compliances with Specification	Contractor	CSC/NHA

Sr. No.	Potential Impact/Project Activity	Mitigation Option/Action	Performance Monitoring Indicators	Responsibility	
				Implementation	Supervision
		▪ Contractor will ensure that the surface drainage is provided to control the surface run off	Compliance Site inspections		
		▪ Contractor will ensure that the movement of earth moving machinery is limited to the work area	Visible signs of any soil erosion		
		▪ Contractor will ensure that erosion protection measures are taken, such as retaining wall (if required), avoidance of steep cut	Photographs Record		
		▪ Contractor will level the borrow and the edges of the pits be given flat slopes as far as possible and as per the satisfaction of the land owner and top soil restored after the completion of the excavation activity	Records		
		▪ Contractor will maintain the complete documentation for the borrow areas i.e., volume excavated, date of excavation, leveling date after completion of excavation.	Compliance		
		▪ Contractor will carry out regular water sprinkling during executing of excavation to mitigate the dust pollution	Compliance		
		▪ Contractor will ensure that the movement of excavating machinery and vehicles is limited to the work area.	Photographic Records		
		▪ The Contractor will prepare Borrow Area Restoration Plan	Site Inspections		
		▪ Contractor will maintain the Photographic record of the area of the nominated waste disposal			

Sr. No.	Potential Impact/Project Activity	Mitigation Option/Action	Performance Monitoring Indicators	Responsibility	
				Implementation	Supervision
		site in order to restore the site at the completion of the construction phase ▪ Contractor will ensure that waste soil is properly disposed of in a manner that does not affect the natural drainage.	Compliance; Photo-graphs		
3.	**Installation and operation of batching plant, Asphalt Plant**	▪ Preferably no private land is used to establish the batching plant & asphalt Plant. Contractor needs to get approval from SC and NHA if he uses any private land for this purpose. Contrac-tor will pay for the use of private land ▪ The location of the batching plant & Asphalt plant needs to be at least 500 m from the vil-lages (main settlement) and out of phase with the prevailing wind direction. If the selected lo-cation is less than 500m from the residential area, then it has to be emission-controlled plant i.e., equipped with wet scrubber. ▪ Contractor will ensure that land contamination from the batching plant, during transportation and dumping of the waste fresh concrete is controlled through careful working of the Con-tractor's crews to avoid spillage of concrete and dumping of waste concrete on private land. Carry fresh concrete in mobile concrete drums only ▪ Contractor will maintain leak / spill record for each incident of spill or damaged vehicles. Damaged / defective vehicles will not be oper-ated unless repaired	Pphotographs; a state-ment signed by NHA that no private land is used, otherwise, con-tractor will be respon-sible for land use Payments. Compliance; community Complaints. System in place Compliance	Contractor	CSC/NHA

Sr. No.	Potential Impact/Project Activity	Mitigation Option/Action	Performance Monitoring Indicators	Responsibility	
				Implementation	Supervision
		▪ Contractor will ensure that the material is stockpiled at the designated area only. ▪ Contractor will ensure that surface drainage is not blocked due to the piling of the raw material ▪ Contractor will store material on site with care and suggestions provided in EIA, in order to minimize the risk of spill or leakage into the river or control water body	Compliance; Photographs Compliance' Photograph System in place		
4.	**Construction Camps/Camp Sites**	▪ The Contractor will seek to avoid sitting camps where their presence might contribute to any conflicts with locals; ▪ Camps will be designed to be self-contained to reduce demand on infrastructure and services of nearby communities; ▪ Contractor will prepare a comprehensive safety and security plan for the camps which will comprise of a training manual, use of safety equipment and emergency preparedness; ▪ Training will be provided to all staff on camp management rules and overall discipline and cultural awareness; ▪ Contractor will prepare a Waste Management Plan that will be implemented to ensure safe handling, storage, collection and disposal of	Compliance; Community consultations and Complaints handling Compliance; Community Complaints safety and security plan in place and operational Evidence of Training Waste Management plan in place and Operational; Evidence of Training	Contractor	CSC/NHA

Sr. No.	Potential Impact/Project Activity	Mitigation Option/Action	Performance Monitoring Indicators	Responsibility	
				Implementation	Supervision
		construction wastes and the training of employees who handle waste; ▪ Contractor should mark and preserve Individual trees and shrubs of high conservation value wherever possible or transplanted if the root conditions are suitable for such an operation; ▪ Site for construction camp will be selected to minimize the removal of existing macro- plants at camp sites; ▪ Contractor will make Photographical and botanical inventory of vegetation before clearing the site; ▪ Compensatory plantation to be done when construction work near ends; and ▪ The contractor(s) shall ensure removal & rehabilitation of site upon completion.	Compliance, Site inspections Compliance with drawings, Site inspection Photographic records Site inspections Photographic record; Site Inspection		
5.	**Wastewater Generation at Construction Camps**	To dispose the liquid waste generated from the construction activities, Contractor will be required to take following steps: ▪ Domestic and chemical effluents from the construction camp will be disposed by the development of on-site sanitation systems i.e., septic tanks; ▪ Proper monitoring to check the compliance of NEQS will be carried out; ▪ Sewage from construction camps will be disposed of after proper pre-treatment and processes such as soakage pit; and	System in place; site inspection Wastewater Quality monitoring results report System in place; site inspections	Contractor	CSC/NHA

Sr. No.	Potential Impact/Project Activity	Mitigation Option/Action	Performance Monitoring Indicators	Responsibility	
				Implementation	Supervision
		▪ The Contactor(s) will be responsible to submit details of site-specific wastewater management plan along with detail of wastewater collection, transportation and its disposal.	wastewater management plan in place and operational; site inspections		
6.	**Solid Waste (Construction, Municipal and Hazardous Waste)**	▪ The demolition waste and excavated material's disposal site will be agreed with the Supervision Consultant and Contractor and marked on site before starting the work ▪ Solid Waste generated during construction and camp sites will be safely disposed in demarcated waste disposal sites and the contractor will provide a proper waste management plan; ▪ Training of work force in the storage and handling of hazardous materials and chemicals construction workers and supervisory staff should be encouraged and educated to practice waste minimization, reuse and recycling to reduce quantity of the waste; ▪ Proper labelling of containers, including the identification and quantity of the contents, hazard contact information etc.; ▪ Waste disposal plan must be reviewed during the entire construction phase in the light of changing weather conditions	Photographs; demarcation on maps and in the field Compliance, site inspections, Waste Management Plan in place and operational Evidence of Training' Compliance, Photographs Compliance; Records and Checks Emergency Response Plan in place and Operational	Contractor	CSC/NHA

Sr. No.	Potential Impact/Project Activity	Mitigation Option/Action	Performance Monitoring Indicators	Responsibility	
				Implementation	Supervision
		▪ Emergency Response Plan shall be prepared to address the accidental spillage of fuels and hazardous goods; ▪ Immediate collection of spilled oils/fuels/lubricants by collection of contaminated soils and skipping oils from surface water by applying appropriate technologies; ▪ Reusing bitumen spillage; and disposing non-usable bitumen spills in a deep trench providing clay linings at bottom and filled with soil at the top (for at-least 0.5 m); ▪ Used oil shall be collected in separate containers stored on impervious platform with restricted access and shall be sold to licensed contractor and the burning of waste oil shall be strictly restricted	System in place; Compliance; records and checks Records and Checks System in place; Site inspections; records and checks		
7.	**<u>Ambient Air Quality</u>** **Dust, smoke and other potential pollutants from Plants & equipment's**	▪ All vehicles, machinery, equipment and generators used during construction activities should be kept in good working condition and be properly tuned and maintained in order to minimize the exhaust emissions; ▪ If the selected site for batching plant is closer than 500m from the build-up area than ensure that zero emission plant is installed. ▪ Ensure that dust emissions due to vehicular traffic are minimized by reducing speed, vehicular traffic minimized through good journey	Monitoring gaseous emission rates from generator and other key equipment System in place Visible dust: Visible observation of size of dust clouds	Contractor	CSC/NHA

Sr. No.	Potential Impact/Project Activity	Mitigation Option/Action	Performance Monitoring Indicators	Responsibility	
				Implementation	Supervision
		management and water sprinkling on non-mettle road when required. ▪ Ensure that periodic Ambient air quality is monitoring to assess the concentration of Carbon Monoxide (CO), Carbon Dioxide (CO2), Nitrogen Dioxide (NO2), Sulphur Dioxide (SO2) and Particulate Matter / (PM10) in the atmosphere, ▪ Contractor's obligations to provide gas as clean source of energy at contractor's camp and not allow them to use wood as fuel. ▪ Ensure that all the combustible non-hazardous waste material should be burnt in the burn pit only. ▪ Ensure that the quantity of waste burnt at one time is managed so as to minimize smoke emission ▪ Control fuel consumption and minimize its waste or leakage by regular monitoring	Quarterly Air Quality Monitoring lab results; Compliance Compliance contractual obligations System in place Maintain record Maintain record		
8.	**Noise Pollution from Construction Activities**	▪ Noise will be controlled by monitoring at a distance of 100m from the boundary wall of any residential unit and while following the NEQS of 45 dB (A). ▪ It is recommended that construction should be minimized during nighttime. ▪ Construction Machinery that produces less noise and vibration should be used in sensitive areas.	Noise Monitoring records Compliance Compliance, site inspections Arrangements in place	Contractor	CSC/NHA

Sr. No.	Potential Impact/Project Activity	Mitigation Option/Action	Performance Monitoring Indicators	Responsibility	
				Implementation	Supervision
		▪ The contractor should make arrangements to minimize the vibration, and noise pollution through good engineering practices. ▪ Before the commencement of the work in sensitive/highly populated areas, the HSE team shall conducts a survey. Earth retaining walls should be constructed to minimize the vibrations in highly populated & sensitive area. ▪ The noise level from construction activity can be reduced by regular maintenance of machinery. Noise can be controlled through engineering control e.g. hammering actions can be substituted by hydraulic. ▪ Ensure that the workers are wearing necessary personal protection equipment (PPE) such as earplugs, earmuffs, etc. where engineering control is not applicable to reduce the impact of noise. Equipment emitting excessive noise in comparison with other similar equipment will not be allowed to operate. ▪ Equipment under use will be regularly maintained, tuned, and provided with mufflers to minimize noise levels. ▪ Prohibit blowing horns on all access roads except under emergency conditions. ▪ Use muffled breakers and silenced diesel generators and compressors to reduce construction noise.	Photographs; record System in place Compliance; availability of PPE. System in place; record; site inspections Compliance Compliance; site inspections		
9.	**Water Resources**	▪ Construction camps will be established in areas with adequate natural drainage channels in order to facilitate the flow of the treated effluents after ensuring that NEQS	Compliance		

Sr. No.	Potential Impact/Project Activity	Mitigation Option/Action	Performance Monitoring Indicators	Responsibility	
				Implementation	Supervision
		are met; ▪ The surface and groundwater reserves will be adequately protected by installing screens and barriers to protect the source of contamination such as construction and oily waste that will degrade its potable quality; ▪ The Contractor will ensure that the construction work is confined within the RoW and water bodies are prevented from pollution during construction; ▪ The solid waste will be disposed of in designated landfill sites to sustain the water quality for domestic requirements; ▪ Regular water quality monitoring according to determined sampling schedule; ▪ The contractor will ensure that construction debris do not find their way into the drainage or streams which may get clogged; ▪ Prohibit washing of machinery and vehicles in surface waters, provide sealed washing basins and collect wastewater in sedimentation/retention pond; ▪ Construction work close to the streams or other water bodies will be avoided, especially during monsoon period; ▪ Wastes will be collected, stored and taken to approve disposal site	Compliance; Site inspections; Site Photographic record Compliance; Site inspections. Compliance; Site inspections; photographs Compliance; Water Quality analysis results Compliance; photographs System in place; site inspections compliance compliance; site inspections; waste disposal place in place and operational		

Sr. No.	Potential Impact/Project Activity	Mitigation Option/Action	Performance Monitoring Indicators	Responsibility	
				Implementation	Supervision
10.	**Biological Resources**	▪ When aligning the access tracks ensure that the chosen route requires minimum vegetation loss and no tree cutting. Every tree cut on site for the execution of work will be replaced with the plantation of a minimum of five new trees	Compliance Site inspection	Contractor	CSC/NHA
		▪ Contractor will ensure that no fire arms are carried out by any of the employees or laborer, except designated security staff if required	Compliance Site inspection		
		▪ Ensure that no-hunting, trapping and/ or harassing wildlife takes place at site. The wildlife protection laws should be strictly implemented	Compliance with wildlife protection rules & regulation		
		▪ Ensure that the camping sites should be located away from the wildlife hot spots, but at project area there is no such area.	Compliance with Drawing		
		▪ Ensure that the general awareness of the crew is enhanced regarding the wildlife, through environmental training and notice boards provided by the contractor	Compliance with Environmental and Wildlife Protection laws		
		▪ Contractor will provide clean source of energy at laborer camp and ensure wood and shrubs are not used as fuel during construction phase	Compliance with EIA/EMP		
		▪ Ensure camp waste/food waste is disposed of in such a way that animals are not attracted	Compliance with Solid Waste Plan		
		▪ Contractor will monitor the noise level near the noise producing activities and use silencer or	Compliance with EIA/EMP		

Sr. No.	Potential Impact/Project Activity	Mitigation Option/Action	Performance Monitoring Indicators	Responsibility	
				Implementation	Supervision
		cordon off the work area with the noise absorbing panels to make sure the noise level within the is acceptable. ▪ Ensure that safe driving practices is observed so that accidental killing of human being and animals crossing the road could be avoided. ▪ Contractor will establish green belts at Proposed interchanges in consultation with RE, NHA and KP Forest department	Compliance with EIA/EMP Site inspections. Photographs		
11	**Traffic Management**	Contractor will prepare and implement detailed traffic management plan in true letter and spirit. As part of this plan, Contractor will implement following measures ▪ Submit temporary haul and access routes plan one month prior to start of works. ▪ Formulate and implement of an alternate route plan for heavy vehicles. ▪ Initiate public awareness campaigns through radio and newspaper ads to educate public and sensitize them to cooperate with project staff and to make them aware of potential risks of accidents and necessary precautions. ▪ Install traffic warning signs, and enforce traffic regulations during transportation of materials and equipment and machinery.	**Traffic Management plan in place and operational** Temporary haul and access routes plan plan of alternate routes for heavy vehicles in place and operational Campaign evidence; ads record Photographic record; site inspections;	Contractor	CSC/NHA

Sr. No.	Potential Impact/Project Activity	Mitigation Option/Action	Performance Monitoring Indicators	Responsibility	
				Implementation	Supervision
		▪ Employ flag persons to control traffic at work sites for safety reasons when construction equipment is entering or leaving work areas.	Employment record; site inspections		
		▪ Create lanes through work site using rope or flagging to minimize risks and injuries from falling objects.			
		▪ lift and place pre-cast sections at night to minimize traffic congestion.	System in place; site inspections		
		▪ Provide road signs indicating lane is closed 500 meters before work site.	Compliance		
		▪ Use traffic cones to direct traffic to move to open lane.			
		▪ Provide sufficient lighting at night within and in vicinity of construction sites.	Site inspections; Photographic record		
		▪ Monitor regularly traffic conditions along access roads to ensure that project vehicles are not causing congestion.	Compliance		
		▪ Define and observe schedules for different types of construction traffic trips.	Compliance; Arrangements in place		
		▪ Install temporary accesses to properties affected by disruption to their permanent accesses. Reinstate good quality permanent accesses following completion of construction.	Compliance; site inspections Compliance; Record check		
		▪ Reinstate good quality permanent accesses following completion of construction.	Site inspections; Photographic record		

Sr. No.	Potential Impact/Project Activity	Mitigation Option/Action	Performance Monitoring Indicators	Responsibility	
				Implementation	Supervision
1.	**Health & Safety of Workers at Active Construction and Camp Site**	▪ Health, Safety and Environment (HSE) plan will be developed and implemented by the contractor. ▪ The contractor will ensure that medical dispensary having, first aid equipment has been established at his camps. Contractor will have to specified work staff and basic medical service and supplies to workers. Ssuitable ambulance service to be available at the camps all time. ▪ A proper screening of laborer should be done at the time of recruitment. Ensure that periodic awareness campaigns for HIV/AIDS are undertaken for the project staff. ▪ Contractor will provide potable water and also shadow area to the workers at work place area for short breaks. ▪ The Contractor will depute guards at all entry points into construction sites 24 hours a day. ▪ The Contractor will provide PPEs to all workers working at site for their safety. ▪ Contractor will ensure no machinery is left unattended in the project area. ▪ The medical staff ensure periodical checks of the cooking staff and cooking practice particularly for symptoms of hepatitis A.	Plan in place and Operational Fully equipped dispensary established; System and staff in place; community complaints Availability of record; evidence of training Provided to staff. System in place. Compliance. HSE plan in place; availability Of PPE. Compliance. Medical Record Compliance. Compliance System and staff	Contractor	CSC/NHA

Sr. No.	Potential Impact/Project Activity	Mitigation Option/Action	Performance Monitoring Indicators	Responsibility	
				Implementation	Supervision
		▪ Contractor will ensure that use of horns is prohibited, except when necessary ▪ Timely public notification on planned construction works. ▪ Trained first aiders and medical staff to be available at project site. ▪ Use of safety signs at the construction site at suitable places	in place; Compliance: Site inspections; photographs		
2.	**Community Safety**	▪ Impose a speed limit of 20 km/h on unpaved roads and link roads for reducing traffic accident risks and dust generation. ▪ Place Traffic warning signs at community roads used for the movement of project vehicles. ▪ Fence the camping sites and work sites before the commencement of any construction activities. ▪ Control the site for not allowing unauthorized people and children to enter the site under any circumstances. ▪ Enforce the speed limit to minimize dust emissions due to vehicular traffic and sprinkle water on unpaved surfaces where necessary. ▪ Ensure all vehicles undergo regular maintenance and will be tuned in accordance with the requirements of the NEQS. ▪ Train laborers regarding Pukhtunwali code of honor and cultural norms in order to avoid any social conflict with the local population.	Compliance evidence of training provided To drivers. Site inspections Compliance Arrangements in place; Site inspection; Implementation of GBV Code of Conduct and GBV Awareness raising both for community and project personnel/Labor. Traffic Management plan in place and operational compliance; photographs Record	Contractor	CSC/NHA

Sr. No.	Potential Impact/Project Activity	Mitigation Option/Action	Performance Monitoring Indicators	Responsibility	
				Implementation	Supervision
		▪ Train workers regarding SEA/SH/GBV and make it mandatory for all workers.	Evidence of Training		
3.	**Physical, Cultural and Historical Sites**	▪ Inform relevant authorities if any archaeological site or artifact are found, in consultation with Supervision Consultant / NHA, ▪ Apply chance find procedures for cultural or historical sites.	Compliance; photographs of any archaeological or religious sites found during Construction. Chance Find procedure in place	Contractor	CSC/NHA
4.	Nuisance/ Disturbance to Social Sensitive Areas	▪ Schedule to transport material to the site considering school timings; ▪ Notify concerned schools, hospitals/dispensary etc. 2 weeks prior to the work; ▪ Conduct a 30 minutes' awareness program on nature of work, likely disturbances and risks and construction work, mitigation measures in place, entry restrictions and dos and don'ts; and ▪ Implement all measures suggested elsewhere in this report – dust and noise control, public safety, traffic management, strictly at the sites.	Compliance; site inspections Compliance Record check; evidence of awareness program Compliance; site inspections; photographs		
5.	**Influx of Labor**	▪ Establish labor camp(s) away from residential population at least 2 Km, keeping in view the cultural differences and social issues; ▪ Recruit labour according to the provisions outlined in the Labour Influx Management Plan and WB guidance.	Site Inspections; community complaints Employment record	Contractor	CSC/NHA

Sr. No.	Potential Impact/Project Activity	Mitigation Option/Action	Performance Monitoring Indicators	Responsibility	
				Implementation	Supervision
		▪ Prefer local people to work with contractor, and hire maximum labor force from the project area because this will reduce the labor influx; ▪ Orient and make the work force to ensure respect for local norms, customs and *Pakhtunwali*; ▪ Complete construction within the stipulated time to move workers to next location; ▪ Establish an effective GRM to resolve all issues related to the community and ensure close monitoring; ▪ Create awareness among workers on proper sanitation and hygiene practices to endorse proper health and maintain good housekeeping practices at all project sites; ▪ Develop and enforce a strict code of conduct for workers to regulate behaviour in the local communities; ▪ Take all sensible precautions to avert illicit, vicious conduct by or amongst the Contractor's personnel, and to preserve unity and harmony, and protection of people and property on and near the sites; ▪ Prohibit drugs, alcohol, weapons, and ammunition on the worksite among personnel; ▪ Appropriate fencing, security check points, gates and security guards should be provided at the construction sites to ensure the security of all plant, equipment, machinery and materials, as well as to secure	Compliance Compliance Compliance Compliance; record GRM in place and operational Compliance with awareness courses on Good Hygiene practices Compliance; record Compliance Compliance Records and Checks		

Sr. No.	Potential Impact/Project Activity	Mitigation Option/Action	Performance Monitoring Indicators	Responsibility	
				Implementation	Supervision
		the safety of site staff; and ▪ Maintain good relations with local communities and their leaders to help reduce the risk of vandalism and theft.	Community Consultation evidence		
6.	**Communicable Diseases**	▪ Arrange to run an active campaign, in the Labor camp, to make people aware of the cause, mode of transmission and consequences of HIV/AIDS. ▪ Strengthen the existing local health & medical services for the benefit of Labor as well as the surrounding villages. ▪ Ensure cleanliness and hygienic conditions at labor camp by ensuring proper drainage and suitable disposal of solid waste. Inoculation against Cholera will be arranged at intervals recommended by Health Department. ▪ Keep all the camps, offices, material depots, machinery yards and work sites open for the inspection of health and safety measures and related documents.	Compliance with safety awareness courses Record; site inspections Compliance; Photographs; Site inspections Record; site inspections	Contractor	CSC/NHA
7.	**Gender Based Violence/Sexual Exploitation and Abuse/Sexual Harassment (GBV/SEA/SH)**	▪ Raise awareness among the communities of the potential risks of GBV, and establish response services in the communities that can respond to instances of GBV (particularly those connected to Labor influx); ▪ The contractor should make sure that no discrimination is made on the basis of gender while hiring of workers.	Awareness campaign Record Compliance; Community complaints Arrangements in place, site inspections		

Sr. No.	Potential Impact/Project Activity	Mitigation Option/Action	Performance Monitoring Indicators	Responsibility	
				Implementation	Supervision
		▪ Provisions of gender disaggregate bathing, changing, and sanitation facilities; and ▪ Contractor should have clear GBV GRM protocols and assign personnel responsible for managing a GBV GRM to address and resolve issues relating to harassment, intimidation, and exploitation, especially in relation to women.	Awareness campaign Record Compliance Compliance; site inspections Compliance; compliant record		

Table 9.4: Operational Phase MM

Sr. No.	Potential Impact/Project Activity	Mitigation Option/Action	Responsibility	
			Implementation	Supervision
		Operational Stage		
1.	Air Pollution	▪ Proponent with the help of EPA KP shall set up system to monitor air quality along project area in accordance with PEQS, 2016 and WHO/IFC guidelines (whichever is stringent) for a specific period to record the quality of air during the operation phase; ▪ Implement a tree plantation plan to reduce the pollutant propagation to the receptors as an additional advantage of road aesthetics. ▪ Maintain road to ensure good surface condition; ▪ Regular vehicle checks to control/ensure compliance with NEQS; ▪ Speed limits at sensitive locations; and ▪ Enforcement and penalties against traffic rules violators	O&M Contractor	NHA
2.	Noise Pollution	▪ Provision of adequate noise barriers such as hedges and indigenous tree species to reduce the noise.	O&M Contractor	NHA

Sr. No.	Potential Impact/Project Activity	Mitigation Option/Action	Responsibility	
			Implementation	Supervision
		▪ Signs for sensitive zones (health centers / educational institutions etc.) to prohibit the use of pressure horns; and reducing speed limits in sensitive locations ▪ Vegetation, if it is high enough, wide enough, and dense enough that it cannot be seen through, can decrease highway traffic noise. ▪ National Environmental Quality standards WHO (**Attached as Annexure VIII**) will be adopted as performance indicators. ▪ Enforcement and penalties against traffic rules violators.		
3.	Impact on Drainage System	▪ The impact can be controlled/reduced by timely and continuous maintenance/ cleaning ▪ of the drainage system; and ▪ Placement of sign boards instructing not to dispose of solid waste to avoid chocking of ▪ Drain around the bridge and at grade road alignment.	O&M Contractor	NHA
4.	Impact on Flora	▪ The saplings planted in the project area against the trees cut should be properly maintained throughout their initial growth period in terms of water requirement and necessary nutrients. Therefore, proper care of newly planted trees should be done; ▪ An awareness campaign targeted on the neighborhood farmers will be carried to popularize the planting of trees, and saplings should be provided on subsidized costs; ▪ Organic farming will be encouraged to minimize the use of chemical fertilizers and pesticides; and Raising of dense plantation on both sides of the SLR will not only mitigate the ill effects of construction of SLR on flora, but it will also improve the landscape of the area and enhance its aesthetic beauty.	O&M Contractor	NHA
5.	Impact on Flora	▪ Raising of dense plantation of shady trees along available suitable places along SLR shall provide resting, nestling and roosting habitat to the fauna and especially to the avifauna which is a major positive impact.	O&M Contractor	NHA

Sr. No.	Potential Impact/Project Activity	Mitigation Option/Action	Responsibility	
			Implementation	Supervision
		▪ Mitigation measure will include provision of animal/livestock crossing under road crossings after every 2 to 3 kilo meter to facilitate their movement ▪ Movements of wildlife to water points should not be hurdled from operational activities. ▪ Illegal hunting or pouching of animals should be monitored and heavy fines to be imposed if hunting or killing done by operational staff.		
6.	Pedestrian and Community Safety	▪ Provide center line road marking edge delineation where possible. ▪ Provide clearly marked signing at townships, sensitive areas such as schools, mosques and health centers. ▪ Enforce speed limits and other traffic rules, especially near schools, hospitals, mosques and built-up sections ▪ **Ensure safety of road users during repairing of carriageway and hydraulic structures by placing standard sign boards and barricading of the repairing site.**	O&M Contractor	NHA
7.	Cumulative Impact	▪ Reduction in travel time and better mode and frequency of transport and Enhanced tourism activities in the area and state which in many terms will boost the local economy ▪ Promotion of trade between Pak- Afghan. Access to quality health care facilities, educational and other infrastructural facilities ▪ Access to quality health care facilities, educational and other infrastructural facilities ▪ Better investment climate for industries creating more employment opportunities to local people.	O&M Contractor	NHA

9.4 REPORTING MECHANISM

The contractor of the project will prepare and submit the environmental compliance reports to the CSC. The CSC will take it further, signed and approved by RE, CRE and submit the Due Diligence reports to PMU and PIU of NHA on monthly, quarterly and semi-annually. The PMU/PIU of NHA will further submit the reports to WB after critically reviewed and rectified for further proceedings and requirements as provided in **Table 9.5**.

Table 9.5: Reporting Frequency

Sr. No.	Type of Reports	Frequency	Submission: By	Submission: To
1	Environmental Monitoring Report	Quarterly	PMU-NHA	WB
2	Environmental Progress	Monthly	CSC	NHA
3	Environmental Checklists	Weekly	CC	CSC

9.5 NON-COMPLIANCE OF ESMP

The implementation of the ESMP involves inputs from various functionaries as discussed earlier. The contractor will be primarily responsible for ensuring implementation of mitigation measures proposed in the ESMP, which will be part of the contract documents.

The provision of environmental mitigation costs as reflected in the ESMP will be made a separate head in the Bill of Quantities (BOQs) for ensuring compliance of ESMP implementation. However, if the contractor fails to comply with the implementation of ESMP and submission of the monthly compliance reports, NHA will enforce compliance of contractor with the terms of the contract, including adherence to the ESMP and WB operational policies.

9.6 ENVIRONMENTAL MONITORING PLAN

Monitoring of environmental components and mitigation measures during construction and operation stages is a key component of ESMP to safeguard the protection of environment. The objectives of monitoring are to monitor changes in the environment during various stages of the project life cycle with respect to baseline conditions and manage environmental issues arising from construction works through closely monitoring the environmental compliances as per WB Safeguard Policies and national requirements. A monitoring mechanism is developed for each identified impact under **Table 9-6** below. It includes but not limited to the following components:

- Location of the monitoring (near the project activity, sensitive receptors or within the project influence area)
- Means of monitoring, for example, parameters and methods of monitoring (visual inspection, field measurements or sampling and analysis)
- Frequency of monitoring (daily, weekly, monthly, annually or during implementation of a particular activity)
- The monitoring program will also include regular monitoring of construction activities for their compliance with the environmental requirements in accordance with the ESMP.

The purpose of such monitoring is to assess the performance of undertaken mitigation measures and to immediately formulate additional mitigation measures and modify the existing ones aimed at meeting the environmental compliance as appropriate during construction. The environmental parameters that may be qualitatively and quantitatively

measured and compared are selected as performance indicators and recommended for monitoring during project implementation and operation stages.

These monitoring indicators will be continuously monitored to ensure compliance with the ESMP and comparison with the baseline conditions established during the design stage. The list of indicators and their applicable standards to ensure compliance are given below:

- Ambient air quality of project area (NEQs, WHO and other WB standards)
- Noise Levels (NEQs, WHO and other WB standards)
- Surface water quality (NEQs, WHO and other WB standards)
- Groundwater quality (NEQs, WHO and other WB standards)

Environmental monitoring during construction is a function of supervision, and ensure adherence to the ESMP. The monitoring is a day-to-day process, which ensures that departures from ESMP are avoided or quickly rectified. During preconstruction period, the monitoring activities will focus on checking the contractor's bidding documents. This will include that all necessary environmental requirements have been included or not.

Post monitoring evaluation will be carried out to evaluate the impacts of the project for certain time. Recommended air, noise and water quality monitoring, greening and landscaping and community feedback are also included in the monitoring plan.

The Environmental action and monitoring plan provide framework for the implementation of mitigating measures and monitoring during construction and operation phases. **Table 9-6** and Table 7-7 illustrate the action to be taken during construction and operational phases of the project. A sample format of monitoring checklist for construction phase activities is placed under **Table 9-6-A** that guides the CC regarding monitoring mechanism. However, this checklist shall be modified and updated accordingly in SSEMP/CESAP by the CC for implementation and submission to CSC on weekly basis.

Table 9.6: Monitoring Plan for Construction Stage

Sr. No.	Monitoring Parameters	Location	Means of Monitoring/ Indicators	Frequency	Applicable Standards	Responsibility	
						Implementation	Supervision
1.	Vegetation clearance	Along 100m RoW	Visual inspection of loss of vegetation, soil erosion & instability, surface water pollution and occupational health of workers and community	Weekly	-	Contractor/CSC	CSC/NHA
2.	Top Soil	Along 100m RoW	Visual inspection of top soil of 20 cm to 30 cm depth should be excavated and stored properly	Beginning of earth works	-	Contractor/CSC	CSC/NHA
3.	Erosion	Side slopes of the embankments and material storage sites	Visual inspection of occurrence of erosion and erosion prevention measures	At the end of filling activity	-	Contractor/CSC	CSC/NHA
4.	Operation of burrow and quarry site	Quarry sites	Visual inspections of quarry sites/ burrow areas for change in landscape and creation of water ponds.	Monthly	-	Contractor/CSC	CSC/NHA
5.	Excavation of earth	Along 100 m RoW	Visual inspection for soil erosion & stability	Weekly	-	Contractor/CSC	CSC/NHA

Sr. No.	Monitoring Parameters	Location	Means of Monitoring/ Indicators	Frequency	Applicable Standards	Responsibility	
						Implementation	Supervision
6.	Material supply	Material supply sites	Inspection of possession of official approval or valid operating license of suppliers' materials (asphalt, cement, quarry and burrow material)	Before the agreement for supply of material	-	Contractor/CSC	CSC/NHA
7.	Storage and handling of materials	Material storage yard/work area and construction camps	Visual inspection of storage facilities	Monthly	-	Contractor/CSC	CSC/NHA
8.	Local roads	Connecting/parallel roads	Visual inspection to ensure local roads are not damaged	Monthly	-	Contractor/CSC	CSC/NHA
9.	Traffic safety	construction site of interchanges	Visual inspection to see whether proper traffic signs are placed and safety barriers for traffic management are occupied, barriers and appropriate signage around all construction areas and excavations	Monthly	-	Contractor/CSC	CSC/NHA
10.	Air Quality	Active site and near the sensitive sites and settlements,	Air quality monitoring mobile lab(Certified laboratory from	Quarterly		Contractor/CSC	CSC/NHA

Sr. No.	Monitoring Parameters	Location	Means of Monitoring/ Indicators	Frequency	Applicable Standards	Responsibility	
						Implementation	Supervision
		asphalt plant downwind and upwind	relevant agency)				
		Material storage & active sites	Visual inspection to ensure water sprinkling is being implemented	Daily		Contractor/CSC	CSC/NHA
		Asphalt plant	Visual inspection to ensure asphalt plant is located greater than 500 m from residential areas	Monthly		Contractor/CSC	CSC/NHA
11.	Noise Levels	Campsite, active construction site, adjacent communities at 100m distance	Noise meters	Monthly	NEQs & WHO standards **(Annexure IX)**	Contractor/CSC	CSC/NHA
12.	Ambient Air Quality	Campsite, active construction site, adjacent communities at 100m distance	Visual inspection of conditions of equipment in use	Monthly	NEQs & WHO standards	Contractor/CSC	CSC/NHA
13.	Surface Water Quality	Water body (if any) within 100m of RoW	Sampling and analysis of surface water quality (Certified laboratory from relevant agency)	Quarterly	NEQs & WHO standards	Contractor/CSC	CSC/NHA
14.	Groundwater Quality	Campsite, active construction site,	Sampling and analysis of	Monthly	NEQs & WHO	Contractor/CSC	SC/NHA

Sr. No.	Monitoring Parameters	Location	Means of Monitoring/ Indicators	Frequency	Applicable Standards	Responsibility	
						Implementation	Supervision
		adjacent communities at 100m distance	groundwater quality (Certified laboratory from relevant agency)		standards		
15.	Drinking Water and Sanitation	Campsite, active construction site, adjacent communities at 100m distance	Visual inspection of safe water and sanitation facilities for the construction workers on the site (Sampling and analysis of groundwater quality - Certified laboratory from relevant agency)	Quarterly	NEQs & WHO standards	Contractor/CSC	CSC/NHA
16.	Solid waste	Campsite, active construction site, adjacent communities at 100m distance	Visual inspection that solid waste is disposed at designated site	Weekly	-	Contractor/CSC	CSC/NHA
17.	Floral and Faunal Monitoring	Along 100m RoW	Visual inspection	Daily	-	Contractor/CSC	CSC/NHA
18.	Cultural and archaeological sites	Along 100m RoW	Visual inspection	Daily	-	Contractor/CSC	CSC/NHA
19.	Visual check for exhaust emissions	Campsite, active construction site, adjacent communities at	Visual inspection	Daily	-		

Sr. No.	Monitoring Parameters	Location	Means of Monitoring/ Indicators	Frequency	Applicable Standards	Responsibility	
						Implementation	Supervision
	from equipment and vehicles	100m distance					
20.	Grievances of the local communities	Campsite, active construction site, adjacent communities at 100m distance	Verification and tracking of grievances registered in the Compliant Registers Feedback from aggrieved persons.	Daily	-	Contractor/CSC	CSC/NHA
21.	Reinstatement of work site	Along the proposed road alignment	Visual Inspection	After completion of all works	-	Contractor/CSC	CSC/NHA
22.	Safety of Worker	At work sites	Inspection of usage of Personal Protective Equipment (PPEs)	Daily		Contractor/CSC	CSC/NHA
		Camp office	Accident/incident reporting record	Monthly		Contractor/CSC	CSC/NHA
23.	Female-Fit Work wear and Women's PPE	Contractor HR office	Site inspections	Monthly		Contractor/CSC	CSC/NHA
24.	Gender-segregated restrooms, changing facilities,	Contractor HR office	Site inspections	Monthly		Contractor/CSC	CSC/NHA

Sr. No.	Monitoring Parameters	Location	Means of Monitoring/ Indicators	Frequency	Applicable Standards	Responsibility	
						Implementation	Supervision
	and washrooms.						
25.	Harassment and Discriminati on	Work sites	Female worker concerns; record check;	Monthly		Contractor/CSC	CSC/NHA
26.	Inclusion of gender-sen-sitive train-ing modules in the pro-ject's train-ing pro-grams.	Work sites and Camp	Training record; photographs	Monthly		Contractor/CSC	CSC/NHA

Table 9-6-A: Sample Checklist for Monitoring

Monthly Environmental Management Checklist-(Construction Phase)					
Sr. No.	**Factor Group/Parame-ters**		**Factor**	**Yes**	**No**
1	**Vegetation clearance**	1.1	Is a copy of the SSEMP on site with contractor?		
		1.2	Is loss of vegetation and soil erosion observed?		
		1.3	Does the contractor have the Horticulturist/Forester?		
		1.4	Does the contractor have the Plantation Plan?		
		1.5	Does contractor do plantation as per the plan?		
		1.6	Is the contractor enforcing the child labor prohibition in vegetation clearance?		
		1.7	Is the contractor encouraging local hiring for plantation		
2	**Top Soil**	2.1	Are borrow areas located on higher ground, away from potential flooding?		
		2.2	Is the topsoil being stockpiled so that it cannot wash away with rain or blow away?		
		2.3	Is post-ditching landscaping undertaken by contractor?		
3	**Erosion**	3.1	Does soil erosion occur on site?		
		3.2	Is contractor following the mitigation measure to control soil erosion?		
4	**Operations of burrow & quarry sites**	4.1	Are borrow areas located on higher ground, away from potential flooding?		
		4.2	Is borrow material suitable for construction?		
		4.3	All quarry materials are being taken from existing licensed/permitted facilities?		
		4.4	Is borrow area require private land?		
5	**Excavation of earth**	5.1	Is excavation occurring on site?		
		5.2	Where does the excavated material dispose of?		
		6.1	Does contractor have enough means of transportation for material supply?		
		7.1	Has contractor conduction community consultation as needed?		
		7.2	Signage in place describing the work?		
		7.3	Safety signs in place and at several locations?		
8	**Local roads**	8.1	Is the dust management record in place with contractor?		
		8.2	Is the dust suppression (sprinkling) carried out daily and adequately?		
		9.1	Is construction camp(s) at least 100m from settlements & residential areas?		
10	**Noise & vibra-tion**	10.1	Any complaint filed against noise & vibration by the locals of the area?		
		10.2	Does contractor implement noise mitigation measures s like working in daytime or near sensitive features?		
11		11.1	Has there been any complaint by the residents of the area regarding air quality damage? Does the contractor implement mitigation measures proposed in the SSEMP?		

Monthly Environmental Management Checklist-(Construction Phase)					
Sr. No.	**Factor Group/Parame-ters**		**Factor**	**Yes**	**No**
		12.1	Is there any water body closer to the construction site? If yes, any contamination observed? Water quality tests performed?		
13	**Ground water quality**	13.1	Any contamination observed due to spillage or something else? Water quality tests performed? If yes, are the results found under the standard limits of NEQs & WHO?		
		13.2	Any ground water body located nearby the ROW?		
14	**Solid waste**	14.1	Does the contractor dispose of the solid waste in a designated site of local gov-ernment/TMA? Record maintenance of solid waste?		
		14.2	Does the contractor provide waste bins on camp site and active construction site?		
15	**Drinking water & sanitation**	15.1	What is the source of drinking water at camp site and construction site for the workers?		
		15.2	Is the water tested? Is there any sanitation system installed for the camp site?		
16	**Flora & fauna**	16.1	How far is the habitat of flora & fauna from construction & camp site?		
		16.2	Are workers instructed to avoid hunting & cutting of plants/trees?		
17	**Exhaust emis-sions**	17.1	Exhaust emissions monitored? What are the sources of exhaust emissions at site		
		17.2	Mitigation measures followed as proposed in the SSEMP?		

Table 9.7: Monitoring Plan for Operational Stage

Sr. No.	Monitoring Parameters	Locations	Means of Monitoring	Frequency	Applicable Standards	Responsibility	
						Implementation	Supervision
1.	Surface water quality	At all locations of sensitive receptors, construction sites like Labor camp, asphalt plant site, crush plant site etc.	Sampling and laboratory analysis (Certified laboratory from relevant agency)	Yearly	NEQs & WHO standards	NHA	External Monitor
2.	Ground water quality	At monitoring locations prior commencement of civil work	Sampling and Laboratory analysis (Certified laboratory from relevant agency)	Yearly	NEQs & WHO standards	NHA	External Monitor
3.	Air Quality	At the baseline monitoring location	Air quality monitoring mobile Lab (Certified laboratory from relevant agency)	Quarterly	NEQs & WHO standards	NHA	External Monitor
4.	Noise Quality	At monitoring locations prior commencement of civil work	Noise meters (Certified laboratory from relevant agency)	Quarterly	NEQs & WHO standards	NHA	External Monitor
5.	**L**andscape	Along project alignment	Visual inspection of long-term degradation of natural landscape at land strips and slopes adjacent to road. Development of landslides, rock falls and other natural hazardous process change of drainage patterns, erosion and degradation of vegetation.	Quarterly	NEQs & WHO standards	NHA	External Monitor

9.7 ENVIRONMENTAL AND SOCIAL MANAGEMENT BUDGET

An Environmental and Social Management budget of **Rs. 139.97 million** has been estimated for implementation of the ESMP for 33 months. This budget also includes cost of environmental monitoring and associated trainings, plantation and its maintenance, equipment used to be used and health and safety cost, and will be included in the bid documents for contractor hiring, so that all E&S mitigation costs mentioned in ESMP are part of bid requirement. A summary of environmental management budget is given below in **Table 9-10** below:

9.7.1 Environmental Monitoring Cost

To respond to the anticipated environmental concerns at an early stage and to determine the intensity of the impact, prediction is required. Specific monitoring schedule is tabulated below in **Table 9-8**. The objectives of the environmental monitoring are listed below:

- To respond to the likely and unforeseen environmental and social impacts when the project is under implementation phase
- To assess the usefulness of mitigation measures and if the mitigation fail corrective action can be taken.

Table 9.8: Environmental Monitoring Cost

Components	Parameters	No. of Samples x Frequency x Year)	Frequency	Responsibility	Duration	Unit Cost (Rs.)	Cost (Rs.)
Construction Phase (2.75 years)							
Ambient Air quality	NO2, SO2, CO, CO2, PM10, PM2.5, TPM	5x4x2.75 = 55	Quarterly	Contractor	24 hours	40,000x55	2,200,000.00
Surface water quality	Priority parameters	2x4x2.75 = 30	Quarterly	Contractor	-	30,000x30	900,000.00
Ground water quality	Priority parameters	4x4x2.75 = 44	Quarterly	Contractor	-	30,000x44	1,320,000.00
Noise level	Day and Nighttime	10x4x2.75 = 110	Quarterly	Contractor	24 hours	5,000x110	550,000.00
Total Cost							**4,970,000.00**
Operation Phase (1 year)							
Air quality	NO2, SO2, CO, CO2, PM10, PM2.5, TPM	5x2x1 = 10	Bi-annually	NHA	24 hours	40,000X10	400,000.00
Surface water quality	Priority parameters	2x1x1 = 2	Annually	NHA	-	30,000X2	60,000.00
Ground water quality	Priority parameters	4x1x1= 4	Annually	NHA	-	30,000X4	120,000.00
Noise level	Day and Nighttime	10x2x1 = 20	Bi-annually	NHA	24 hours	5,000X20	100,000.00
						Total Cost	**680,000.00**
						Other costs	**1,000,000.00**
						Grand Total	**6,650,000.00**

9.7.2 Health, Safety and Environment Cost

The need of Health Safety and Environment (HSE) intends to provide a framework for safety and security to infrastructure, people and vehicles. It assigns responsibility to organizations and individuals for carrying out specific actions at projected times and places in a normal and emergency that exceeds the capability or routine responsibility of any agency. The Environment, Health & Safety (EHS) strategies provide guidance to prevent any potential sources causing hazard to the resources during all stages of the project.

After Pandemic-2019, health and safety issues has emerged more critically. Because of the high vulnerability, the overall HSE should be ensured as per Occupational Health and Safety Guidelines of International Finance Corporation IFC World Bank Group (OHS WBG). The contractor must ensure the compliance of WB OHS policies and guidelines in following dimensions:

1 Occupational Health and Safety

- General Facility Design and Operation
- Communication and Training
- Physical Hazards
- Chemical Hazards
- Radiological Hazards
- PPEs
- Special Hazard Environments
- Monitoring

2 Community Health and Safety

- Water Quality and Availability
- Structural Safety of Project Infrastructure
- Life and Fire Safety (LFS)
- Traffic Safety
- Transport of Hazardous Materials
- Disease Prevention
- Emergency Preparedness and Response
- Prevention of and response to Sexual Exploitation and Abuse (SEA)and Sexual Harassment (SH)

3 Construction and Decommissioning

- Environment
- Occupational Health and Safety
- Community Health and Safety

Table 9.9: Cost of HSE & Staffing

Items	Quantity	Unit Price (PKR)	Total Price (PKR)
Items of PPEs			
Safety shoes	1,000	3,000	3,000,000/-
Gloves	10,000	500	5,000,000/-
Dust masks	5,000	30	150,000/-
Ear plugs	5,000	40	200,000/-
Safety Helmets	200	2,000	400,000/-
Safety Jackets	500	600	300,000/-
First Aid Box	5	5,000	25,000/-
Dust Bins	60	1,500	90,000/-
Rain Coat	100	2,500	250,000/-
Safety Cones	100	2,000	200,000/-
Safety Sign Boards	50	2,000	100,000/-
Warming Tape	100	600	60,000/-
Gum Boots	100	2,500	250,000/-
Cost of noise barriers	-	-	200,000/-
		Total	**10,225,000**
Human Resource			

Item	Unit	Unit Rate	Input	Total Cost PKR
HSE Engineer	1	80,000/month	33 Months	2,640,000.00
Environmental Engineer	1	80,000/month	33 Months	2,640,000.00
Environmental Specialist	1	200,000/	33 Months	6,600,000.00
Horticulturist/Forester	1	80,000/month	33 Months	2,640,000.00
Doctor	1	200,000/month	33 Months	6,600,000.00
Establishment of Dispen-sary	1	10,000,000		10,000,000.00
Other Resources				
Rent of ambulance	1	100,000/month	33 Months	3,300,000.00
Rent of Vehicle	1	80,000/month	33 Months	2,640,000.00
			Total	**37,060,000.00**
			Grand Total	**47,285,000/-**

9.7.3 Summary of Environmental Management Budget

Table 9.10: Summary of ESIA Budget

Sr. No.	Component	Total Cost	Total Cost (Millions)
1	Environmental Monitoring Cost	6,650,000/-	6.65
2	Plantation (includes plantation and maintenance for 3 years) for Green Belt and along route plantation	78,110,000/-	78.11
3	HSE & staffing	47,285,000/-	47.285
4	Training	2,000,000/-	2.0
5	External Monitor (2.75 years)	5,225,000/-	5.225
6	GRM Budget for Arrangement & Other Expenses	700,000/-	0.7
		Total	**139.97**

9.8 DEVELOPMENT OF ENVIRONMENTAL & SOCIAL MANAGEMENT PLANS

The Contractor will be required to prepare site-specific Environmental Management plans (SSEMP)/ Construction Environmental & Social Action Plan (CESAP), before mobilization and commencement of construction works. The SSEMP/CESAP may include:

9.8.1 Construction Environmental and Social Action Plan

The Contractor will prepare a 'Construction Environmental and Social Action Plan' (CESAP) demonstrating how they will comply with the requirements of Site-Specific Management Plans, ESCPs, and the mitigation measures proposed in the ESMP of this ESIA Report. The CESAP will form the part of the contract documents and will be used as a monitoring tool for compliance. Violation of the compliance requirements will be treated as non-compliance leading to the corrections or otherwise imposing penalty on the Contractor.

9.8.2 Occupational Health and Safety Plan

The Contractor will also prepare an occupational health and safety plan devising the general guidelines for the identified hazards and preventive measures presented in the site-specific actions and ESCPs in this ESIA.

OHS plan will be done (a) when there is a change in the scope of the project, (b) there is a change in construction methodology/technique based on site condition, (c) following significant OHS hazard or a major accident, and (d) at the end of the project (to allow for improvements in subsequent projects).

OHS Plan should contain general guidance for all identified hazards under each work activities and they should be presented in three discrete headings, (a) Contractor's Standards on the identified hazard management, (b) Expected site-specific OHS hazard and risks during construction, and (c) Control and Preventive Measures proposed by the Contractor.

9.8.3 Workers Accommodation Plan

Workers' Accommodation Plan (WAP) for the Project shall be prepared and implemented by the Contractor. The scope and applicability of the WAP is limited to the design and management of the worker accommodations provided during the construction phase of the Project. Contractor will ensure sufficient resources are allocated on an on-going basis to achieve the effective implementation of the worker accommodation plan.

i) Accommodation Planning and Arrangement

Worker accommodation will be located within the Project site and will be provided during the construction phase of the Project. The worker accommodation will encompass areas where it shall not interfere with the construction activities. Alongside the construction planning, the Contractor along with NHA, shall conduct a space assessment of accommodations.

- The average minimum space of usual standards ranges from 10 to 12.5 cubic meters (volume) or 4 to 5.5 square meters (surface) per person will be provided throughout the construction period. A minimum ceiling height of 2.1 meters shall be provided.
- Other specifications including building construction standards and fire safety will be managed according to the Building Code of Pakistan.
- Drinking water complying with the provincial Environmental Quality Standards shall be provided at the worker accommodations.

- The sewage and waste disposal system will be provided in residential facilities following the regulatory requirements. As septic tanks will be constructed for management of sewage from the residential area and grease traps will be constructed to manage sewage from the kitchen/mess.
- Health and hygiene facilities will be provided against cold, heat, damp, biological hazards (disease-carrying animals), noise, vibration, food security, and fire.
- Washing facilities will be provided as required. For sanitation, septic tanks will be constructed on the campsite as per guidelines.
- Employees will be provided with first aid training to cope with emergencies at the camp, in addition to emergency response at the workplace. Basic health care facilities at the Project site and ambulance services will be available.
- If required, the project site during construction may be encompassed by walls to limit the impact on communities and ensure camp security.
- All workers will be provided with an employee identity card and no person will be allowed to enter in the worker accommodations area without identification, or prior approval through security for visitors and other employees.
- Standby generators to be located away from the communities towards the backside of the Project site and away from Worker Accommodation.

ii) Inspection

A standard checklist on the workers' accommodation should be developed by the Contractor on the cleanliness of the rooms, kitchen, toilets, open areas, and disposal sites. The checklist will be used for the daily compliance of the cleanliness condition.

- Project Manager of the Contractor will conduct an ongoing assessment of the accommodation requirement and the residual requirements for upcoming staffing.
- The responsible staff of HSE of the CPC Contractor will prepare monthly inspection report based on the inspection checklists and keep records and submissions along with other submissions to NHA.

9.8.4 Waste Management Plan (SWP)

This section provides the key elements to be included in a waste disposal plan or operating procedure to be developed by the Contractor that will be employed during the construction activities of the Project. The Licensed Contractor will be hired, who will collect waste on regular basis and disposed-off on a designated area declared by TMA. Practicable efforts will be made to minimize the waste generated while the project is in progress. The main types of waste that will be generated are:

- Used oils and chemicals
- Garage Waste
- Sewage
- Camp waste
- Medical waste
- Packing waste
- Excess construction material.

The solid and liquid waste to be generated from the project activities and camps is to be disposed of as per measures discussed above.

9.8.5 Labor Influx Management Plan

To cater these impacts mitigation measure is suggested in the plan (Attached as **Annexure XXI** in Volume-2 of ESIA Report) to avoid disturbance to local community as well as environment.

9.8.6 Security Management Plan (SMP)

- Security Management Plan (SMP) is intended to set out responsibilities and tasks associated with the management of security concerns during the Construction/operation of the Projects. This Plan was developed to:
- Ensure that the Projects comply with applicable environmental, health and safety, and social (EHSS) requirements;
- Ensure that all personnel involved in the Construction/operation of the Projects, including the NHA and any contractors and subcontractors working for or on behalf of the Projects fully understands the Project Owner's policies and expectations on security management; and Implement Applicable Good International Practices to handle security management related issues in an appropriate manner.
- All employees, the NHA/ Contractor are required to comply with applicable E&S requirements and standards that are defined in this section for security management during the construction/operation of the Projects. These requirements will also be incorporated into commercial contracts. In addition, where standards referred to below are inconsistent or contradictory, the approach is to apply the most stringent standard unless otherwise agreed by the NHA.
- Security in charge and Security Contractor in consultation with the local police shall implement a security procedure that identifies and responds to different situations of threats to security in a manner appropriate to the level of threat and with respect for human rights. This shall be based on local information, government concerns, and direct information obtained.
- The detailed Security Management Plan for SLR Project has been prepared and has been annexed as Annex **IV** in the ESIA volume II. The NHA/ Contractor Team shall be responsible for coordinating with Security Contractor in providing all necessary facilities and equipment related to security management during the construction/operation phase to ensure all security issues are managed and responded to in a timely manner.
- To ensure security at the Projects sites, a security station shall be provided at each entrance gate and storage area.
- At each station, a security guard shall be appointed to manage the delegated area 24/7. The emergency contact list shall be posted at each security station in order to ensure that the security guards know how to coordinate with other relevant employees/ departments for emergency response in case security incidents/ accidents happen at the Projects construction/operation site.
- Contractor and Security Manager are encouraged to reach out to authorities (e.g., local police, the forest security personnel, local emergency service), preferably in advance of any issue, to understand potential deployments and, to the extent possible, to promote appropriate and proportional use of force. It involves simply making introductions to the local police station and initiating a discussion about when and how authorities are likely to respond to incidents at the Projects or involving the Projects personnel.
- The Contractor and Security Manager shall closely consult with local authorities in developing security action plans for scenarios that security guards may be faced with. They shall maintain contact and communication through check-ins with public security forces to help the company be confident that police will respond quickly and

professionally if an incident occurs, or that suspects (including community members) are caught trespassing or stealing will be treated fairly in police custody.

9.8.7 Other Management Plans (Volume-2)

Material Transportation Plan (MTP) will be prepared by the Contractor to prevent accidents during transportation by using vehicles to work locations using other means. The plan should address specific details on the site conditions of the plain area and mountainous terrain and the complexity of transporting construction materials. Extreme precautions will be required in terms of safety and security.

Spoil Management Plan (SMP) will be prepared by the Contractor on the management of excess spoils from various excavation activities during the construction period.

Solid Waste Management Plan (SWMP) will be prepared by the Contractor on the management of solid waste during the construction period.

Emergency Preparedness Plan (EPP) will be prepared by the Contractor after assessing potential risks and hazards that could be encountered during construction.

Communication Plan (CP) to deal with the interaction of the community, complaints management, workers recruitment, notice of works, and workers conduct with locals.

Traffic Management Plan (TMP) to deal with the management of project vehicles.

Resources Utilization Plans (RUP) such for Energy and Water

9.9 TRAINING AND SKILL DEVELOPMENT PROGRAMS

Contractor to organize sessions for skill development and training to maintain awareness of relevant environmental and social aspects for staff and workers.

9.9.1 Skill Development for Contractor Employees

It is proposed that skill development by the Contractor be considered in the project. One-week job-specific skill development training will be provided with pay to the landowners and their relatives before their employment. The Contractor will provide training in the following areas:

(a) **Communication Skills:** Communication forms the backbone of almost any construction project. Whether it is to present an idea to the supervisor or foreman, discuss an alternate plan when construction hits a snag, or even just request new supplies, communication is important to make sure the project stays on track. The Contractor will always prefer construction workers who already have this soft skill; therefore, a good communicator will pay off the construction site by this skill.
(b) **Teamwork Skills:** Construction workers have to work in teams. Teamwork skills help get the job done. Much like good communication skills keep everyone on the same page, good teamwork skills allow everyone to work together harmoniously. The job stays on track and will likely be finished sooner if everyone works together.
(c) **Time Management Skills:** Time management skills are incredibly important for construction workers in any number of roles. Construction work has deadlines to meet. Some tasks are time-sensitive (e.g., concrete creeping). Delays are very common on the sites of construction projects. Contractor needs workers who can manage their

time effectively. The Contractor needs workers who know how to prioritize and reorganize their schedules when faced with unexpected delays.

(d) **Technical Skills:** Specific construction skills include manual and mechanical excavation, stone-laying, pouring cement, erecting, and installing specific types of equipment. Contractor, typically appreciate versatile workers who can take on additional tasks as needed. Construction tasks may include:

Table 9.11: Construction Tasks

(i)	Masonry	(vii)	OSHA safety requirements
(ii)	Electrical	(viii)	Reading and interpreting drawings
(iii)	Framing	(ix)	Erecting
(iv)	Concrete	(x)	Crane and Rigging
(v)	Sheet metal work	(xi)	Operation of Construction equipment
(vi)	Environmental codes	(xii)	Use of Power tools

9.9.2 Training on Environment and Social Aspects

Personnel, including Contractor personnel, working for or on behalf of the project will receive training to maintain awareness of relevant environmental and social aspects, impacts, and risks associated with the Project and corresponding controls. The training will also maintain awareness of the environmental benefits of improved personal performance and the potential consequences of departure from specified procedures.

Visitors to the project sites will receive relevant environmental and social awareness training as part of site induction training. Environmental training will help to ensure that the requirements of this ESIA and ESMP are clearly understood and followed by all the project personnel during the construction phase. The Contractor will have primary responsibility for providing training to all construction personnel in line with the Training Plan shown in Table 7-11 below:

Table 9.12: Training Schedule

Sr. No	Target Audience	Trainers	Contents	Schedule
1.	Contractor Supervisors/ Managers	Third Party	Induction training per 'Training Plan'	Before the start of construction activities
2.	Selected management staff from Contractor	Contractor	• Key findings of ESIA • Mitigation measures • ESMP	Before the start of construction activities
3.	All site personnel	Contractor	• Mitigation measures of EMP and ESIA • Camp rules	Before and during construction activities
4.	Construction crew	Contractor	• ESMP • Waste disposal procedures	Before and during construction activities
5.	Drivers	Contractor	• Road safety • Defensive driving • Road access restrictions • Vehicle movement restrictions • Waste disposal	Before and during the construction phase

Sr. No	Target Audience	Trainers	Contents	Schedule
6.	Construction Staff	Contractor	• Waste disposal • Vehicle movement restrictions	Before and during the construction phase
7.	Camp staff	Contractor	• Camp operation • Waste disposal • Natural resource conservation • Housekeeping • Camp Rules	Before and during the construction phase
8.	Construction Staff of Contractors	Contractor	• Introduction to the **Gender Code of Conduct** • Respectful and Inclusive Behavior • Preventing and Addressing Sexual Harassment • Equal Opportunities and Non-Discrimination • Promoting Women's Participation	Before and during the construction phase

9.10 CONSULTATION SCHEDULE FOR CONSTRUCTION PHASE

ESIA (Environmental and Social Impact Assessment) consultation during the construction phase of a road project will serve several important needs and objectives. These include Stakeholder Engagement; information Dissemination; ensure compliance with applicable environmental and social regulations, guidelines, and standards; Conflict Resolution and Grievance Handling; Monitoring and Feedback. Consultation Schedule has been provided in the Table 7-13 below.

Table 9.13: Consultation Schedule during Construction Phase

Sr. No	Consultation Type	Location	Consultation agenda	Responsibility	Duration
1.	Public Information Sessions	Local settlements/Mouza within or along RoW	Conduct public information sessions to provide updates on the project, construction timelines, traffic management plans, and any temporary disruptions that may occur.	Contractor Site Engineer or HSE Officer	Initial stage of the construction
2.	Community Engagement in Khyber Merged District	Mouza falling in RoW of District Khyber	Engage with tribal communities (at regular intervals) that may be affected by the road project to understand their	Supervision Consultant, Environment and Social Experts and NHA	Almost whole construction period, whenever required.

Sr. No	Consultation Type	Location	Consultation agenda	Responsibility	Duration
			concerns regarding traditional land use practices, Gender issues, Labor influx and develop appropriate mitigation strategies.		
3.	Environmental Agencies Consultation	At Construction sites	Engage with KP environmental agency responsible for overseeing environmental compliance during the construction phase. Seek their input, address concerns, and ensure compliance with applicable regulations and permits.	Supervision Consultant Environment Expert & NHA	Almost whole construction period, whenever required
4.	Construction Workforce Consultation	Contraction Camp and Construction site	Engage with the construction workforce and contractors involved in the project to ensure their awareness of environmental and social safeguards, safety measures, and adherence to project-specific requirements.	Supervision Consultant Environment and Social Experts	Almost whole construction period, whenever required
5.	Consultation with women	At Construction Camp (if any female workers) and in the affected community	Engage with the females within the affected community to create awareness about GBV and the social and cultural issues arising from the construction activities and workforce.	Supervision Consultant Gender Expert	Almost whole construction period, whenever required

9.11 JOB HAZARD ANALYSIS

Job hazard analysis (JHA) will be conducted for each construction component focusing on job tasks as a way to identify hazards before they occur. It will focus on the relationship between the worker, the task, the tools, and the work environment. Ideally, after identifying uncontrolled hazards, steps should be taken to eliminate or reduce them to an acceptable risk level. Many workers are injured and killed at the worksite every day. The JHA should be one of the major components of the larger commitment of the Contractor health and safety management

system. The JHA should be conducted on many jobs in the worksite. Priority should be given to the following types of jobs:

- Jobs with the highest injury or illness rates;
- Jobs with the potential to cause severe or disabling injuries or illness, even if there is no history of previous accidents;
- Jobs in which one simple human error could lead to a severe accident or injury;
- Jobs that are new or complex to the construction or have undergone changes in construction processes and procedures;
- Jobs complex enough to require written instructions.

9.12 INCLUSION OF ESMP IN CONTRACT DOCUMENTS

The ESMP of the Project and OHS will be included in the Contractor agreement documents and will be followed. The technical specifications of the agreement documents will clearly state that the contractor will need to comply with the mitigation measures and preventive actions provided in the ESMP and ESCPs; International best practices for HSE; and NEQs.

9.12.1 BOQs in Agreement Documents

The following items will be included in the Bills of Quantities (BOQs) of agreement documents:

- After the award of the contract and before mobilization, the Contractor will prepare and submit two separate plans, CESAP/SSEMP and OHS Plan.
- Provision of Environmental and OHS Staffs for the entire construction period.
- Quarterly noise and ambient air quality monitoring i.e., PM10, NO2, SO2, CO2, CO.
- 15 minutes' continuous noise monitoring at work site during the construction work.
- Payments to Contractor will be linked to environmental, health, and safety performance, measured by completion of the prescribed environmental and social mitigation measures in the CESAP and preventive actions described in the OHS plan.

9.12.2 Contractor`s Certifications

It is recommended that the Contractor procured under the Project be compliant of ISO 9001 Quality Management, ISO 14001 Environmental Management, and OHSAS 18001Occupational Health and Safety Management. These will be done by the client giving preference to the Contractor having ISO and OHSAS certifications during prequalification or technical evaluation.

9.13 CHANGE MANAGEMENT

The Change Management System proposed for the project recognizes three orders of changes in the project design or project area:

First-Order: A first-order change is one that leads to a significant departure from the project described in ESIA and consequently requires a reassessment of its environmental impact. Examples of first-order changes include:

- Shifting of the project area by more than 5 km
- Increasing the total length of Road/RoW by over 10 km
- Using technology that has significantly greater effects
- Increasing the crew size by more than 50%
- Re-routing the ROW through any sensitive wildlife areas.

A new environmental assessment will be conducted and a revised ESIA report submitted to the provincial EPA for a first-order change in the project.

Second-Order: A second-order change is one that entails project activities not significantly different from those described in the ESIA. A second-order change may alter the project's impact, but not its overall magnitude. In case of such changes, the E & R will be required to reassess the impact of the activity on the environment, specify additional mitigation measures, if necessary, and report the changes to the provincial EPA. Examples of such changes include:

- Shifting of the project area by 1 to 5 km
- Increasing the total length of Road/RoW by 5 to 10 km
- Using a different technology that is as disturbing, or less disturbing than that proposed
- Increasing the crew size by more than 10% but less than 50%.

Third-Order: A third-order change or uncertainty is of little consequence to the ESIA findings. In case such a change is made, the only action necessary will be to update the EMP to reflect how the change has been dealt with. Examples of third-order changes are:

- Shifting of the project area by 1 km or less
- Increasing the total length of Road/RoW by less than 5 km
- Changing the layout of the campsites or construction sites.

The examples given above are hypothetical and have been given to illustrate the magnitude of the three types of changes. At this stage, no changes are under consideration. Any change in the project design will be evaluated based on the criteria provided above, and appropriate action will be taken. The record will be maintained in the Change Record Register.

9.14 EQUIPMENT MAINTENANCE DETAILS

Construction: Equipment during the construction phase includes dump trucks, loader trucks, excavators, cranes, front-end loaders, fuel tankers, water bowser, cars, etc. This equipment and other machinery will only be repaired at designated sites at the warehouse.

Operations: Limited vehicular movement by the maintenance team will be required on a need basis.

9.15 CHANCE FINDS PROCEDURES

Chance Finds Procedures (CFP) are defined as cultural heritage objects, commonly related to archaeological or historic sites (e.g., pottery, bones, stone tools) that are unexpectedly encountered during project related activities/clearance. A CFP is a project-specific instruction that outlines the actions to be taken if archaeological objects are accidentally encountered.

The Proponent is advised to commence clearance and preparation activities as early as possible, prior to the start of proposed construction activity. This will ensure that any delays that may result from the accidental disturbance of archaeological assets (and the subsequent implementation of this Procedure) are resolved as efficiently as possible. As set out in detail below, delays would involve time for the archaeologist to investigate a disturbed site and recommend appropriate recommendations (e.g. preservation in situ and Project redesign or archaeological excavation / evaluation and preservation by record) by the consultation of Archaeology Department.

No excavation or disturbance of archaeological sites should occur by persons without the appropriate license by the Archaeology Department. Further to the national legislative

requirements, international guidance on cultural heritage management and mitigation has been considered, specifically IFC/World Bank Group Performance Standard 8 which provides guidance on cultural heritage management best practice. The pertinent requirements of Performance Standard 8 (IFC, 2012), in relation to cultural heritage management, include:

- An objective to protect cultural heritage, as defined by IFC PS8, paragraph 3 (regardless of whether or not it has been legally protected or previously disturbed) from the adverse impacts of project activities and support its preservation;
- Where the risk and identification process (e.g., baseline assessment) determines that there a chance of impacts to cultural heritage, the client will retain competent professionals to assist in the protection of cultural heritage;

The implementation of the CFP aims to ensure that accidental cultural heritage discoveries are managed in a clear and sustainable fashion throughout the lifetime of the project. This procedure is intended for review on an annual basis so the content can be refined to take account of experiences learnt and any significant new phases of activity.

9.16 PERFORMANCE INDICATORS

For evaluating the performance of the environmental and social management and monitoring plan, performance indicators are identified for the efficient and timely implementation of measures/actions proposed in ESMP. The indicators are defined both for the implementation phase and for the operation phase. SC will be responsible for compiling the information on these indicators and report to NHA. To measure the overall environmental performance of the project, a list of performance indicators is given below:

- The number of inspections carried out by SC Consultant per month.
- The number of non-compliances observed by SC Consultant or RE.
- Availability of environmental, social, and OHS specialists in CSC Consultant.
- Availability of environmental, social, and OHS specialists with Contractors.
- Timely reporting of documents (as defined in ESMP and monitoring plan).
- Number of training imparted to stakeholders/other capacity building initiatives.
- Number of consultations held and number of male and female participated
- Number of grievances received.
- Number of grievances resolved.
- Number of PAPs received timely compensation for their affected assets.
  Number of constructions related accidents. The incident report template is provided below.

Accident Report FORM – Worker's Health and Safety

To : Site Supervisor

Accident: _____ **Date & Time:** _____

Location : _____ **Report by :** _____

Contact Information : _____

Consequences		Provide Details (what, where, how many, how much)		
Impact on people :	Injuries :			
	Fatalities :			
Impact on Property :	Building :			
	Equipment: (IT, Tel., etc.)			
	Utilities :			
	Site accessible :			
Surrounding :	Spill, leak :			
	Neighbors :			
Media :	On site :			
	Potential to attract :			
	Spokesperson notified :			
Business Continuity :	Disrupted temporary :			
	Could lead to disruption :			
Incident Level: *(circle the level)*	**1** Contained and Isolated	**2** Potentially Serious :	**3** Very Serious	
Incident witness people notified:				

End of Preliminary Report – Complete following items when accident is resolved	
Cause of Outage and Resolution:	
Chain of Events and Activities :	
Internal and External Contributors:	
Follow-up Activities:	
Strong / Weak Points/Recommendations:	
Costs incurred due to this incident:	
Equipment:	
Travel:	
Manpower:	
Overtime;	
Others:	

10 CONCLUSION & RECOMMENDATIONS

Following are the major conclusion drawn from ESIA study:

1. The proposed project requires ESIA in accordance with the Schedule II of PEPA1997, and other international financing agencies;
2. Under Section 12 (with subsequent amendment) of the PEPA 1997, any project falling under any category specified in Schedule II - Sector Environmentally Sensitive Areas (critical and sensitive areas) requires the proponent to file an ESIA with the federal agency (EPA) or provincial agency (KP-EPA);
3. Impact assessment for construction and operation phases reveals that most of the adverse environmental impacts are associated with the construction phase of the Project. The impacts can be minimized and controlled to a maximum value by adopting mitigation measures as suggested in the ESMP;
4. Sensitive areas including National Parks, Wildlife Sanctuaries, Game Reserves, Reserved Forests and Protected Wetlands are not located near the proposed alignment;
5. The project traverses through the agricultural land and barren land of District Nowshera, Peshawar and Khyber.
6. Some of the concerns shared by women were regarding displacement issues, labour influx issues, female security risks, health issues, particularly respiratory problems, caused by heavy dust during construction, and insufficient legal documentation can lead to various problems, including the fear of property loss and the potential inability to receive compensation.
7. The proposed alignment affects number of residential structures, community structures including mosques, schools, and fertile land producing cash crops and fruits (Residential 199, Commercial structures 408, Community Structures (Mosques) 2, graveyards 02, public (school) 01).
8. Local community has shown various concerns (discussed in Chapter 8) that in any case need to be addressed to the extent possible by the Project.
9. The Project must have a functional and effective GRM set up before start of civil works.
10. The project must employ a proactive communication strategy to ensure PAPs and local population are made aware of project works, benefits, and impacts in a manner that is easy to understand, and in a timely manner.
11. The PAPs with income below the Official Poverty Line (OPL) will be entitled for special assistance (vulnerability allowance) to ensure their living standard is restored if not improved. However, additional verification of vulnerability will be done upon completion of detailed design. Apart from land affected person, 86 PAPs are identified during socio-economic survey.
12. The Project must have a functional and effective GRM set up before start of civil works.
13. ESMP provides a detailed mitigation matrix that covers impacts, measures, roles and responsibility and timings. Monitoring plan for both the phases has also been separately given in the ESMP;
14. The project must employ a proactive communication strategy to ensure PAPs and local population are made aware of project works, benefits, and impacts in a manner that is easy to understand, and in a timely manner.
15. Surface and groundwater are available in and around the project alignment. Nearest potable water source for construction and other use is canals and streams located at a distance of 100 m to 5 km at different locations;
16. The groundwater quality is also good and non-saline.
17. The proposed project has negative impacts on the agricultural land. However, this is a onetime impact, and the people will benefit from the proposed project in the longer run. Project area has varieties of fruits and vegetables, such as peach, plum, mulberry and

rice, wheat, maize. In addition to that, onion, tomato, potato, cabbage, garlic and various other vegetables are the major produce.

18. Reduction in traffic congestion on existing roads like N- 5 and N-55.
19. Reduction in travel time through short access to and from Torkham.
20. Travel time for goods transport will decrease substantially.
21. Direct access to community settlements adjacent to the proposed project.
22. Provision of a standardized road with good quality, reducing vehicle operating costs with direct impact on country's micro economics in general.
23. Presently, construction of link road could be accomplished ensuring minimal possible displacement of local people due to land availability.
24. Promotion of trade between Pakistan and Afghanistan.