



NATIONAL HIGHWAY AUTHORITY, PAKISTAN

**ENVIRONMENTAL
IMPACT ASSESSMENT
(EIA)**

Reconstruction of National Highway N-5 under Pakistan's Resilient Recovery, Rehabilitation and Reconstruction Framework Project – Phase 1A

(March 2026)



VOLUME 1: MAIN REPORT EIA (PHASE-1A)

**SECTION 7: RAWALPINDI TO HASSANABDAL
(Islamabad Capital Territory Section)**



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**RECONSTRUCTION OF NATIONAL HIGHWAY N-5 UNDER PAKISTAN'S
RESILIENT RECOVERY, REHABILITATION AND RECONSTRUCTION
FRAMEWORK PROJECT – PHASE 1A (ICT Section)
Environmental Impact Assessment (EIA)**

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LIST OF ABBREVIATIONS

AIIB	Asian Infrastructure Investment Bank
AOI	Area of Influence
BCP	Building Code of Pakistan
BOD	Biological Oxygen Demand
CDA	Capital Development Authority
CO	Carbon Monoxide
COD	Chemical Oxygen Demand
CoI	Corridor of Impact
COVID-19	Coronavirus disease
CPEC	China Pakistan Economic Corridor
CSC	Construction Supervision Consultant
E&S	Environmental and Social
EALS	Environment, Afforestation and Land Section
EC	Employment of Children Act
ECP	Environmental Code of Practice
EHS	Environmental Health and Safety
EIA	Environmental Impact Assessments
EPA	Environmental Protection Agency
ESF	Environmental and Social Framework
ESHS	Environmental, Social, Health and Safety
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESMPF	Environmental and Social Management Planning Framework
ESP	Environmental and Social Policy
ESS	Environmental and Social Standards
FGDs	Focused Group Discussions
FI	Financial Intermediary
GBV	Gender Based Violence
GHG	Greenhouse Gas
GIS	Geographical Information System
GoP	Government of Pakistan
GRM	grievance redress mechanism
H&S	Health and Safety
HSE	Health Safety & Environment
IA	Implementing Agency
ICT	Islamabad Capital Territory
IEE	Initial Environmental Examination
IFC	International Finance Corporation
ILO	International Labour Organization
KPH	Kilometres Per Hour
LAA	Land Acquisition Act
LC	Least Concern
MSDS	Material Safety Data Sheets

NCS	Pakistan National Conservation Strategy
NEQS	National Environmental Quality Standards
NESPAK	National Engineering Services Pakistan
NGO's	Non-Governmental Organizations
NHA	National Highway Authority
NO	Nitrogen Oxide
NOC	No Objection Certificate
O&M	Operation and Maintenance
OHS	Occupational Health and Safety
Pak-EPA	Pakistan Environmental Protection Agency
PAPs	Project Affected Persons
PGA	Peak Ground Acceleration
PHA	Parks & Horticulture Authority
PIU	Project Implementation Unit
PM	Particulate Matter
PMU	Project Management Unit
PPE	Personnel Protective Equipment
PSHA	Probabilistic Seismic Hazard Assessment
RAP	Resettlement Action Plan
RE	Resident Engineer
ROW	Right Of Way
SC	Supervision Consultant
SEP	Stakeholder Engagement Plan
SO ₂	Sulfur Dioxide
SOP	Standard Operating Procedures
STDs	Sexually-Transmitted Disease
TMP	Traffic Management Plan
UBC	Uniform Building Code
UTC	Coordinated Universal Time
WHO	World Health Organisation

EXECUTIVE SUMMARY

ES1 INTRODUCTION

The Government of Pakistan (GOP), through the National Highway Authority (NHA), is reconstructing 487 km of the N5 Highway in two phases, including 100 km damaged by the 2022 floods. The project aims to expand the existing 4-lane dual carriageway to 6 lanes where necessary and add 7.3-meter-wide service roads in urban areas to improve accessibility.

With financing from the Asian Infrastructure Investment Bank (AIIB) and other partners, NHA has launched the "Reconstruction of National Highway N5 under Pakistan's Resilient Recovery, Rehabilitation, and Reconstruction Framework Project." AIIB's Multi-phase Program (MPP) funds the reconstruction of 209 km. Phase 1A (the Project) involves the reconstruction of 141 km, covering key sections across four regions:

- Section 2: Ranipur to Sukkur (70 km) – Sindh
- Section 7: Rawalpindi to Hassanabdal (40 km) – Punjab and Islamabad Capital Territory (ICT) Section
- Section 8: Nowshera to Peshawar (31 km) – Khyber Pakhtunkhwa

The Project includes geometric enhancements, dual-side service roads in urban areas, and advanced road safety features, such as:

- Flyovers and improved underpasses for smoother traffic flow
- Pedestrian crossings and protected U-turns to enhance safety
- Modern bus bays for improved public transport access

Key benefits of the Project include:

- Reduced congestion and improved pavement conditions, addressing flood damage
- Dedicated lanes for heavy traffic to extend road lifespan
- Protected U-turns and service lanes for efficient local traffic management
- Upgraded road safety standards to at least 3-Star ratings

This modernization aligns with NHA's 20-year strategic plan and AIIB's Project Objectives, ensuring a safer, high-speed, and disaster-resilient highway that strengthens Pakistan's economic growth, connectivity, and climate resilience.

This EIA should be read in conjunction with other E&S documents prepared for the Phase 1A Project and the subsequent Phases, such as the ESMPF, RAP, RAPF, GAP, GAPF, SEP, LMP, etc¹.

ES2 REGULATORY AND POLICY REVIEW

¹ Documents available online at - <https://nha.gov.pk/documents/topic/26544>

National and provincial regulations require the Project Proponent to conduct an environmental and social assessment and obtain approval from the relevant provincial environmental protection agency before implementation.

To secure financing from the Asian Infrastructure Investment Bank (AIIB), the project must comply with AIIB's Environmental and Social Framework (ESF) and applicable Environmental and Social Standards (ESSs), specifically:

- ESS 1: Environmental and Social Assessment and Management
- ESS 2: Land Acquisition and Involuntary Resettlement

As per the Pakistan Environmental Protection Act (Review of IEE and EIA Regulations, 2000, along with AIIB's ESF, the Phase 1A (ICT section) Project is classified as Category A, requiring a comprehensive Environmental Impact Assessment (EIA) before construction can commence.

ES3 DESCRIPTION OF THE PROJECT

The Phase 1A Project focuses on three key sections of N5, covering a total of 141 km: Ranipur to Sukkur (70 km) in Sindh Province, Rawalpindi to Hassanabdal (40 km) which include 22.5km in Punjab Province and 17.5 km the Islamabad Capital Territory (ICT), and Nowshera to Peshawar (31 km) in KP Province. Phase 1A (ICT Section) includes, 03 km service road, 01 flyover, 02 weigh stations, 14 bus bays, mud cleaning and Widening of 02 bridges and 12 culverts, 12 pedestrian bridges, 11 protected U-turns, and 01 toll plaza.

Project Area of Influence

The Project Areas of Influence for both the construction and operation phases of the project. During construction, the physical footprint includes the immediate work area with a 100-meter buffer, while the buffer zone extends up to 500 meters to account for impacts such as noise, dust, and vibration. Access roads used for transporting materials have a 50-meter buffer on each side, and traffic diversions may influence areas up to 2,000 meters away. Environmental impacts, including effects on soil, water, and air quality, are considered within a 500-meter zone.

In the operation phase, the road's influence on traffic flow and economic activity extends up to 5,000 meters, reflecting broader regional impacts. Air quality and noise changes are expected to affect areas within a 500-meter radius, depending on traffic conditions and vehicle types.

Implementation Schedule

The tentative implementation period for proposed Project is Twenty-Four (24) months for Section 7 including ICT section.

ES4 ANALYSIS OF ALTERNATIVES

Without Project Alternative

Phase 1A (ICT section) of the N5 Highway faces severe congestion, slower speeds, longer travel times, and increased pollution due to dense urbanization and unprotected U-turns at key locations across ICT.

The 2022 floods have further deteriorated road conditions, and traffic projections indicate worsening congestion over time. Without intervention, the situation will lead to:

- Longer travel times and increased vehicle queuing
- Higher levels of dust, emissions, and noise pollution
- Greater accident risks due to deteriorating road conditions
- Restricted access to cities, limiting education, healthcare, and emergency response

A "No Project Option" would hinder economic growth, disrupt local and regional development, and reduce the quality of life for communities along the corridor.

Alternatives Considered in Design

The analysis of alternatives has been carried out mainly based on the technical analysis of various alternative options, such as, flyovers/ underpasses, U-turns, road crossings, traffic diversion during construction, pavement type, workforce Options, to meet the desired objective in the most cost-effective and environmentally sound and socially benign manner.

Alternatives evaluated, and the rationale for selecting the preferred options are presented below:

- For major intersections, flyovers were chosen over underpasses or at-grade crossings to improve traffic flow and safety.
- Looped U-turns were selected as a cost-effective and safer option compared to other designs.
- New pedestrian bridges were preferred for road crossings to enhance pedestrian safety and accessibility.
- Traffic diversion during construction will rely on existing parallel roads and staged use of the right-of-way (RoW) to minimize disruptions.
- Asphalt pavement was selected for its cost-effectiveness and smoother driving experience.
- Finally, a workforce composition of 70% local and 30% migrant workers was chosen to balance cost, efficiency, and community integration.

The selected options ensure that the N5 Highway reconstruction meets long-term traffic efficiency, safety, cost-effectiveness, social acceptance, and environmental sustainability goals.

ES5 DESCRIPTION OF THE ENVIRONMENT

Considering the potential impacts of the Phase 1A (ICT section) Project, existing baseline environmental conditions in the Project Area of Influence (Aoi) were assessed for the physical, ecological and socio-economic conditions. Following section provides a summary of the baseline data:

Physical Environment

The data presented in the Phase 1A (ICT section) has been collected from the primary and secondary sources. For primary data acquisition, the Environment and Social team conducted field visits, environmental quality monitoring, socioeconomic and census surveys during the months of October and December 2024 and January and February 2025.

Geology: The geology of the Project area consists of the following:

- Rawalpindi to Hassanabdal region (Including ICT section) is primarily characterized by Mesozoic (Mz) rocks, including sedimentary formations such as limestone and shale, along with Holocene (Q) deposits of recent alluvial soils.

Seismicity: The Phase 1A (ICT section) Project as per Building Code of Pakistan (BCP), 2007 (Seismic Provisions) falls entirely in the zone-2B (Moderate Hazard) category with PGA 0.16 to 0.24g for Section 7 (ICT section).

Climate and Meteorology: The climate and meteorology data are obtained from the published data of Climate Normal of Pakistan (1991 to 2020), for Section 7 (ICT section) reliance is made on Islamabad weather station.

Waste Management: Capital Development Authority (CDA) is responsible to ensure efficient collection, transportation, recovery, treatment and disposal of waste generated in Rawalpindi to Hassanabdal (ICT section).

Landuse: The land use of the Phase 1A (ICT section) Project area mainly includes existing road, residential and commercial areas, masjid, health facilities and educational institutions within the Aoi.

Environmental Quality: Ambient air quality monitoring at the Phase 1A (ICT section) Project Site measured NO₂, NO, SO₂, CO, PM_{2.5}, and PM₁₀ over 24 hours with one-hour intervals. SO₂, PM_{2.5}, and PM₁₀ exceeded stringent emission standards (WHO, NEQS, IFC), likely due to high diesel traffic. Noise monitoring, conducted using Sound Meter found levels exceeding stringent emission standards (WHO, NEQS, IFC) across all highway sections of Phase 1A (ICT section) highway.

Drinking water, surface water, and wastewater samples were analyzed for physical, chemical, and microbiological parameters. Drinking water met standards except for minor odour and taste issues. Surface water complied except for elevated COD in some samples. Wastewater exceeded stringent emission standards (WHO, NEQS, IFC) limits for BOD, COD, and TSS in certain cases.

Ecological Environment

ICT Section of the Phase 1A Project road has a humid subtropical and dry climate with five seasons, lying in the sub-tropical scrub zone. Dominant tree species include *Acacia modesta*, *Olea ferruginea*, *Dodonaea viscosa*, and others, providing fodder for wildlife and livestock. While the district hosts various wildlife species, the project area is degraded and lacks designated habitats. It is estimated that there are approximately 630 trees/saplings within the ROW of NHA which will be cut down in Phase 1A (ICT section).

Requirements of No Objection Certificate from Forest Department

The N5 Highway, tracing the historic Grand Trunk Road, is renowned for its tree-lined avenues that serve ecological and cultural functions. Post-independence, roadside plantations continued, especially along the N5, Pakistan's main transport corridor. While some trees still remain, but many were lost to road expansion. Recent plantings have been led by the NHA, which is now inventorying trees along Phase 1A (ICT section). Any removal of trees shall be compensated by replanting—typically 10 saplings per tree removed. It is important to note that trees located within the NHA-owned ROW are the property of NHA. The felling or uprooting of these trees will be carried out by the contractor engaged under the project, and the felled trees will subsequently be handed over to the concerned Forest Department. The respective Forest Department of CDA will be responsible for conducting the auction of the removed trees, ensuring that NHA is duly involved and consulted throughout the auction process.

ES6 SOCIO-ECONOMIC ENVIRONMENT

Demography: A socio-economic survey of 126 AHs, comprising 756 individuals, found a male-to-female ratio of 51:49 and an average household size of six. The sex ratio was 104 men per 100 women. Regarding family structure, 31% lived in extended/joint families, while 69% were in nuclear households. Age distribution showed 17% were up to 25 years, 48% between 26–35, 21% between 36–45, and 14% over 45, indicating respondents were mature enough to assess the project's impact.

Religion and Language: The vast majority (99.5%) of the subproject area's population follows Islam, with a small Hindu minority (0.5%).

Sindhi is the dominant mother tongue, though Saraiki and Urdu are also spoken. Despite linguistic diversity, Hindko and Pashto is widely understood and used for communication. The affected population includes various social subdivisions, with key castes such as Rajpoot, Syed, Khattar, Dar, Raja, Abbasi

Education and Literacy: The census found that 41% of AHs are illiterate, while 59% are literate—slightly above the 50.14% national literacy rate (Census 2023).

Occupational and Livelihood: The survey found 41% of household members as dependents, including children under 10, housewives, and the unemployed. The remaining members are engaged in various professions, with 19% in shopkeeping - operating general stores, selling food items, or running roadside eateries - while 9% work in private jobs.

Household Income and Expenditure: The survey found that 12% of AHs earn up to PKR 37,000 monthly, 39% earn PKR 37,001–45,000, 21% earn PKR 45,001–55,000, 16% earn PKR 55,001–65,000, and 12% earn above PKR 65,000. With PKR 37,000 as Pakistan's poverty threshold, about 5% of AHs are considered poor.

Housing Condition and Ownership: A majority of the AHs members in the project area (58%) are living in Pacca houses which are constructed with solid building materials while 25% respondents had semi Pacca houses which are made of masonry bricks with mud mortar. Only 15% of the respondents mentioned that they live in Katcha houses made of mud and straws while 2% live in temporary hut houses. Generally, poor households live in Katcha and hut houses while lower income households would live in Semi-Pacca houses. Those who can afford to live in Pacca households are generally not poor. The data shows high-level social disparity among well-off families and poorer households in the project area. The survey revealed that 83% of households have access to schooling and electricity, 51% to healthcare, 31% to gas, 9% to water, 28% to sewerage, and 89% to mobile services.

Access to Infrastructure and Services: The socioeconomic survey revealed that 83% of households have access to schooling and electricity, 51% to healthcare, 31% to gas, 9% to water, 28% to sewerage, and 89% to mobile services. The primary water source depends on location. In the project area, 81% of households rely on hand pumps/bore water, while 9% use public supply. Hand pumps are mainly near irrigation channels, with water collection typically done by women. However, 82% of respondents are dissatisfied with water quality.

Gender Assessment: The gender assessment highlights barriers women face, including limited resources, mobility, education, and employment due to cultural norms. Challenges in KP province include restricted survey participation, underreporting of issues like domestic violence, lack of public transport, job opportunities, safety, healthcare, and workplace discrimination. While the project cannot fully address these issues, efforts will ensure women's equal access to work, vocational training, and grievance redress mechanisms while promoting gender-sensitive transport design. A detailed gender action plan is included in the RAP.

ES7 PUBLIC CONSULTATION

A series of consultations were conducted to get the feedback/concerns of the different stakeholders including government departments, Project Affected Persons (PAPs), local community and other general public residing in the Project Area. Consultation process included Focus Group Discussions, semi-structured interviews, one to one meeting and interviews with the government and private institutions. Basic concerns of the stakeholders were related to land procurement, construction phase impacts including dust, air and noise pollution, health and safety and privacy issues etc. and implementation of mitigation measures.

Consultations were also carried out with the women (gender consultations) at two locations for Section 7 (ICT section). Local females raised concerns and suggestions including privacy issues, health concerns, and limited access to education and employment, for which proposed measures to mitigate these issues are proposed such as establishing a functional Grievance Redressal Mechanism (GRM), providing job opportunities for local females, and incorporating special provisions for women's safety and convenience.

Consultations showed overall support from communities and government agencies, with requests to enhance local benefits through social development services. Key issues, suggestions, and project commitments are summarized in **Table ES-1**.

Table ES-1: Feedback from affected communities

Issue Raised by Participants	Suggestions from Participants	Commitments by Project Proponent
Access problems due to construction	Local people should not be restricted from their settlements and farmland.	Proper access will be provided to the local people to reach surrounding areas easily.
Disturbance to social amenities	Social amenities should be restored after the construction completes to avoid inconvenience.	Social amenities will be restored after construction and before the operation of the road.
Restricted movement, especially for women, due to labor influx	Construction should be scheduled to allow free movement after working hours.	People should be informed about construction schedules to ensure safe movement.
Dust and noise disturbances to residential and commercial areas	Protective measures should be taken to safeguard the local community.	Contractors must follow dust suppression measures as per the recommendation of the ESMP and other precautionary measures to protect public health and property.
Employment opportunities for local workers	Skilled and unskilled labor should be hired from the local community to improve project acceptance.	Contractors will be encouraged to prioritize hiring local workers. The EIA aims for up to 70% local workforce, and ESMP will propose training programs through a skill development program for the local unemployed youths.
Poor drainage system causing water logging	A proper drainage system should be designed alongside the road.	The Design Consultant evaluated the drainage system, identifying bottlenecks based on 2022 flood damages and future projections. To improve climate resilience, cross-drainage structures and mitigation measures were incorporated into the design. Many culverts and bridges were clogged with mud, obstructing flow. The climate change assessment recommended increasing capacity for 10 bridges and 10 culverts, clearing mud from 8 culverts and 7 bridges, and replacing 1 bridge and 8 culverts.
Minimizing disruption during civil works	Construction should be done in small patches and completed quickly to reduce community disturbance.	Contractor's construction schedule will be sustainable in nature to minimize delays and disruptions and allow diversion route to detour traffic.
Traffic congestion due to construction vehicles	A traffic management plan should be prepared, and alternative routes should be provided.	Contractors will be required to prepare and implement a Traffic Management Plan (TMP).
Dust pollution causing health issues	Regular water sprinkling should be done to control dust.	Contractors must follow dust suppression measures as per the recommendation of the ESMP and other precautionary measures to protect public health.

A Stakeholder Engagement Plan has been developed in accordance with the AIIB ESF guidelines and presented in the Phase 1A SEP.

ES8 ENVIRONMENTAL AND SOCIAL IMPACTS AND RISKS AND MITIGATION MEASURES

Significant efforts were made to identify the main environmental issues related to the design, construction and operation of the Phase 1A (ICT section) Project. The impacts and risks of substantial significance and their mitigation measures are presented in **Table ES-2**.

Table ES.2: Impacts and Risks assessment for the Project

ESF Standards, Environmental Impacts and Social Risks	Risk Ratings before Mitigation and Control		Rationale	Mitigation	Risk Ratings after Mitigation and Control	
	Construction Stage	Operation Stage			Construction Stage	Operation Stage
ESS1: Assessment and Management of E&S Risks and Impacts						
Lack of appropriate E&S personnel with Construction Supervision Consultant (CSC), Contractors and the Implementing Agency (IA)	Substantial	Low	Appropriate E&S personnel are essential to implement, supervise, and monitor the ESMP, LMP, and OCHS Plan. Supervision and monitoring during project implementation provide information about key environmental and social aspects of the project and the effectiveness of mitigation measures. Such information enables the IA and the Bank to evaluate the success of mitigation and allows corrective action to be taken when needed. Inadequate resources will lead to major impacts and risk in the physical, biological and social environment and eventual harms to environment and non-compliances with ESMP requirements.	Mitigation measures include compliance of this EIA particularly following guidance for creating different plans and staff requirements with education, experience and training in the ESMP and in the bidding documents.	Low	Low
Inadequate implementation of ESMP, LMP, OCHSMP.	Substantial	Low	Lack of experience of the contractor in implementing environmental, health and safety standards required by the ESF. Lack of resources and qualified Environment, Health, and Safety	• Recruit qualified contractors who maintains environmental sustainability in corporate strategy.	Low	Low

ESF Standards, Environmental Impacts and Social Risks	Risk Ratings before Mitigation and Control		Rationale	Mitigation	Risk Ratings after Mitigation and Control	
	Construction Stage	Operation Stage			Construction Stage	Operation Stage
			(EHS) staffs with various organization will become bottlenecks for the correct implementation, supervision, and monitoring of the ESMP. The ESMP and other plans identify measures and actions in accordance with the mitigation hierarchy and hierarchy of control that reduce potentially adverse environmental impacts and social risks to acceptable levels. Inadequate implementation will result in major concern from the community and risking the health and safety of the workforces and lead to major injuries and illness.	• Avoid contractors with poor environmental, health, and safety management. • Contractor's qualifications stated in the ESMP are included as the pre-qualification criteria in the short-listing process. • Ensure that the conditions of the ESMP is correctly reflected in the contractor's bidding documents and the supervision consultant's TOR. • EHS bills of quantities are included in the specifications. • Education, qualification and training requirements of personnel are included in the bidding documents and considered by the supervision consultant when they give approval to the contractor. • Prepare Contractor's Environmental and Social Management Plan (C-		

ESF Standards, Environmental Impacts and Social Risks	Risk Ratings before Mitigation and Control		Rationale	Mitigation	Risk Ratings after Mitigation and Control	
	Construction Stage	Operation Stage			Construction Stage	Operation Stage
				ESMP), OCHSMP based on the ESMP. • Recruit qualified staffs to implement the C-ESMP, OCHSMP.		
ESS1: Labor and Working Condition						
Occupational Health and Safety (OHS)	substantial	Substantial	- Occupational health and safety risks in Pakistan are heightened due to weak safety practices, poor labor rights enforcement, and inadequate worker accommodations. Key hazards include heavy equipment operation, man/machine interaction, hazardous materials, trip and fall risks, dust, noise, falling objects, and electrical dangers, especially during construction. - While risks decrease in the operational phase, maintenance work near live equipment and energized overhead lines still presents significant hazards.	- Contractors will prepare and implement OHS management plan that would include standard operating procedures (SOPs) for all works, requirement of conducting Job Hazard Analysis and preparing Method Statements containing OHS aspects, traffic interface planning, working at height and hot work permit, barricading, OHS training requirements, incident recording and reporting protocols. - NHA will prepare a similar Plan/System for the operation phase.	Moderate	Moderate
Employment generation	Positive		Approximately 800 jobs are expected to be created during the construction phase (200 skilled and 600 unskilled or low skilled).	• A skill development plan is proposed to train local workers in construction	-	-

ESF Standards, Environmental Impacts and Social Risks	Risk Ratings before Mitigation and Control		Rationale	Mitigation	Risk Ratings after Mitigation and Control	
	Construction Stage	Operation Stage			Construction Stage	Operation Stage
			Most unskilled positions are likely to be sourced from the local districts and communities, thereby sharing project benefits with affected communities. They will be in roles as laborers, security, catering, cleaning, and drivers of vehicles. Employment generation will contribute to household income and will improve households' socioeconomic conditions, providing greater security and reducing people's sensitivity to socioeconomic shocks and impoverishment risks. For the local impoverished people, this can increase their wellbeing and resilience. The employment will also contribute to skills development and professional experience, therefore making the beneficiaries more employable in the future, further reducing vulnerability.	trade, such as, welding, mechanic, operation of heavy equipment and construction machinery, etc.		
Enhancement of economic growth due to improved road connectivity	Moderate		The proposed reconstruction of Phase 1A (ICT section) N5 will reduce congestion, enhance traffic flow, ease movement of road users and goods and thus generate movement of more	• AIIB supports sustainable infrastructure and productive sectors to foster economic growth and improve lives. Aligned with the SDGs, it integrates		

ESF Standards, Environmental Impacts and Social Risks	Risk Ratings before Mitigation and Control		Rationale	Mitigation	Risk Ratings after Mitigation and Control	
	Construction Stage	Operation Stage			Construction Stage	Operation Stage
			cargo by road and correspondingly economic growth.	economic, social, and environmental dimensions of sustainability. The Bank adheres to sustainable development principles in project planning and execution, as outlined in its Environmental and Social Policy.		
ESS1: Resource Efficiency and Pollution Prevention						
Land use change	Substantial	Low	Land will be cleared for the highway expansion, service road, new bus bays, controlled U-turn using median strips and to build access roads for material transportation. Land clearance will occur during the early stage of construction period for a limited amount of time. The sensitivity of the soil at the construction site is considered medium since it is susceptible to erosion. In addition, there will be about 1,500 land required for the construction camp and yard for each section of the road.	Mitigation measures would include proper land clearance planning, spoil management measures, vegetation clearance and erosion management, sediment management, design of storm water drainage in construction areas as well as design and implementation of site erosion control.	Low	Low
Air pollution	Substantial	Moderate	Ambient air quality monitoring found very high concentration of SO ₂ (54.8 µg/m ³ in average in Section 7 against the national	Mitigation measures would include emissions management from construction vehicles,	Moderate	Low

ESF Standards, Environmental Impacts and Social Risks	Risk Ratings before Mitigation and Control		Rationale	Mitigation	Risk Ratings after Mitigation and Control	
	Construction Stage	Operation Stage			Construction Stage	Operation Stage
			standard of 40 $\mu\text{g}/\text{m}^3$), PM10 (127.5 $\mu\text{g}/\text{m}^3$ in average in Section 7 against the national standard of 45 $\mu\text{g}/\text{m}^3$), and PM2.5 (44.5 $\mu\text{g}/\text{m}^3$ in average in Section 7 against the national standard of 15 $\mu\text{g}/\text{m}^3$), exceeding the NAAQS. Airshed in major cities of Pakistan are already degraded as transboundary pollution is a major contributor to fine particulate matter in South Asia, while elevated SO_2 concentrations primarily result from the high prevalence of diesel-fueled vehicles, traffic congestion at intersections, deteriorating pavement conditions, and emissions from coal-fired power plants. Local air quality including dust is expected to deteriorate further due to emissions from construction plants, equipment, and exacerbation by traffic congestion. The impact on air quality is considered significant, driven by activities such as construction plant operations, traffic diversions, site clearance,	frequent sprinkling of water on unpaved roads, regular maintenance of vehicles and construction equipment, and preventing the release of emission from burning waste materials. Dust control measures will consist of regular vehicle and equipment maintenance program, proper construction materials planning, dust management, and frequent water sprinkling. The NHA in collaboration with federal EPA and the Climate Change Division (CCD), may establish a Continuous Emission Monitoring System (CEMS) to assess air quality in the project area. This system will monitor major intersections and sensitive receptors in accordance with the stringent emission standards (WHO, NEQS, IFC) for a specified duration, capturing air quality concentrations during the operational phase.		

ESF Standards, Environmental Impacts and Social Risks	Risk Ratings before Mitigation and Control		Rationale	Mitigation	Risk Ratings after Mitigation and Control	
	Construction Stage	Operation Stage			Construction Stage	Operation Stage
			earthwork, and excavation. These emissions will be concentrated along the highway corridor during the construction phase. Dust generation, particularly in dry conditions, will have substantial effects extending beyond the immediate vicinity. A major source of dust pollution will be the resuspension of particles from unpaved roads due to construction traffic. Given the limited capacity of the local community to adapt, the potential degradation of air quality is a significant concern. During the operation phase, the expanded highway capacity, along with service roads for local traffic, protected U-turns, pedestrian bridges, flyovers, and underpasses, will enhance traffic flow, reducing congestion and lowering overall traffic emissions, thereby contributing to improved air quality.	Additionally, planting greenbelts along the highway is a preferred method to mitigate air pollution.		
Disturbance due to noise and vibration	Moderate	Substantial	Baseline surveys along the Phase 1A highway revealed high noise levels, with average daytime readings of 75 dBA at	Mitigation measures include requiring contractors to add provisions for noise and vibration management,	Low	Moderate

ESF Standards, Environmental Impacts and Social Risks	Risk Ratings before Mitigation and Control		Rationale	Mitigation	Risk Ratings after Mitigation and Control	
	Construction Stage	Operation Stage			Construction Stage	Operation Stage
			Section 7 exceeding the standard of 65 dBA for commercial area. Nighttime levels were also elevated at 64 dBA surpassing the 55 dBA standard. Construction activities may further disturb nearby settlements and businesses due to noise and vibrations from vehicles and equipment on service roads and the highway, as well as from construction camps, potentially disrupting local wildlife. Operational noise impacts are expected to increase due to higher traffic volumes due to uninterrupted flow in the 6-lane main highway and traffic segregation. Preliminary forecasts from the Traffic Noise Model (TNM 3.0) anticipate average noise levels along highway, will rise to 86.2 dBA by 2030 and 88.2 dBA by 2045.	organize the loading and unloading of trucks, and handling operations for the purpose of minimizing construction noise on the work site. • Avoiding/minimizing noisy works during the night time as far as possible and maintaining community liaison to aware people about the construction activity. • Noise barriers along highways are effective structures designed to mitigate noise pollution from traffic. Depending on the topography and sensitivity of receptors, any of the following noise barriers can be considered: ○ earth mounds (berms) that absorb sound, ○ solid barriers made from materials like concrete, wood, or metal, which can reflect sound, ○ transparent barriers often made of acrylic or		

ESF Standards, Environmental Impacts and Social Risks	Risk Ratings before Mitigation and Control		Rationale	Mitigation	Risk Ratings after Mitigation and Control	
	Construction Stage	Operation Stage			Construction Stage	Operation Stage
				glass, these allow visibility while reducing noise. - NHA will conduct more comprehensive noise assessment prior to the commencement of the construction, including additional noise level monitoring, noise forecasts during construction and operation particularly at noise-sensitive locations. Based on the detailed results of noise monitoring and forecasts at receptor locations, noise mitigation measures will be implemented. - Vibration measurement during construction phase by the contractor near the settlements/sensitive receptors. - Timing of the construction works to be determined during the recommended operational hours, to reduce vibration levels to residential properties;		

ESF Standards, Environmental Impacts and Social Risks	Risk Ratings before Mitigation and Control		Rationale	Mitigation	Risk Ratings after Mitigation and Control	
	Construction Stage	Operation Stage			Construction Stage	Operation Stage
				Residents to be pre-warned of high vibration events.		
ESS 1: Conserving Biodiversity and Sustainable Management of Natural Resources						
Losses of trees and terrestrial habitat due to land clearance	Substantial	Low	There may be temporary and permanent terrestrial habitat loss and degradation at construction, camp, and yard area. It is estimated that land will be cleared for the highway construction affecting a total of 630 trees, which include beneficial and medicinal trees as well. This will result in the direct loss of plants and habitats and displacement of fauna. Soil erosion arising from clearance could result in loss of plant species.	- Mitigation measures include minimizing land clearance, restricting activities to designated areas, and properly planning camps, machinery movement, and temporary roads to protect vegetation. - Construction camps should be established in areas with little to no vegetation, and alternate routes for access and diversion road should be chosen to avoid environmental impact. - Camp locations will be selected to minimize environmental effects, reduce costs, and limit land use. - Compensate each tree with 10 trees planted with a total of 6300 saplings, through a plantation enhancement program.	Low	Low
ESS 2: Land Acquisition and Involuntary Resettlement						

ESF Standards, Environmental Impacts and Social Risks	Risk Ratings before Mitigation and Control		Rationale	Mitigation	Risk Ratings after Mitigation and Control	
	Construction Stage	Operation Stage			Construction Stage	Operation Stage
Resettlement of affected people	Substantial	Low	All work related to reconstruction of the Phase 1A (ICT section) N5 shall be carried out within the existing RoW of NHA, therefore no permanent land acquisition will be required. However, the Project activities will pose resettlement related impacts (detailed provided in RAP) during the Project implementation.	- Fair and timely compensation will be provided to all affected individuals losing their livelihoods along the route. - Relevant stakeholders, including affected individuals, will be actively engaged in designing effective livelihood restoration measures. - The Resettlement Action Plan (RAP) will include a comprehensive livelihood restoration plan, with continuous monitoring of commercial activity recovery. - An initial compensation assessment for income loss will be conducted based on the preliminary road alignment and construction camp locations, with updates following the final alignment determination. - Awareness programs and training sessions will be conducted to inform affected individuals about project	Low	Low

ESF Standards, Environmental Impacts and Social Risks	Risk Ratings before Mitigation and Control		Rationale	Mitigation	Risk Ratings after Mitigation and Control	
	Construction Stage	Operation Stage			Construction Stage	Operation Stage
				benefits, land acquisition reasons, and compensation procedures.		

ES9 OCCUPATIONAL AND COMMUNITY HEALTH AND SAFETY (OCHS)

The OCHS Management System (OCHSMS) includes the Contractors' high-level corporate policies, processes, and Standard Operating Procedures (SOPs). A guidance is provided for all operational activities related to the Project. Some of the key high-risk activities may involve the following:

- Vehicles and driving;
- Operation of mobile equipment on site and on community roads including passenger vehicles, material transport trucks, mill/planer, cranes, excavator, compactor, rollers, etc.;
- Excavation Operation and associated risk to community members.
- Work at height and dropped objects;
- Material haulage;
- Manual handling;
- Lifting and crainage;
- Scaffolding;
- Operation of Batching and Asphalt Mixing plants;
- Hot work (asphalt);
- Maintenance and operation of the site camp and other facilities like workshop and first aid center;
- Use of security forces; and
- Electrical works.

ES10 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

The ESMP of the Phase 1A mainly comprises of employer's requirement to pre-qualify contractors and environmental, health and safety requirements in the bidding documents, management plans, institutional setup, capacity building and training, presents key monitoring and performance indicators, and grievance redress mechanism, trainings, and reporting and documentation. Total cost of ESMP implementation is \$ 18,701,211. The budget for Civil Works with the Contractor is \$ 5,982,300 (including \$ 650,000 for ICT Section) and the PIU-HQ cost is \$ 12,718,911.

1 INTRODUCTION

1.1 Background

The Government of Pakistan (GOP), through the National Highway Authority (NHA), plans to reconstruct eight sections of the N5 Highway, covering a total of 487 kilometers, spanning 8-sections in two phases, including 100 kilometers damaged during the 2022 floods. The reconstruction aims to upgrade the existing infrastructure by expanding the current 4-lane dual carriageway to a 6-lane dual carriageway where needed. In urban areas, a 7.3-meter-wide service road (or as allowed by the available right of way) will be constructed. The intervention also focuses on enhancing the road corridor with climate-resilient infrastructure by adding cross-drainage structures and implementing other adaptive measures. Additionally, it includes widening and upgrading existing bridge structures, rehabilitating deteriorated road sections, and improving highway safety through geometric enhancements, the installation of road safety devices, pedestrian crossings, and dedicated U-turns, among other safety features.

NHA with support from the Asian Infrastructure Investment Bank (AIIB) and potential additional financiers, has launched the "Reconstruction of National Highway N5 under Pakistan's Resilient Recovery, Rehabilitation, and Reconstruction Framework Project".

To ensure robust project planning and regulatory compliance, NHA has engaged National Engineering Services Pakistan (NESPAK) Pvt. Ltd. as the Engineering and Design (E&D) consultant. NESPAK is responsible for preparing technical designs and developing Environmental and Social (E&S) instruments, including the Environmental and Social Impact Assessment (ESIA/EIA), in accordance with Pakistan's national and provincial regulations and AIIB's Environmental and Social Framework (ESF).

AIIB's Multi-Phase Program (MPP) focuses on Phase 1, encompassing four sections of the N5, totaling 209 km across Islamabad Capital Territory, Punjab, Khyber Pakhtunkhwa (KP), and Sindh provinces, and the reconstruction of a 1-km-long bridge in Sindh province. The Phase 1A Project (the "Project") focuses on three key sections of N5, covering a total of 141 km: Ranipur to Sukkur (70 km) in Sindh Province, Rawalpindi to Hassanabdal (23 km) in Punjab Province & the Rawalpindi to Hassanabdal (17.5 km – RD 02+000 to RD 19+500) in Islamabad Capital Territory (ICT), and Nowshera to Peshawar (31 km) in KP Province. Phase 1A (ICT Section) includes, 03 km service road, 01 flyover, 02 weigh stations, 14 bus bays, mud cleaning and Widening of 02 bridges and 12 culverts, 12 pedestrian bridges, 11 protected U-turns, and 01 toll plaza. The Phase 1B will focus on another key section of N5: Lahore to Gujranwala (68 km) in Punjab province, alongside the reconstruction of 1 km long Nai Baran Bridge in Sindh Province.

This strategic investment aims to strengthen Pakistan's transportation network, ensuring long-term sustainability and improved connectivity. The initiative aims to enhance climate resilience, improve operational efficiency, and strengthen road safety in critical sections of N5, aligning with the Project Objectives (POs).

The priority sections of the N5 highway are heavily trafficked and congested, causing significant delays and inconvenience for commuters. This issue is further worsened by the

deteriorating pavement conditions, particularly due to damage from the 2022 floods. Both the northbound and southbound lanes are in poor condition and require urgent rehabilitation, except for a few stretches where the road remains in fair condition.

The Project will ensure that the N5 provides safe, high-speed, sustainable and disaster resilient road corridor, provide dedicated lane for heavy traffic to minimize the road deterioration, provide service lane in urban areas to manage the local traffic and reduce their direct accessibility on main carriageway, plan protected U-Turns for smooth flow and to minimize the accident, and enhance road safety through Star Rating improvements up to 3 Star or better.

1.2 Environmental Impact Assessment (ESIA) / Environmental and Social Impact Assessment (ESIA) Study

This EIA/ESIA is in compliance with the requirements of national environmental protection agency (Pak EPA) as well as AIIB's ESF 2024. This ESIA/EIA is conducted for Phase 1A (Islamabad Capital Territory - ICT road sections of N5 Highway). The EIA/ESIA has been prepared by NESPAK team hired by NHA which was reviewed and updated by Independent Environmental and Social (E&S) Consultants with support and additional input from NESPAK E&S team. Based on the available primary and secondary information, further analysis of the impacts and risks and mitigation and control measures for the Project was performed and presented in the final EIA/ESIA. This ESIA/EIA should be read in conjunction with other E&S documents prepared for the Phase 1A Project and the subsequent Phases, such as the ESMPF, RAP, RPF, GAP, GAPF, SEP, LMP, etc². The terms Environmental Impact Assessment (EIA) and Environmental and Social Impact Assessment (ESIA) are used interchangeably in this document. Both refer to the integrated assessment of potential environmental and social impacts of the proposed project, along with corresponding mitigation and management measures. Where the term EIA is used, it should be understood to include social aspects in line with ESIA requirements.

1.2.1 EIA Objectives

The objectives of this EIA are to identify and address the environmental and social impacts and risks of the Phase 1A ICT road sections. The specific objectives include:

- Identify and assess the potential environmental impacts and social and risks stemming from the project in the planning, construction and operation phases (direct, indirect and cumulative impacts).
- Design appropriate mitigation, management, and monitoring measures (to avoid, minimize, mitigate, offset or compensate for them), to implement an environmentally benign and socially responsible project without compromising its technical and economic feasibility and to help determine crucial elements that facilitate the making of choices and decisions as per AIIB's Environmental and Social Standards 1 (ESS1).

² Documents available online at - <https://nha.gov.pk/documents/topic/26544>

- Analyze occupational and community health and safety during construction and operation stages and ensure corresponding measures using hierarchy of controls as per ESS1.
- Provide complete documents that will satisfy the requirements of Federal EPA and the AIIB's ESF and ESSs.
- Ensure that effects on people and the environment to be taken into account at the earliest possible stage in the technical design and decision-making processes.
- Assess the capacity of the implementation agency in environment, social, health and safety management and recommend measures to strengthen the capacity in terms of human resources, logistics, skills development, and training.
- Carry out consultations with the key stakeholders and obtain their views and concerns on the project and its impacts on environment and people, in compliance with AIIB's ESS1.
- Prepare an environment and social management plan addressing implementation arrangements, employer's requirements, and various mitigation and enhancement measures.

1.2.2 Area of Influence

The Area of Influence (Aol) covers all land or water, directly or indirectly impacted by the Project. This includes communities and areas adjacent to the Aol that may experience impacts (e.g., traffic safety, aesthetic or noise impacts) during the construction and operation of the Project, despite being located outside of the area in which the Project will be implemented. Direct Aol includes all the areas, where activities related to the construction will take place. **Table 1-1** defines the Aol of the Project. In addition, corridor of impacts are presented in Figure 1-1 for Section 7 (ICT Section). All areas include a core and buffer area, the extent of the buffer (measured from the outer boundary of the RoW) is determined by the reach of impacts such as noise and air pollution.

Table 1-1: Project Areas of Influence

Areas of Influence	Description	Buffer Distance (m)
Physical Footprint	The immediate construction site, including the road, sidewalks, medians, and construction staging areas. A 150 m buffer from the actual footprint is considered and named as corridor of impact (Col). This Col will be affected during both construction and operation stages. Detailed investigations are conducted along the COI	150
Buffer Zone	Adjacent areas potentially affected by noise, dust, vibration, and safety risks.	500
Access roads	Access roads that will be used for material transportation, will experience increase in traffic during construction. A 50-meter buffer is considered each side of the roads to account for potential noise, dust, and safety risk.	50
Traffic Diversions	Areas influenced by detours, alternative routes, and changes in traffic patterns.	2,000
Biodiversity Impacts/Buffer	Geographical extent where the project may directly or indirectly cause impacts on ecosystems, habitats, and species.	2,000

Areas of Influence	Description	Buffer Distance (m)
Environmental Impact Zone	Areas where soil, water, and air quality might be impacted by construction activities, including quarries, run-off zones, and habitats affected by noise or habitat disruption.	500
<i>Operation</i>		
Traffic Influence	The extent of the new or improved road's effect on traffic flow, congestion, and safety in surrounding areas.	5,000
Economic Zone	Areas experiencing economic impacts due to improved access, such as businesses, markets, and residential zones.	5,000
Air Quality and Noise Influence	The area where changes in emissions and noise levels could affect public health, often influenced by vehicle type, speed, and volume.	500

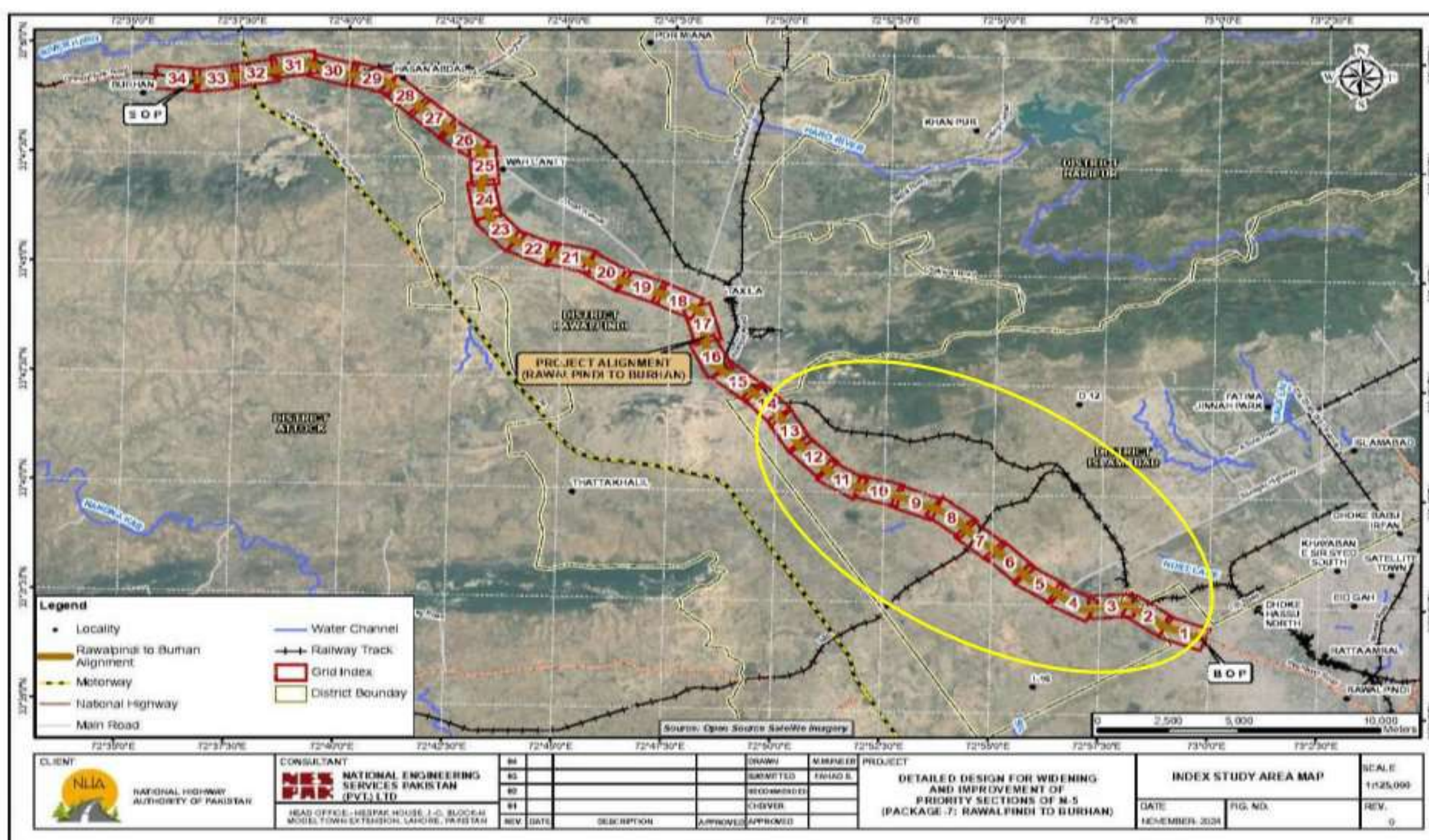


Figure 1-1: Corridor of Impact of Section 7: Rawalpindi to Hassanabdal (ICT Section)

1.2.3 EIA Study Team

This EIA was prepared by the NESPAK team and updated by two Independent Consultants with support from NESPAK. The Independent Consultants consists of the following specialists:

- Dr. Masud Karim, International Environmental Consultant
- Razaak Ghani, International Social Development Consultant

NESPAK Team consists of the following individual presented in **Table 1-2**.

Table 1-2: Team Composition for the EIA Study

Sr. No.	Name	Designation
1.	Mr. Mir Ghazanfar Afzal	Head (Environment and Resettlement) / Team Leader E&S

Sr. No.	Name	Designation
		Assessment Studies - Quality Assurance (QA) Expert
2.	Ms Uzma Iqbal	Sr. Environment Scientist
3.	Mr. Fahad Saleem	Sr. Environmental Engineer
4.	Mr. Wasim Abbas	Sr. Resettlement Expert
5.	Mr. Muhammad Sajjad	Stakeholder Engagement Specialist
6.	Ms Ramla	Sr. Gender Specialist
7.	Mr. Ibadullah Khan	Sr. Ecologist
8.	Mr. Muhammad Abdul Basit	Environmental Monitoring Expert
9.	Mr. Waleed Farooq	OHS Expert
10.	Mr. Ashraf Wahla	Sr. Sociologist – Field Mobilizer (I)
11.	Mr. Shahid Anwar Bajwa	Sr. Sociologist – Field Mobilizer (II)
12.	Mr. M. Muneeb Yousaf	GIS Analyst

1.2.4 EIA methodology

During the EIA study, a comprehensive assessment was conducted to evaluate the potential Environmental, Social, Health, and Safety (ESHS) effects and risks associated with the project's design, construction, and operation phases. The analysis leveraged site surveys, such as, socioeconomic, census, environmental quality monitoring, and biodiversity, conducted during September 2024 to February 2025, existing secondary data from government published literatures, such as census, statistical yearbook etc., stakeholder consultations, and professional insights drawn from similar projects. Details of these surveys and consultation are presented in Chapters 5, 6, and 7.

Each receptor was assessed for its sensitivity to changes in its external environment. Potential project-induced changes and hazards associated with project activities were analyzed to determine their potential impacts on receptors, as well as the risks posed to workers and the surrounding community.

By combining receptor sensitivity with the magnitude of potential impacts, the significance of each impact on each receptor was estimated. Based on this assessment, appropriate mitigation measures, risk controls, and management and monitoring strategies were developed to eliminate, avoid, minimize, or compensate for potential impacts and risks effectively.

1.3 Stakeholders Consultation and Focus Group Discussions

The EIA Team were engaged in consultation with various stakeholders, including NHA, local and national institutions, NGOs, project affected communities, and public consultations/public hearing in locations of project interventions and Pak EPA. Specific discussion sessions were conducted to include vulnerable groups (elderly, women, children, etc.). The outcome of these consultations has been utilized for identifying the important/valued environmental and social components and designing the mitigation, focusing the actual field scenario by fulfilling the expectation of the stakeholders.

1.4 Document Structure

Chapter 1: **Introduction** - briefly presents the project background, need and methodology of the EIA study.

*Chapter 2: **Policy, Legal and Institutional Framework*** - The legal provisions related to environmental protection relevant to the planning stage and operational activities of the Project are identified and discussed under the scope of the EIA study. AIIB's ESF, ESS and World Bank's EHSR are introduced along with the comparison of ESF and National Guidelines and how to fill the gaps.

*Chapter 3: **Project Description*** - The details of the technical features of the Project have been presented in this chapter based on the Technical Report of the Design Consultant. The details include the project overview, locations and description of the sites, major components, construction activities, type of equipment used, resources required, waste to be generated, costs and implementation schedule of the project.

*Chapter 4: **Analysis of Alternatives*** - The alternatives considered during project planning and design phase have been discussed in this chapter. It also includes a comparison between the project and without project alternative.

*Chapter 5: **Environmental and Biodiversity Baseline*** - Baseline environmental conditions covering the climatic conditions, physical environment including land, air, water, noise, aesthetic, waste, and traffic conditions in the project area of influence. The Chapter also presents biodiversity of the project area covering ecosystem, protected areas, habitats of important species, description of flora and fauna, mammals, birds, and fish.

*Chapter 6: **Socioeconomic Baseline*** - To provide a baseline of socio-economic and demographic indicators against which to measure the impacts of the Project over time, this chapter assesses the influence area against a number of social economic indicators, such as agriculture, health care, education, infrastructure, gender relations, and labor rights.

*Chapter 7: **Stakeholder Consultations*** - This chapter describes the process and outcome of the consultations carried out involving various types of stakeholders for determining the environmental and social impacts and risks associated with project implementation, along with the feedbacks/concerns/views on the Project.

*Chapter 8: **Environmental and Social Impacts and Risks*** - This chapter assessed potential risks and impacts of the project on physical, biological and socioeconomic environment using the mitigation hierarchy of ESS1. A cumulative impact assessment is also included in this chapter.

*Chapter 9: **Occupational and Community Health and Safety*** - This chapter describes all activities related to Occupational Health and Safety (OHS) and Community Health and Safety (CHS) which are planned and directed with consistent, approved, health and safety management practices, procedures or standards, in compliance with ESS1.

*Chapter 10: **Environmental and Social Management Plan*** - This chapter presents the environmental and social management plan (ESMP) of the project which is based on ESMP implementation practices in other Bank funded projects in the region and other good international industry practices. The basic objective of the ESMP is to manage adverse impacts and risks of proposed project interventions in a way that minimizes the impact and risk on the environment, workers, and community. The chapter also presents the implementation mechanism of the ESMP. This chapter also includes the present institutional arrangements and capacity building ability of the Project Implementation Unit in Headquarter (PIU-HQ) and the description of arrangements of Project Implementation Unit (PIU) for each section, consultant, and contractor.

2 POLICY, LEGAL, AND INSTITUTIONAL FRAMEWORK

2.1 General

This Chapter summarizes the national, provincial, AIB and international environmental and social legislation, regulations, standards, and treaties relevant to this EIA of the Project. The footprint of the Phase 1A (ICT Section) is located in the administrative boundaries of Islamabad Capital Territory. Hence, the rules, regulations and standards applicable in the ICT are applicable to this Project in respective Sections. AIB's ESF and the ESS relevant to this project are duly described in this section. World Bank Group's EHS Guidelines shall also be followed to make the project implementation in compliance with these guidelines.

2.2 Review of the National Environmental Requirements

The applicable Environmental and Social (E&S) legislations and regulations are briefly described in **Table 2-1**.

Table 2-1: Applicable National Acts

National Acts (Year of implementation)	Relevance/Applicability
Pakistan Environmental Protection Act, 1997	The Pakistan Environmental Protection Act, 1997 (PEPA-1997) is the apex legislative tool empowering the federal government to frame regulations for the protection of the environment through federal agency. However, after 18 th amendment, the powers have been delegated to provincial EPAs.
Pakistan Environmental Protection Agency, (Review of IEE and EIA) Regulations, 2000	The provisions of these regulations are applicable for environmental screening of the Project (portion of Section 7), which implies that what type of environmental assessment is required for the proposed Project. The process described in the regulation will be useful for NHA to follow the procedure to file the case with Pak EPA and to understand its review process along with timelines to be followed.
National Environmental Quality Standards (2010)	Project to be implemented in Islamabad and KP (Section 7 and Section 8) must comply with NEQS during all the phases i.e. construction and operation.
Pakistan Climate Change Act 2017	Under the Pakistan Climate Change Act 2017, any intervention in the country must take measures for comprehensive climate change mitigations and adaptations in line with country level commitments to United Nations Framework Convention on Climate Change (UNFCCC).
The Forest Act (1927) and Forest (Amendment in 2010)	The Forest Act of 1927 establishes the right of GoP to designate areas of reserved forest, village forest and protected forest. It has been confirmed through consultations that no such areas are present within the Project Aol.
Protection of Trees and Brushwood Act (1949)	The Protection of Trees and Brushwood Act of 1949 prohibits the cutting or lopping of trees in the project area. This EIA has been prepared in consistence with this Act. Contractor and sub-contractor will have to comply with this Act.
Pakistan Labour laws 1973	Labor rights in Pakistan specified under Article 11 and 17 of the constitution of Pakistan, shall be applicable to the proposed project. More specific laws are described separately.

National Acts (Year of implementation)	Relevance/Applicability
Factories Act, 1934	This is an act to consolidate and amend laws on labor rights and for matters connected to their safety, basic welfare facilities including living, food, occupational health including infectious diseases and protection from those infectious diseases; it also covers the work-related hazards and protection from those hazards, shelters facilities during rest time, restriction of working hours and holidays rules etc.
Employment of Children Act (ECA), 1991	This Act 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 Protection Against Harassment of Women at the Workplace Act, 2010	The Protection Against Harassment of Women at the Workplace Act, 2010 is a legislative act in Pakistan that seeks to protect women from sexual harassment at their place of work, and equally applicable to this project.
Disabled Persons (Employment and Rehabilitation) Act 2015	The Disabled Persons (Employment) and Rehabilitation (Amendment) Act 2015 seeks to reinforce the rights of people with disabilities in Pakistan in terms of their employment and everyday livelihood benefits, under the domain of this project activities.
Transgender Person Act 2018.	The Act provides legal recognition to transgender persons and prohibits discrimination and harassment. It also places an obligation on local governments to provide for the welfare of the community.
Land Acquisition Act 1894	Empowers the government to acquire private land for projects in the national interest. However, this project requires no land acquisition, hence this law is not applicable.

The detailed of applicable laws, regulations and policies related to this project are provided in ESMPF along with its description and relevance to project.

2.3 Relevant Sections of Federal Environmental Laws/Acts Triggered

Table 2-2 enlists the key sections of the Federal Environment Protection Act that have a direct bearing on the project area:

Table 2-2: Key Sections of Federal, Environment Protection Acts for Project

Environmental Legislation	Pak-EPA 1997	Relevance with Project
Prohibition of Certain Discharges or Emissions: "No person shall discharge or emit, or allow the discharge or emission of, any effluent or waste or air pollutant or noise, load, concentration or level which is in excess of the Environmental Quality Standards." "No person shall discharge effluents, emissions or wastes in excess of load permitted in the conditions of environment permit or environmental approval or license."	Section 11 of Act	Triggered The Project is required to show the compliance of national and international standards related with air pollution, effluents, noise level, and waste.
IEE and EIA:	Section 12 of Act	Triggered

Environmental Legislation	Pak-EPA 1997	Relevance with Project
"No proponent of a project shall commence construction and 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 Agency, environmental approval in respect thereof."		The Project is required to obtain environmental approval of this EIA/ before commencement of work from Pak EPA under these sections of the acts.
Handling of Hazardous Substances "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 14 of Act	Triggered The Project is required to show the compliance of provincial and international standards related with Handling of Hazardous Substances, such as, bitumen and other petroleum products.
Regulation of Motor Vehicles "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 standards, or where the applicable standards established under clauses (g) and (h) of subsection (1) of section-6."	Section 15 of Act	Triggered The Project is required to show the compliance of national and international standards related with Handling of Motor Vehicles.
Penalties Whoever contravenes or fails to comply with the provisions of section 11, 12/13, 13/14, 14/15, 15/16, and 17/18 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 15/16, such contravention shall be punishable under sub-section (2) only.	Section 17 of Act	Triggered The Project proponent (NHA) is required to show the compliance of all regulatory requirements of the Project.

2.4 Applicable National Policies

Pakistan has in place a comprehensive constitutional, policy 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 in

Table 2-3. The full list of relevant policies is provided in **Table 2-1**.

Table 2-3: Applicable National Policies and Guidelines

National Policies (Year of implementation)	Relevance / Applicability
National Conservation Strategy (NCS), 1992	The NCS requires the project to show the compliance of all 14 core areas specified in the policy for environmental protection, conservation of natural resources and environmental sustainability through efficient use of resources.
National Environment Policy, 2005	This policy gives directions for addressing environmental issues and provides means for promoting conservation and environmental protection in line with international obligations and following the principles of sustainable management of resources and economic growth.
National Forest Policy (NFP), 2010	The NFP establishes emphasizes on restoration, development, conservation and sustainable management of forests and allied natural resources. It seeks the project to ensure the sustainability of ecosystem functions, services and benefits for present and future generations.
National Climate Change Policy, 2012	The policy commits for taking appropriate measures for mitigation and adaptation to climate change through tools of environmental assessment, environmental management and environmental enhancement. The present EIA has been prepared in consistence with this policy.
National Water Policy, 2002	Objectives of this policy include, efficient management and conservation of existing water resources, optimal development of potential water resources and improved flood control and protective measures. This project has considered the goals of this policy.
Guidelines for Sensitive and Critical Areas, 1997	These Guidelines aim for protection of critical ecosystems such as biosphere reserves, national parks, wildlife sanctuaries and preserves, and archaeological sites. The project has considered the objectives of the policy.
Guidelines for Public Consultation, 1997	Public involvement can lead to a better and more acceptable decision for project implementation; hence, the project has considered these guidelines for preparatory work.

2.5 National Environmental Quality Standards

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)
- 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).

For the proposed Project, all local (Environmental Quality Standards – NEQS) and international standards (International Finance Corporation – IFC, World Bank Group (WBG) Environmental, Health, and Safety (EHS) Guidelines and WHO Guidelines) have been selected to establish the most stringent environmental guidelines.

A comparative analysis of applicable local and international guidelines for ambient air quality, noise and water has been conducted. Based on the comparison, most of the parameters of NEQS standards for ambient air quality, noise, water and wastewater are more stringent in comparison to WBG-EHS/WHO guidelines/standards. As far as regulations regarding other environmental parameters are concerned such as numbers of acceptable effluent disposal parameters, the local regulations i.e. NEQS take precedence over any other international regulations such as WBG-EHS. However, the comparison has been made with stringent values among the WHO, WBG-EHS, FAO and NEQS standards. The comparison of these standards is provided in ESMPF.

2.6 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 — Bonn Convention, 1983
 - Conserve terrestrial, aquatic and avian migratory species throughout their range.
 - Migratory species threatened with extinction are listed in Appendix A of the Convention.
 - Strive towards strictly protecting these animals, conserving or restoring the places where they live, mitigating obstacles to migration and controlling other factors that might endanger them.
- Convention on Wetlands of International Importance
- 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
- Kyoto Protocol to the Convention United Nations Framework on Climate Change
- Stockholm Convention on Persistent Organic Pollutants
- Convention on Biological Diversity
 - Conservation of biological diversity,
 - Sustainable use of its component, and
- Fair and equitable sharing of benefits arising from genetic resources United Nations Convention on the Rights of the Child
- UNFCCC

ILO's Fundamental Conventions – Ratified by Pakistan

The following ILO's fundamental convention shall be applicable.

- Forced Labour Convention, 1930 (Convention No. 29)
- Freedom of Association and Protection of the Right to Organize Convention, 1948 (Convention No. 87)
- Right to Organize and Collective Bargaining Convention, 1949 (Convention No. 98)
- Equal Remuneration Convention, 1951 (Convention No. 100)
- Abolition of Forced Labour Convention, 1957 (Convention No. 105)
- Discrimination (Employment and Occupation) Convention, 1958 (Convention No. 111)
- Minimum Age Convention, 1973 (Convention No. 138) Minimum age specified: 14 years
- Worst Forms of Child Labour Convention, 1999 (Convention No. 182)

2.7 World Bank Group Environmental, Health and Safety Guidelines

World Bank Group's Environmental, Health, and Safety (EHS) Guidelines are applicable to the proposed project. In particular, contractors will be required to implement the General EHS Guidelines (April 2007) and the EHS Guidelines for Construction Materials Extraction (April 2007).

2.8 AIIB's Environmental and Social Framework

AIIB's Environmental and Social Framework (ESF) sets out the commitment to sustainable development, through an Environmental and Social Policy (ESP) and a set of Environmental and Social Standard (ESS) that are designed for environmental and social sustainability. There are 3 ESS and their applicability on project is given in **Table 2-4**.

Table 2-4: AIIB Environmental and Social Standards Applicable to the Project

Sr. No.	Environmental and Social Standards	Description	Requirements and Gaps between ESF and Local Legislation	Relevance with Project and Actions (to be) Taken
ESS 1	Environmental and Social Assessment and Management	Identify Project-related risks to and impacts in the Project's area of influence. Engage in meaningful consultation with stakeholders during the Project's preparation and implementation. Apply a mitigation hierarchy approach by anticipating and avoiding risks and impacts; minimizing or reducing risks and impacts; and compensate for or offset them, where technically and financially feasible.	Assess the Project and its E&S risks and impacts; prepare Project's E&S documentation and furnish them to the bank, engage in consultation with Project-affected people and other relevant stakeholders, implement the Project in accordance with its E&S obligations under the Legal Agreements, and include the relevant E&S requirements in the bidding documents. Relevant local Laws/Regulation (a) PEPA 1997 (b) IEE and EIA Regulations, 2000 Gaps: (i) The Schedules of IEE/EIA Regulations and the Environment Protection Acts of both provinces do not cover explicitly all of the AIIB's ESS in their statutory description. (ii) Limited Stakeholder/Social engagement is focused in Environment Protection Acts of both provinces, however, ESS1 through Stakeholder Engagement plan involves the consultations with all Stakeholders during project planning and implementation. (iii) The EIA require economic alternatives, their selection and rejection criteria. (iv) Employer's E&S requirements in the bidding document are not required by the Provincial laws.	(i) Project components were thoroughly screened to ensure that they are covered by and meet the requirements of ESS1 and Government laws and regulation. (ii) Extensive and meaningful consultations were conducted during the preparation of E&S documents. An SEP has been prepared to continue consultation during the implementation phase. (iii) E&S risks and Impacts have been identified in the EIA based on surveys and consultations with primary stakeholders including communities and implementing agency. (iv) Environmental and Social Management Plan (ESMP) has been prepared based on the screening outcome and impact and risk assessment in the EIA. ESMP/EMP will also include Employer's E&S requirements in the bidding documents. (v) The EIA will be disclosed both in the NHA and Bank's websites. (vi) Monitoring and reporting on E&S performance will be carried out during implementation.
ESS 1	Health and Safety of	Assess health and safety risks to Project workers and Project-affected communities.	Requirements for the Borrower to prepare and adopt labor management procedures. Provisions on the treatment of direct,	Project will recruit the following types of workers: (i) Direct workers will include the project managers and supervisors, who are

Sr. No.	Environmental and Social Standards	Description	Requirements and Gaps between ESF and Local Legislation	Relevance with Project and Actions (to be) Taken
	Workers and Communities	Promote the fair treatment, non-discrimination, and equal opportunity of project workers. Protect project workers, with particular emphasis on vulnerable workers. Prevent the use of all forms of forced labor and child labor. Support the principles of freedom of association and collective bargaining of project workers in a manner consistent with national law. Provide project workers with accessible means to raise workplace concerns. Assess and appropriately manage the risks of adverse impacts on communities that may result from temporary Project-induced labor influx. If	contracted, community, and primary supply workers, and government civil servants. Requirements on terms and conditions of work, non-discrimination and equal opportunity and workers organizations. Provisions on child labor and forced labor. Requirements on occupational health and safety, in keeping with the World Bank Group's Environmental, Health, and Safety Guidelines (EHSF). Relevant Local Laws/Regulation a) Pakistan Labour laws b) Employment of Children Act, 1991 Gaps (i) The labor act does not make it mandatory for development interventions to be assessed and reviewed in terms of labor and working conditions, including OHS before approval. (ii) The labor act does not require development projects to prepare labor management plans / procedure or OCHSMP. (iii) No national OHS standards/guidelines are available for comparison or for implementation during the project.	employees of NHA; (ii) All workforces deployed by the Contractors and the Project Supervision Consultant under the NHA will be deemed to be contracted workers. The Engineering, Procurement and Construction (EPC) Contractor might further engage multiple subcontractors; (iii) Influx of migrant labor from other districts for construction works is a norm, however, will be minimized by employing local skilled workers to avoid influx. (i) A Labor Management Procedure (LMP) has been prepared to regulate working condition and management of workers relation including worker specific Grievance Redress Mechanism (GRM), terms and conditions of employment, nondiscrimination and equal opportunity, Sexual Exploitation and Abuse/Sexual Harassments (SEA/SH), protection of workforce, the prohibition of child /forced labor (including in source country and supply chain) and provision of OHS management. High likelihood of direct exposure to increased construction related traffic and equipment especially at access road traversing settlement area with limited carriageway/roadway width and poor condition, and sensitive receptors such as schools, religious place, health center/hospitals; and high dust levels from earthworks, high noise and emission level from traffic congestion and

Sr. No.	Environmental and Social Standards	Description	Requirements and Gaps between ESF and Local Legislation	Relevance with Project and Actions (to be) Taken
				idling of vehicles, and operation on batching and bitumen plant. (ii) Occupational and community health and safety (OCHS) will be addressed in the EIA through an OCHS Framework by identifying major occupational safety and health risks for the workers during construction. (iii) World Bank Group's EHS Guidelines and Good International Industry Practice, such as, OSHA will be used for guidance.
ESS 1	Resource Efficiency	Implement technically and financially feasible measures and sustainable use of resources, including energy, water, and raw materials. Avoid or minimize adverse impacts on human health and the environment caused by pollution from project activities. Avoid or minimize project-related emissions of short and long-lived climate pollutants. Avoid or minimize generation of hazardous and non-hazardous waste. Minimize and manage the risks and impacts associated with pesticide use. Requires technically and financially feasible measures to improve efficient consumption of energy, water, and raw	Requires an estimate of gross greenhouse gas emissions resulting from project (unless minor), where technically and financially feasible. Requirements on management of wastes, chemical and hazardous materials, and contains provisions to address historical pollution. In comparison with ESS1, environmental laws, i.e., Pak EPA exclusively prohibit the pollutants emission (under section 11 of Acts) and in case of violation penalize the proponent/s. ESS1 does not penalize the proponent/s, however give emphasis to avoid / minimize the pollution through Good International Industry and Management Practices. Gaps: There is no major gaps with the national regulations and standards except the ambient air quality standards (AAQS). National AAQS is relax for some pollutants compared with World Bank Group's Guidelines, e.g., standard for particulate concentrations.	With respect to Resource Efficiency, the project preparation and the EIA process have identified feasible measures for efficient (a) energy use; (b) water usage and management to minimize water usage during construction, conservation measures to offset total construction water demand and maintain balance for demand of water resources; and (c) raw materials use by exploring use of local materials, recycled construction materials, use of innovative design so as to minimize project's footprints on finite water bodies. With respect to Pollution Management, based on past NHA project experiences, the project has developed, as part of the EIA process, prevention and management measures to offset risks and impacts of pollution from potential sources such as dust and emission from operation of construction equipment, material haulage vehicles, batching and bitumen plants; effluents and wastewater from labor camps, construction camp; spillage or

Sr. No.	Environmental and Social Standards	Description	Requirements and Gaps between ESF and Local Legislation	Relevance with Project and Actions (to be) Taken
		materials, and introduces specific requirements for water efficiency where a project has high water demand.		leakage during handling of hazardous materials like petroleum fuel, battery wastes etc.; and disposal of nonhazardous wastes (cardboards, panel boxes) generated during project implementation period.
ESS 1	Conserving Biodiversity	Protect and conserve biodiversity, sustainably managing terrestrial and aquatic natural resources and maintaining core ecological functions and services are fundamental to sustainable development.	Requirements for projects affecting areas that are legally protected designated for protection or regionally/internationally recognized to be of high biodiversity value. Requirements on sustainable management of natural resources, by making balance with a commitment to sustainable use of the multiple economic, social and cultural values of biodiversity and natural resources in an optimized manner. Relevant Laws and regulations a) Pakistan Environmental Protection Act, 1997 b) Guidelines for Sensitive and Critical Areas, 1997 c) Forest Act (1927) and Forest (Amendment Act 2010) d) Protection of Trees and Brushwood Act (1949) Gaps The national laws do not describe quantitatively the compensatory plans of wildlife and forestry, i.e., how many numbers of trees to be planted against cutting of one tree. While sufficient penalty clauses are available in national laws.	Site clearance activities for project footprint will involve removal of vegetation and felling of trees. The biodiversity baseline studies have indicated that there are potential impacts on biodiversity, with flora and fauna, however most of the affected species are indigenous and least concern as per IUCN category. ESMP will consider compensatory measures for each tree felt during the construction, recommended numbers are 1:10 (1 tree felt will be compensated by 10 saplings planting).
ESS 1	Stakeholder Engagement	Establish a systematic approach to stakeholder engagement that helps	Requires engaging with Project-affected people and other relevant stakeholders, through: (i) timely disclosure of the Project's environmental	Relevant as the project will involve a wide variety of stakeholders during its project cycle including Forest Department that are

Sr. No.	Environmental and Social Standards	Description	Requirements and Gaps between ESF and Local Legislation	Relevance with Project and Actions (to be) Taken
	and Information Disclosure	Borrowers identify stakeholders and maintain a constructive relationship with them. Assess stakeholder interest and support for the project and enable stakeholders' views to be taken into account in project design. Promote and provide means for effective and inclusive engagement with project affected parties throughout the project life-cycle. Ensure that appropriate project information is disclosed to stakeholders in a timely, understandable, accessible and appropriate manner.	and social information; (ii) meaningful consultation; and (iii) Project-level grievance redress mechanisms (GRMs), which can be readily accessed by Project-affected people. Stakeholder engagement throughout the project life cycle, and preparation and implementation of a Stakeholder Engagement Plan (SEP). Requires early identification of stakeholders, both project-affected parties and other interested parties, and clarification on how effective engagement takes place. Stakeholder engagement to be conducted in a manner proportionate to the nature, scale, risks and impacts of the project, and appropriate to stakeholders' interests. Specifies what is required for information disclosure and to achieve meaningful consultation. Relevant Laws/Regulation (a) PEPA 1997 (b) IEE and EIA Regulations, 2000 Gaps Limited Stakeholder/Social engagement is focused in Environment Protection Acts of both provinces; however, ESS through SEP involves the Stakeholder engagement till the completion of project.	associated with ESMP implementation and community consultation for health and Safety, especially traffic safety. The project will ensure: i) Relevant stakeholders for the project are properly identified. ii) Stakeholders have been consulted during the preparation of the /EIA. iii) A Stakeholder Engagement Plan (SEP) has been prepared to be followed during the implementation of the project.

2.9 Project Categorization

Schedule II of the Pak Environmental Protection (Review of Initial Environmental Examination and Environmental Impact Assessment) Regulations 2000 Categories of projects requiring Environmental Impact Assessment (EIA), listed under Transport Category Bullet 2: Federal or Provincial Highways. Therefore, Phase 1A Section 7 (ICT Section) of N5 reconstruction and expansion will require an EIA as per as per the Article 4 of the 2000 Regulations.

2.9.1 Environmental and Social Framework of AIIB

AIIB Environmental and Social Framework uses categories of A (significant), B (limited), C (minimal) or FI (provision of funds through a financial intermediary). Category A with significant adverse environmental and social impacts, requires an ESIA along with Environmental and Social Management Plan (ESMP). Category B with limited potentially adverse environmental and social impacts and require an ESMP or an ESMPF. Category C with minimal environmental and social impacts Bank does not require an environmental and social assessment, but does require the Client to prepare an analysis of the environmental and social aspects of the Project.

AIIB, in its environmental and social review, classified the Project as 'A' with high risk as per the Environmental and Social Risk Classification. Potential environmental impacts and social risks are identified, including construction and expansion of the Phase 1A of N5, air pollution due to dust and bitumen plant; high noise level and vibrations from construction vehicles and machinery; road safety for communities due to high volume of construction vehicles using local access road; traffic congestion and associated air pollution during diversion of traffic from N5; water logging during the reconstruction of drainage structures; accidental spills, particularly from fuel and lubricants used in construction machinery; occupational health and safety risks during construction; potential capacity constraints within the NHA in ensuring environmental and social compliance, considering the extensive geographic scope of the proposed intervention; and improper site reinstatement, where construction sites are inadequately restored post-project. The Project will also contribute to environmental benefits by reducing fuel consumption through smoother traffic flow and lower congestion.

2.9.2 Environment Category and E&S Risk Classification

A review of the project based on available information suggests the project falls under "Schedule II" of Pak EPA Act, and 'Category A' as per the AIIB's E&S Screening and Categorization. This is because the potential adverse risks and impacts on human populations and the environment are likely to be significant. The Project involve activities that have a high potential for harming people or the environment and is located away from environmentally or socially sensitive areas. As such, the potential risks and impacts and issues are likely to have the following characteristics:

- Irreversible, cumulative, diverse or unprecedented. These impacts may affect an area larger than the footprint, subject to physical works and may be temporary or permanent in nature.
- High in magnitude

- Wide coverage, with likelihood of impacts beyond the actual footprint of the Project
- High probability of serious adverse effects to human health and/or the environment

2.10 Environment Regulatory Authorities

2.10.1 Overview

The project will be implemented and operated by NHA with the involvement of government ministries, departments and agencies, where these hold responsibilities relevant to the Project and / or represent key stakeholder interests. Private sector companies will also play a role particularly during construction.

2.10.2 Statutory organizations

A summary of the key E&S regulatory institutions and their relationship with the project in accordance with national, provincial, and international requirements is provided in **Table 2-5**.

Table 2-5: Roles of statutory organizations

Organization	Functions / Role
Pakistan Environmental Protection Agency (Pak-EPA)	EPA are responsible for: • Regulating the environmental issues. • Reviewing and checking environmental assessment report prepared as per the legal requirements. • Environmental approvals of the Project. • Ensuring the implementation of government policies, during the project implementation. • Ensuring compliance and reviewing the performance of environmental management plans implementation.
Forest Departments (CDA-Islamabad,	The forest departments are responsible for: • Administration and enforcement of Provincial Forest Ordinances. • Protection of forests, waste lands and its biodiversity from project interventions, denudation etc. • Promotion of suggesting measures for forest management involving community and project resources. • Conservation and improvement of ecology and natural habitat.
Islamabad Wildlife Management Board	The wildlife departments are responsible for: • Enforcing the National Wildlife (Protection, Preservation, Conservation and Management) Act of 1975 and the rules made there under • Identifying, notifying, and managing National Parks, Wildlife Parks, Wildlife Refuges, Wildlife Sanctuaries and Game Reserves. • Protecting the wildlife from any intervention. • Replenishing the depleted wildlife population through protection and/or reintroduction measures.
CDA - Labor Relations	The labour departments in provinces are responsible for: • Guaranteeing the rights of the workers like the right to organize, the right to collective bargaining, participation in the affairs of the

Organization	Functions / Role
	implementing agency, health & safety, minimum wages, compensation, etc., are followed in the project.
ICT (Administration) - Women Development Wing	These departments are responsible for: - Transformation of the government into an organization that actively practices and promotes gender equality and women empowerment. - Mainstreaming gender equality perspective across public policies, laws, programs, and projects by departments and agencies of the government with a focus on women empowerment. - looking after various marginalized segments of population such as poor, persons with disabilities, orphans, victims of violence and specifically women to ensure the welfare and support the marginalized group of society.
ICT (Administration) - Labour Welfare Department	The workers welfare boards are responsible for: - provision of housing, education, health and other welfare facilities to the workers and their families. - Promoting the same through projects.
Employees' Old Age Benefit Institution	The EOBI is responsible for: Making sure that workers are benefitted after retirement from the collected/raised funds.

2.11 APPROVALS FROM RELEVANT GOVERNMENT DEPARTMENTS

The proposed project will require various approvals from relevant government departments during implementation as summarized **Table 2-6** in below.

Table 2-6: Approvals and Permits Required during Project Implementation for ICT Section

Sr. No.	Approval Required	Issuing Authority	Requirements	Responsible Agency	Schedule
1.	Clearance of ESIA/ESMPs, RAPs, and other required instruments as described in the ESMPF and RPF	AIIB	Submission of site-specific E&S instruments	PIU-HQ-NHA	Prior to initiation of subproject construction works
2.	Clearance of EIA and Environmental approval for the construction works	Pak EPA	Submission of EIA(s)	PIU-HQ-NHA	Prior to initiation of subproject construction works
3.	Approval for notified forest & wildlife areas, and clearing of trees (for trees outside the NHA's ROW)	Forest and Wildlife Department	Submission of request with detailed project layout/plans	PIU-HQ-NHA	During construction phase
4.	Approval for disposal of solid and liquid waste	Concerned Municipal Authorities	Submission of request with detailed project layout,	PIU-HQ-NHA	During construction phase

Sr. No.	Approval Required	Issuing Authority	Requirements	Responsible Agency	Schedule
			location map and Waste Management Plan		
5.	Approval for crossing of public utilities	Concerned Agencies	Submission of request with detailed project layout, location map and site-specific details of utilities	PIU-HQ-NHA	During construction phase

3 DESCRIPTION OF PROJECT

3.1 Project Background

The National Highway Authority (NHA) has developed a comprehensive 20-year plan to reconstruct and widen the entire 1,819-kilometer-long N5 highway in four phases. This strategic initiative aims to enhance connectivity, improve road safety, and boost economic activity across Pakistan.

The Project aims to enhance climate resilience, operational efficiency, and road safety by reconstructing and upgrading critical four-lane segments into a climate-resilient six-lane dual carriageway. AIB's financing, referred to as the "Multi-phase Program" (MPP), supports the reconstruction of four sections of the N5 highway in Phase 1, spanning 209 km across Islamabad Capital Territory, Punjab, Khyber Pakhtunkhwa, and Sindh provinces. Phase 1 has divided into Phase 1A consisting of three Sections (2, 7, and 8) with 141 km road and Phase 1B is covering 68 km road and 1 km long Nai Baran bridge. The Section 7 of Phase 1A consists of 17.5km alignment in ICT for this this EIA is complied.

The reconstruction and upgrades include geometric enhancements, service roads on both sides in urban areas, the installation of advanced road safety devices, flyovers, improved underpasses, pedestrian crossings, protected U-turns, and newly designed or modified bus bays.

The Project also aims to minimize congestion and delays by expanding capacity with additional lanes, improving accessibility, and enhancing the road's ability to accommodate higher traffic volumes for the efficient movement of goods and passengers. Key benefits include reduced vehicle operating costs and travel time, improved road safety with a lower accident rate, and strengthened socio-economic conditions in surrounding areas. By fostering employment opportunities, supporting local businesses, and facilitating smoother transportation of raw materials and finished goods to markets, the project will contribute to economic growth. Additionally, the improved geometric road design will help prevent accidents and ensure the timely delivery of perishable goods, reducing spoilage and logistical inefficiencies.

The upgraded N5 will be designed with climate resilience, road safety, and operational efficiency in mind:

- **Climate Resilience** – The use of climate-adaptive materials and designs will strengthen the highway's ability to withstand extreme weather events, such as flooding and heat damage, minimizing disruptions and maintenance costs.
- **Road Safety** – Modernized Road designs and advanced traffic management systems will significantly reduce accident rates, ensuring safer travel for commuters and freight operators.
- **Intelligent Transportation Systems (ITS)** – The integration of ITS will enhance real-time traffic monitoring, congestion management, and incident response, leading to improved transport efficiency for logistics companies and everyday travelers.

By making the N5 highway safer, more resilient, and better managed, the Project is set to deliver long-term economic and social benefits for Pakistan, reinforcing its role as a vital transport corridor for trade and commerce.

3.2 Project location

Phase 1A ICT Section of the project (the "Project") prioritizes the reconstruction and expansion of three critical sections of the N5 highway, covering a total of 17.5 kilometers:

- **ICT - Section 7: Rawalpindi to Hassanabdal (RD 02+000 to RD 19+500)** – Situated in Islamabad Capital Territory (ICT), this stretch is a vital part of the highway connecting the northern region with the federal capital and beyond. Its reconstruction is expected to enhance mobility and safety for commuters and freight transport.

The location maps of Section are presented in **Figure 1-1**, Section 7 (ICT Section), respectively.

3.3 Project Salient Features

The Phase 1A (ICT Section) Project involves widening and improvement of the existing section of the Rawalpindi-Hassanabdal of N5 Highway. It also involves the provision of service roads close to urban settings, extension of existing and construction of new structures which include bridges, culverts, flyover and relocation of existing drains (locations are provided in Vol. 3 - Climate Change Assessment Report) and existing utilities (where required). The salient features of the Project are presented in

Table 3-1.

Table 3-1: Salient design features of the Phase 1A – ICT Section highway

Project Feature	Rawalpindi – Hassanabdal (ICT Section)
Length (km)	17.5
Design Speed (Rural/Semi Urban/ Urban) (km/h)	100 / 80 / 60
Design Vehicle	WB-20 (6 Axle Articulated Trailer)
Flyovers Railways	01 (3+3 lanes)
Service Roads (km)	03km (both side)
Weigh Stations	02 Locations, (2+2 lanes, existing to be modified)
Bus bays	14 (Proposed and existing to be retained)
Drainage Structures	Mud cleaning and maintenance 12 culverts 02 bridges
Pedestrian Bridges/ Pedestrian Underpasses	12 (Pedestrian Bridges), 07 (Pedestrian Underpasses retained)
U-turns	11 (Protected U Turns)
Toll Plaza	01 at Sangjani,

Project Feature	Rawalpindi – Hassanabdal (ICT Section)
	Existing to be modified with new design of toll booth, canopy, bays, pavement and electrical/ electronic works. Renovation of toll adjacent building.

Pavement designs of all three sections of the road will follow AASHTO guidelines and presented in **Table 3-2**.

Table 3-2: Pavement design for ICT Section of the highway

Item	Unit	Rawalpindi – Hassanabdal (ICT Section)
<i>Widening Section</i>		
Asphalt Concrete Wearing Course	mm	50
Asphalt Concrete Base Course	mm	180
Aggregate Base Course	mm	300
Granular Subbase	mm	250
<i>Rehabilitation of existing road</i>		
Asphalt Concrete Wearing Course	mm	50
Asphalt Concrete Base Course	mm	180
Aggregate Base Course	mm	150
Asphalt Concrete Wearing Course	mm	50
Asphalt Concrete Base Course	mm	80
Aggregate Base Course	mm	250
Granular Subbase	mm	150
Subgrade shall have a minimum soaked CBR	%	8% @95% M.D.D.
Design period	Year	10

The typical cross section of the Phase 1A ICT Section Project highway is presented in **Figure 3-1**.

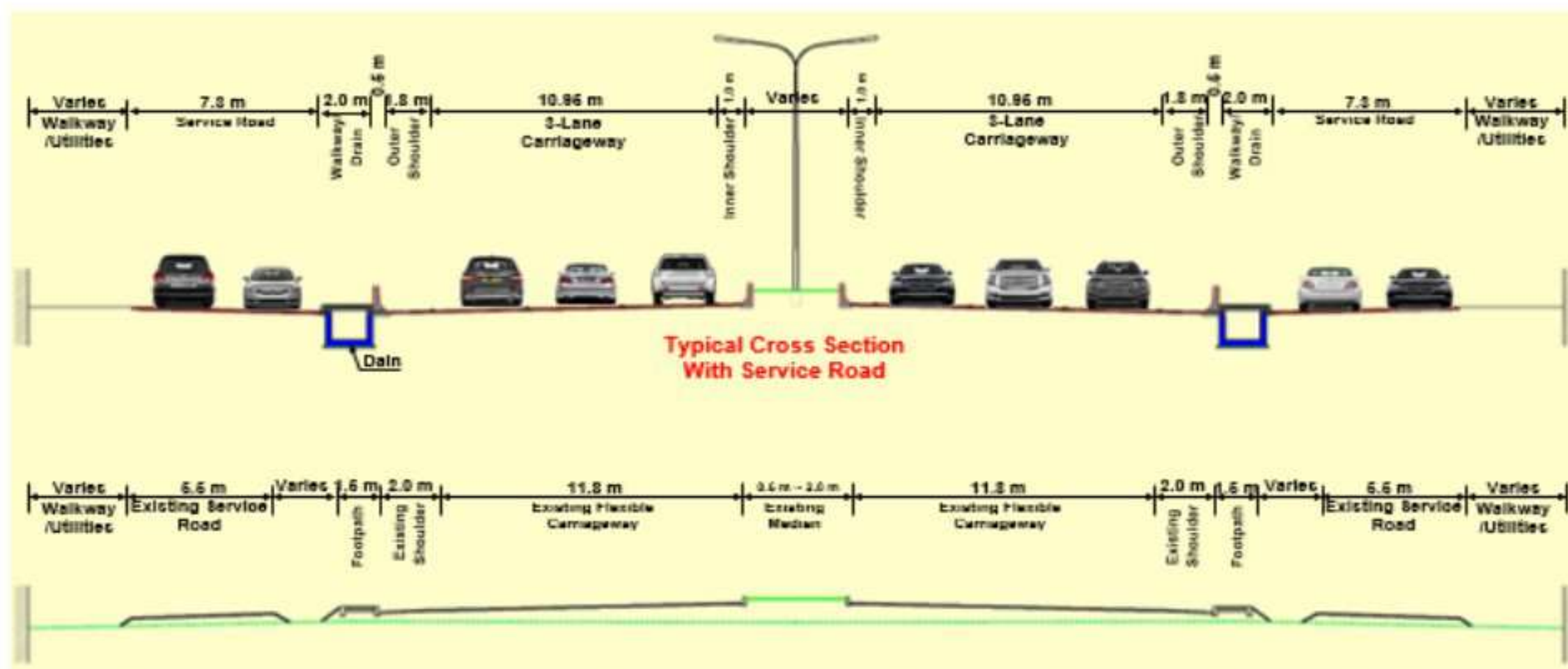


Figure 3-1: Typical Cross Section of the 6 Lane highway with Service Road

3.4 Traffic Data

The main objective of Traffic Studies is to assess the volumes and composition of traffic load likely to use the proposed road immediately after the Project implementation. The projected volumes of traffic for the future years are used to predict air quality and noise level. NHA provided traffic counts data of 2024, along with forecasted traffic of 2030 and 2045 and are presented in

Table 3-3.

NHA forecasts regional traffic volume based on the relevant provisions of Highway Capacity Manual (2017 Edition, People's Communications Press). NHA estimated the maximum service traffic volume corresponding to the traffic demand under the design conditions and the design service level. It aims to determine whether the construction and implementation conditions of the Project can ensure that the planned Class-C II highway can operate under the required Level -IV service level in future after the reconstruction of the Phase 1A highway.

In 2024, the average two-way daily traffic was recorded as 59,592 vehicles/day for Phase 1A ICT Section. By 2030, the projected two-way daily traffic is expected to increase after the reconstructed highway is operational to 72,360 vehicles/day and Looking further ahead to 2045, the forecasted two-way daily traffic is estimated to reach 111,242 vehicles/day.

Table 3-3: Current and forecasted Traffic on Section 7 (ICT Section)

Year	Directions	Motor Cycles	Rickshaws	Cars/Jeeps	Wagons/Pickups	Mini Buses/Trucks	Buses/Coasters	Trucks		Trucks (Articulated)			Tractors Trolley	Total Traffic (VPD)	Total PCUs
								2-Axle	3-Axle	4-Axle	5-Axle	6-Axle			
2024	Tarnol to Taxila	10893	1596	30928	3622	1386	279	727	5037	166	62	200	66	54962	59592
2030	Tarnol to Taxila	13903	1972	37898	4295	1607	324	862	5969	197	74	237	78	67415	72360
2045	Tarnol to Taxila	22823	3091	58602	6575	2327	469	1288	8918	294	110	353	117	104967	111242

Source: PC1

3.5 Associated facility

There is no associated facility in Phase 1A Project.

3.6 Construction Materials

The materials used in construction 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. Additionally, the project will require the consumption of bitumen for asphalt plant, petrol, diesel, and lubricants/oil for vehicles and construction machinery. The construction material will be procured from approved quarries (Taxila for Section 7 - ICT) and

no new quarry will be required by the contractors. The quantity of construction material required for the proposed project has been estimated tentatively and provided in **Table 3-4**.

Table 3-4: Quantification of Construction Material

Sr. No.	Description	Unit	Section 7 ICT Section
			(17.5 km)
1	Concrete	m ³	108,365
2	Cement	Bag	925,020
		ton	46,251
3	Reinforced Steel	ton	8,953
4	Excavation	m ³	23,887
5	Embankment	m ³	2,139,318
6	Subbase	m ³	418,536
7	Aggregate Base	m ³	273,266

3.6.1 Borrow Soil for Embankment

Topography of the project area is plain and borrow soil for road embankment is locally available along road alignment. It is estimated that surplus materials generated from excavation in Section 7 (ICT) which will be used for embankment preparation.

3.6.2 Borrow Material for Sub Base

Suitable sub-base materials are locally available, making them a cost-effective choice. These materials may include pit-run or bed-run gravel, sand-gravel mixtures, or soil aggregates. Numerous seasonal nullahs (streams) cross the road alignment, and their material can be used as sub-base after removing particles larger than 2 inches. Sample testing of locally sourced materials will be conducted before final selection. The Provincial Mines and Minerals Departments lease these streams and nullahs to designated vendors. Therefore, the Contractor must coordinate with the approved vendors to source materials from these locations. To ensure environmental compliance, the use of riverbed material will be strictly prohibited, and only materials from designated quarry sites in Taxila will be permitted.

a) Crushed Aggregate

Aggregates of different sizes are naturally available along the Phase 1A - ICT Project area. Aggregate will be tested by the design consultant, as well as the Contractor and approved by the Supervision Consultant before use.

b) Fine Aggregate

Sand will be obtained locally from the designated quarry sites, which are licensed by relevant department of the government, complying with environmental regulations. It will be ensured that river bed material will not be allowed to use. Samples of sand available from approved quarry sites will be tested by the design consultant, as well as the Contractor for their gradation to meet the desired requirements as per standards for concrete.

c) **Subgrade Material**

Large quantity of sub-grade (soil) is abundantly available at Taxilla along the Project alignment. Borrow pits of suitable material at a reasonable reach will be selected, complying EPA requirements and international good practices. The testing for index properties, sulfate, chloride contents and organic contents will be performed.

d) **Asphalt, Reinforcement and Cement**

Asphalt, reinforcement and cement will be transported from local markets. The testing of available material will be done as per the Project requirements.

3.7 **Construction Activities**

Construction of the Phase 1A (ICT Section) highway involve the following major tasks:

- Site Clearance (clearing of vegetation/ trees);
- Earth work (Excavation and filling of unsuitable material and top soil);
- Establishment of Camps and Workshops;
- Transportation and Storage of Materials;
- Use of Construction Vehicle and Heavy Machinery;
- Installation and operation of Batching and Asphalt Plants;
- Spoil Disposal;
- Structural Works;
- Drainage Work;
- Roadwork (milling, levelling, preparation of sub grade, sub base, base and wearing course including asphalt and concrete mixing); and
- Miscellaneous Work (Road Ancillaries, Traffic Signs and Signals etc.)

The right-of-way of all three Sections lie in plain land and do not pass through any mountainous terrain, hence drilling and blasting will not be needed. The reconstruction and widening of the Phase 1A highway include but not limited to the following:

- The project involves comprehensive road infrastructure improvements, including milling and removal of the existing surface, excavation and grading for elevation adjustments, installation of a new base layer, and pavement overlay with asphalt. Compaction will ensure stability. Bridge construction includes deck, superstructure, and substructure work, along with the improvement of underpasses, construction of new pedestrian bridges, and widening of existing ones. Structural enhancements include the installation of new expansion joints, bearings, and guardrails.
- Culvert reconstruction involves removing old structures, installing new concrete or corrugated metal culverts, backfilling, and compaction. Road shoulders will be reinforced, graded, and shaped to prevent erosion, with appropriate materials such as aggregate or asphalt applied. Road safety measures include installing new lane markings, crosswalks, stop bars, and signage for traffic guidance and compliance with safety standards.
- Maintenance and rehabilitation efforts include patching and resurfacing road defects, crack sealing, and leveling surfaces. Bridges will undergo repairs for spalling, cracks, and structural deterioration, including expansion joint and bearing rehabilitation.

Existing culverts will be cleaned, maintained, repaired, or relined to extend their lifespan. Additional measures include refreshing road markings and signage, replacing damaged signs, maintaining shoulders through grading and re-graveling, and clearing obstructions from culverts and ditches to improve drainage.

3.8 Construction Equipment

The list of the machinery and the equipment required for the construction of the Project is provided in **Table 3-5**. The machinery and equipment used for the proposed Project will typically result in the release of oil spills and gaseous emissions.

Table 3-5: Machinery and Equipment Requirement

Sr. No.	Type of Machinery/ Equipment	Sr. No.	Type of Machinery/ Equipment
1	Mill/Planer	11	Self-Propelled Pneumatic Roller
2	Dump Truck	12	Asphalt Distributor
3	Front End Loader and Dozer	13	Batching Plant/ Crusher
4	Grader	14	Concrete Transit Truck
5	Vibratory Roller	15	Concrete Pump
6	Water Tankers	16	Excavator
7	Aggregate Spreaders	17	Water Pumps
8	Third Wheel Rollers	18	Cranes
9	Tandem Roller	19	Vibrators
10	Asphalt Plant	20	Generators

3.9 Construction Camps and Yards

Camp sites will be selected based on following considerations:

- Number of workforces deployed;
- Type and quantity of machinery mobilized;
- Availability of adequate area for establishing camp sites including parking areas for machinery, stores and workshops;
- Access to communication and local markets and away from the local population settlements; and
- Appropriate distance from sensitive areas including settlements and religious and/or cultural facilities.

Based on the above criteria and consultant's experience, one construction camps including Contractor's office, construction equipment yard, material stock piling, parking spaces etc. will be required for each Section. However, final locations will be selected by the Contractor in association with the Employer and the Supervision Consultant employed by the Concessionaire, which will be finalized after the approval from Project Director. Care will be taken to safeguard the existing environment of the area and location shall be selected away from settlements. If it will not be possible to locate camp sites within the RoW, the contractors may acquire land on lease from private landowners. The contractors while selecting the locations of construction camps and yard will be required to consider the following criteria:

- Temporary lease of land from the private owner with an agreed price.

- Resettlement of people and houses must be avoided while selecting the location of the camps and yards;
- Camp and yard site will be away from the residential areas and sensitive receptors;
- Selection of sites shall be near the Project area having proper access to the nearby main/link road;
- The site must be located in a place where the drainage from and through the camps will not threat any domestic or public water supply;
- Camp and yard site must be adequate in size to prevent overcrowding of necessary structures (about 1500 m² land is required for each camp site as per designers' recommendation, which may be finalized during implementation phase as per requirement);
- The site will avoid any damage of property, vegetation, irrigation, and drinking water supply systems;
- The camp site must not be subject to periodic flooding; and
- The site must be away from ecologically sensitive areas, e.g., wildlife sanctuaries, game reserves, national parks, etc.

3.10 Work Force

The workforce required for Phase 1A (ICT Section) of the 6-lane highway construction depends on various factors, including construction methods, mechanization levels, project timelines, and labor productivity. However, based on industry standards and previous large-scale road construction projects, the Consultant has estimated the required workforce, as presented in **Table 3-6**. The actual workforce for each Section will be determined by the contractors during the construction phase.

Road construction is a significant employment-generating industry, and the country has a well-established pool of skilled workers, including those with experience from the Middle East. It is anticipated that less than 30% of the workforce during the peak construction period will be migrant workers, primarily for specialized tasks requiring advanced technical skills and management staff.

Table 3-6: Estimated workforces for 3 Sections of Phase 1A (ICT Section) Project

Sections	Length (km)	Total No of Workers	Skilled Workers	Unskilled Workers
Section 7 (ICT)	17.5	800	200	600

3.11 Security Personnel

A total of 10-15 security personnel (approximately) shall be deployed for each Section under the Project. Detailed project site security plan has been provided in the Labor Management Plan (LMP) document (please refer to Annexure II of the LMP).

3.12 Water Requirement

The source of water for construction purpose during the construction phase will be transported using water bowser tanks from local sources and drinking water from reliable groundwater (if available after testing water quality parameters eligible for drinking purpose) will be used. The

water consumption in the camp for human use is estimated to be 32,000 liters/day³ for Section 7 (ICT). It is estimated that 0.083 million m³ of water for construction purpose during the entire construction period (about 116 m³ per day) will be utilized for concreting activities.

3.13 Energy Sources

Energy resources will be essential for operating Project vehicles, construction machinery, batching plants, asphalt plants, offices, residential colonies, and labor camps. The primary energy sources required for the Project include diesel, petrol, natural gas, and electricity.

It is estimated that the total energy demand across all sources will be approximately 307 terajoules for Section 7 (ICT). However, contractors will be responsible for maintaining detailed records of fuel consumption for various energy sources throughout the construction phase.

Diesel, petrol, and natural gas will be sourced from the nearest fuel stations, which are readily available in cities, towns, and along existing highways. Electricity will be supplied through local power distribution companies, with connections established from the nearest substations and distribution lines.

3.14 Project Implementation Schedule

The tentative implementation period for proposed Project is 24 months for whole Section 7 out of which 12 months for Section 7 (ICT Section) are estimated.

3.15 Cost of the Project

Total Phase 1A Project cost is estimated about PKR 31.09 billion for Section 7 including ICT section costs about 14 Billion PKR.

³ Tentative Work Force Requirements Including Client and Contractor Staff"

= (800) x (40) = 32,000 liters/day

Water Demand = Design Standards of Pakistan <https://pecongress.org.pk/images/upload/books/Paper418.pdf>

4 ANALYSIS OF ALTERNATIVES

4.1 General

This chapter provides a detailed examination of the alternatives considered for various components of Phase 1A (ICT section) of the N5 Highway reconstruction during the design phase. It outlines the different design options explored for key project elements, including roadway alignment, pavement materials, drainage systems, and structural improvements such as bridges, culverts, and interchanges.

The analysis evaluates the technical robustness of each alternative, assessing factors such as structural integrity, durability, ease of maintenance, and compliance with engineering standards and regulatory requirements. Additionally, the cost implications of each option are examined, considering both initial construction expenses and long-term operational and maintenance costs to determine overall economic viability.

Furthermore, the chapter investigates the social impact of the proposed alternatives, including potential effects on local communities, accessibility, traffic flow, and road safety. Public concerns, stakeholder interests, and the potential for displacement or disruption to nearby residents and businesses are also considered.

Finally, the environmental consequences of each alternative are assessed, focusing on factors such as land use, air quality, noise pollution, water management, and ecological impacts. The evaluation ensures that the selected alternative aligns with sustainability principles while minimizing negative effects on the surrounding environment.

Through this comparative analysis, the chapter aims to identify the most balanced and optimal solution that ensures the long-term success and sustainability of the N5 Highway reconstruction under Phase 1A (ICT section).

The first section includes an analysis of the no project option compared with the Project, followed by an analysis of alternative to Flyovers, Controlled U-turns, New Pedestrian bridges, Alternative routes for diverting traffic, Pavement alternatives (Asphalt vs. Concrete), and finally a summary of the selected options.

4.2 No Project Alternative

The Phase 1A Project of the N5 Road has become a major congestion point, characterized by slower speeds, longer travel times, and increased vehicle queuing. This is primarily due to the dense urbanization in the area, which has also led to higher levels of noise and air pollution. The unprotected U-turns along key locations on N5—specifically at Tarnol, and Islamabad Capital Territory areas in Section 7 (ICT Sections),—are exacerbating the situation.

Currently, the capacity of Phase 1A (ICT Section) of the N5 highway is insufficient to ensure smooth traffic flow. The road condition has further deteriorated due to the 2022 flood damage. Traffic volume is expected to rise over time, as indicated by traffic projection surveys, which will lead to even more congestion in the future. Without intervention, these increased traffic

volumes will result in longer travel times, higher levels of dust, vehicular emissions, noise, and a greater risk of accidents and traffic conflicts.

The highway's worsening condition will lead to increased wear and tear on vehicles and higher accident probabilities. Additionally, access to the main city from nearby villages will remain difficult, limiting residents' access to better educational and healthcare facilities. In emergency situations, rescue services will struggle to reach affected or safe areas, further exacerbating risks. The proposed project will upgrade the road from 4 to 6 lanes, incorporating service roads, pedestrian bridges, underpasses, flyovers, and controlled U-turns to enhance traffic flow, reduce congestion, improve air quality, and high noise levels due to high speed traffic movement.

Given these concerns, it is clear that the "No Project Option" would not only impede national economic growth but also negatively impact local and regional development and the overall quality of life for the communities along the N5 corridor.

4.3 Dedicated U-Turns

Alternatives Considered:

- **Option 1:** Implementing designated controlled U-turns with signalized management.
- **Option 2:** Constructing elevated U-turn ramps for grade separation.
- **Option 3:** Using loop U-turn intersections to redirect traffic.
- **Option 4:** Maintaining existing uncontrolled U-turns.

Evaluation:

- **Cost:** Controlled U-turns and loop U-turn intersections are cost-effective, while elevated U-turn ramps require high construction costs.
- **Construction Issues:** Elevated U-turns require additional structural work, increasing complexity. Loop U-turns need more land but reduce congestion.
- **Social Impact:** Controlled U-turns enhance safety and traffic flow. Elevated ramps eliminate intersection conflicts but may inconvenience local access.
- **Environmental Impact:** Reduced vehicle idling decreases emissions; however, construction activities may disrupt traffic temporarily.

Selected Option: Since ICT section of Phase 1A highway has median, which can be used for constructing loop U-turns, to balance safety, cost-effectiveness, and traffic efficiency.

4.4 New Pedestrian Bridges

Alternatives Considered:

- **Option 1:** Constructing pedestrian bridges at key locations.
- **Option 2:** Installing pedestrian underpasses.
- **Option 3:** Enhancing existing zebra crossings with traffic signals.

Evaluation:

- **Cost:** Pedestrian bridges are moderately expensive but provide long-term benefits. Underpasses require high excavation and maintenance costs.

- **Construction Issues:** Bridges are easier to construct, while underpasses need proper lighting, ground support, and security measures to ensure usability.
- **Social Impact:** Bridges improve pedestrian safety and accessibility. Underpasses may be less attractive due to safety concerns.
- **Environmental Impact:** Bridges have minimal environmental impact, while underpasses require significant excavation and land disturbance.

Selected Option: Pedestrian bridges to enhance safety and minimize construction challenges.

4.5 Alternative Routes for Traffic Diversion During Construction

Alternatives Considered:

- **Option 1:** Utilizing parallel roads and existing bypasses.
- **Option 2:** Constructing temporary roads adjacent to the construction site.
- **Option 3:** Implementing staged construction with partial road closures.

Evaluation:

- **Cost:** Using existing roads is the most cost-effective option, while temporary diversion road using the RoW may reduce the cost, without land acquisition.
- **Construction Issues:** Service/diversion roads using the existing RoW in one side and widening on the other side vis-versa, while partial closures of the existing highway will cause congestion.
- **Social Impact:** Properly planned diversions minimize inconvenience for commuters and businesses.
- **Environmental Impact:** Utilizing existing RoW reduces land disturbance and construction waste.

Selected Option: A combination of parallel roads using the RoW, bypasses, and staged construction to balance cost and minimize disruption.

4.6 Pavement Alternatives

Alternatives Considered:

- **Option 1:** Asphalt pavement.
- **Option 2:** Concrete pavement.
- **Option 3:** Composite pavement (asphalt over concrete).

Evaluation:

- **Cost:** Asphalt is cheaper initially but requires frequent maintenance. Concrete has a higher upfront cost but longer lifespan.
- **Construction Issues:** Concrete takes longer to cure, delaying project completion. Asphalt allows faster installation and phased construction.
- **Social Impact:** Asphalt provides a smoother ride but wears out faster. Concrete is more durable, especially for heavy traffic.
- **Environmental Impact:** Asphalt emits more CO₂ during production, smooth driving experience and less noise, whereas concrete is more sustainable in the long run but generates high noise level.

Selected Option: Due to its low initial investment cost asphalt pavement is considered in the design.

4.7 Alternative Workforce Options

Alternatives Considered

- **Option 1:** Local Worker
- **Option 2:** Migrant Worker
- **Option 3:** Mixture of Local and Migrant Workers

Evaluation

- **Cost:** Recruiting a mix of local and migrant worker provides an optimal balance between cost efficiency and workforce availability. Relying solely on local labor may reduce transportation and accommodation costs but could lead to inefficiencies due to skill gaps. Conversely, bringing in an entirely external workforce increases costs associated with travel, housing, and allowances. A blended approach ensures cost-effectiveness while maintaining quality and productivity.
- **Construction:** The feasibility of construction depends on having a workforce with the right skill set. Local worker alone may not provide the necessary mix of skilled, semi-skilled, and unskilled workers, leading to potential delays. Hiring all worker from outside might address skill shortages but could disrupt workflow integration and increase logistical challenges. A combination of local and external labor ensures a balanced workforce capable of meeting the project's technical requirements while maintaining steady progress.
- **Social Impact:** The social implications of worker recruitment are significant. Employing a majority of local workers supports community livelihoods, fosters social cohesion, and minimizes displacement risks. Over-reliance on migrant worker could cause social disruptions and resentment within the local community. Public consultations have emphasized the importance of prioritizing local employment opportunities, recommending that at least 70% of the workforce be sourced locally.
- **Environmental Impact:** A mixed labor approach also has environmental benefits. Hiring more local workers reduces transportation-related carbon emissions and minimizes the environmental footprint of worker accommodations. On the other hand, bringing in a large number of migrant workers could strain local resources such as water, energy, and housing. Therefore, adopting a strategy where the majority of labor is hired locally helps mitigate negative environmental impacts.

Selected Option: Considering these factors, it is recommended that a minimum of 70% of the labor force be recruited from local areas, with external hires limited to specialized skills and management. This approach ensures cost efficiency, timely construction, social acceptance, and minimal environmental disruption.

4.8 Summary of Selected Options

Component	Selected Alternative	Justification
Reconstruction of Phase 1A N5 Highway	6-lane highway expansion with associated facilities	Enhance traffic flow, reduce congestion, improve air quality, and high noise levels due to high speed traffic movement.
U-Turns	Looped U-turns	Balances cost, safety, and traffic efficiency.
Road crossings	New pedestrian bridges	Ensures pedestrian safety and ease of access with minimal construction issues.
Traffic Diversion during construction	Use of parallel or diversion roads using the RoW in one side and staged construction on the side	Using the existing RoW for temporary diversion roads can help keep construction moving without disrupting the primary road's capacity, which can help reduce costs related to delays and interruptions.
Pavement Type	Asphalt pavement	Initial low investment cost, smooth driving experience, and less noise.
Workforce Options	Ideal mix of local (70%) and migrant (30%) workers.	Ensures cost efficiency, timely construction, social acceptance, and minimal environmental impact.

The selected options ensure that the N5 Highway reconstruction meets long-term traffic efficiency, safety, cost-effectiveness, social acceptance, and environmental sustainability goals.

5 ENVIRONMENTAL AND BIODIVERSITY BASELINE

5.1 General

For any development project, the prevailing E&S conditions need to be assessed prior to the stages of planning, designing and execution of the Phase 1A (ICT section) Project. The existing E&S conditions of the proposed project have been considered within the Col as shown in **Figure 1-1**, with respect to physical, biological and socio-economic aspects. The Study Area is selected on the basis of the Phase 1A (ICT section) Project's potential environmental and social impacts on the local resources and their mitigation measures.

Information has been collected from variety of sources, including published literature, DCRs, field observations and surveys, conducted specifically for this Phase 1A (ICT section) Project have been analyzed for this study. Consultations were also held with the general public and other relevant stakeholders of the Phase 1A (ICT section) Project area in order to seek the public opinion on the implementation of the proposed Phase 1A (ICT section) Project. Survey tool used for public consultation for baseline data collection during field visit is attached as **Annex 5-1**. For primary data acquisition, the Environment and Social team conducted the field visit during the months of October and December 2024.

5.2 Physical Resources

5.2.1 Topography

The proposed Phase 1A Project ICT Section through boundary area of Islamabad Capital Territory. The elevation of this Section ranges from 375 m to 600 m. This section near the foothills of Margalla Hills National Park (located 2,017 m away from the RoW) transitions into mountainous terrain, presenting challenges such as steep gradients, and potential flooding, however, landslide is not expected in this Section of the highway.

Figure 5-1, represents the topography of the Aol of the proposed Phase 1A (ICT section) Project Section 7.

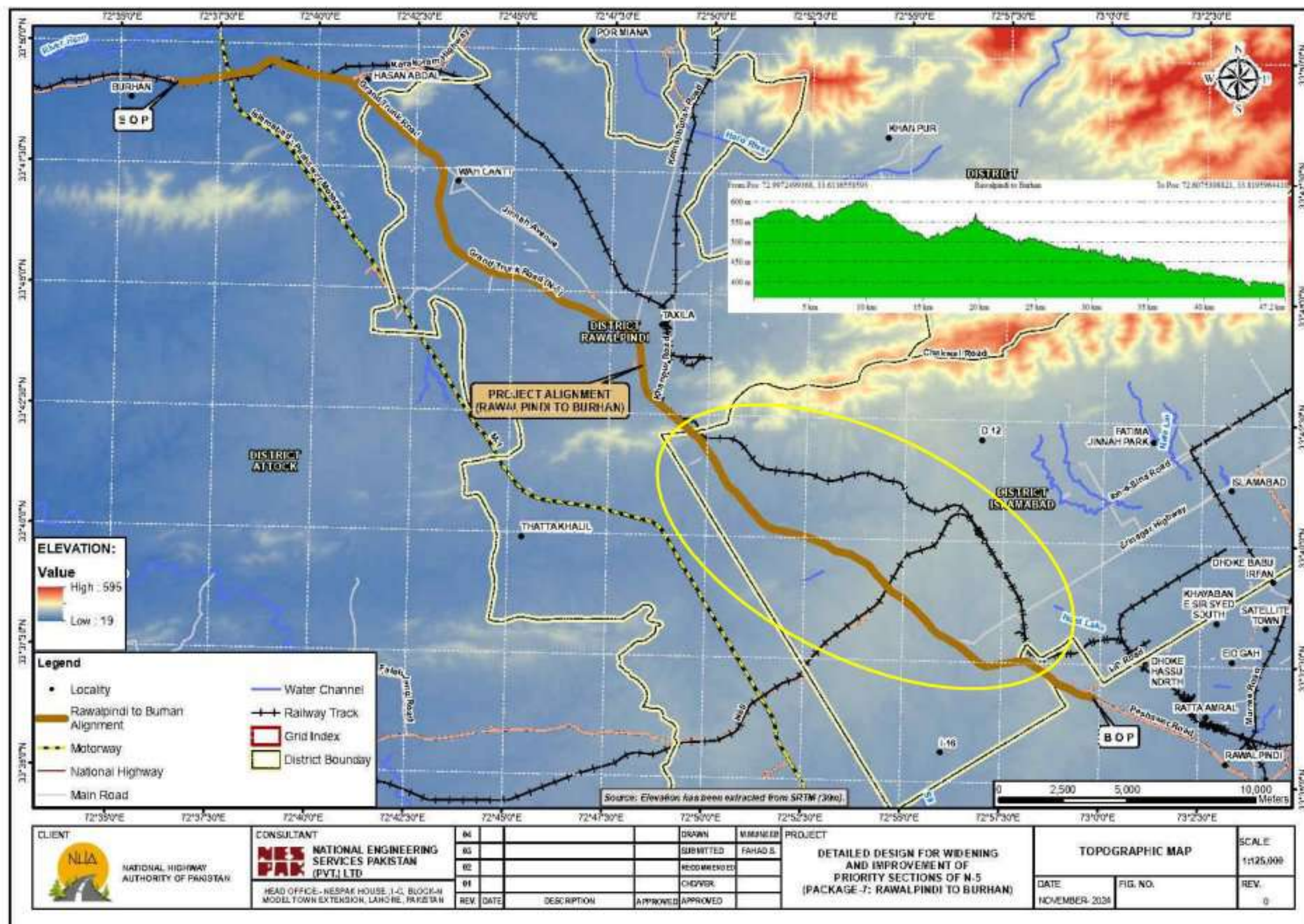


Figure 5-1: Topography Map of Section 7: Rawalpindi to Hassanabdal (ICT section)

5.2.2 Regional Geology

The N5 runs through a variety of terrains including rugged mountainous topography, gently sloping valley side slopes and nearly horizontal valley flats, and vast plains. The highlands among these terrains are generally covered by rocks which exhibit a great diversity among rock types, spatial distribution and their origin. Likewise, the soils covering the low-lands, intermountain valleys and vast plains, comprise a wide range of consolidated and unconsolidated sediments having discrete types and origin. Geological Map of the Section 7 (Including ICT section) is shown in **Figure 5-2**, respectively

The geology of the region is primarily characterized by Mesozoic (Mz) rocks⁴, including sedimentary formations such as limestone and shale, along with Holocene (Q)⁵ deposits of recent alluvial soils and Eocene and Paleocene Rocks (Tep)⁶. This section, including the area around ICT and the Margalla Hills, features more complex geology dominated by limestone, shale, and sandstone formations.

⁴ Includes Cretaceous, Jurassic and Triassic rocks.

⁵ Unconsolidated surficial deposits of silt, sand, and gravel.

⁶ Shallow marine foraminiferal limestone and grey fossiliferous shales, divided into several formations..

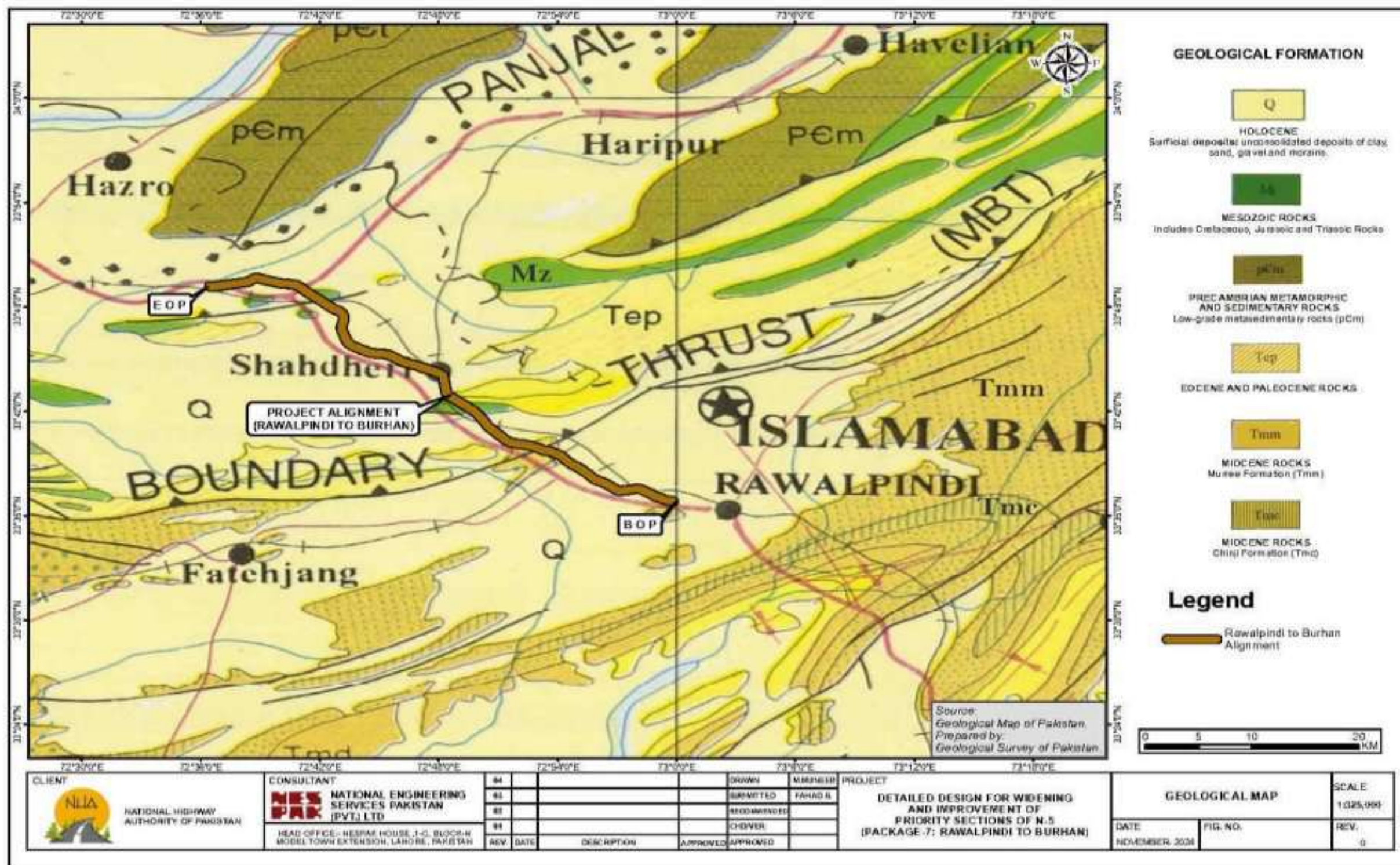


Figure 5-2: Regional Geological Map of Section 7: Rawalpindi to Hassanabdal (ICT Section)

5.2.3 Seismology

On the basis of Peak Ground Acceleration (PGA) values obtained through Probabilistic Seismic Hazard Assessment (PSHA), Pakistan is divided into five (05) seismic zones in line with the Uniform Building Code (UBC), 1997 of the Pakistan. The boundaries of these zones are defined on the basis as shown in **Table 5-1**.

Table 5-1: Values of Seismic Zones of Pakistan

Sr. No.	Zone	PGA (g)
1	1	0.05 to 0.08
2	2A	0.08 to 0.16
3	2B	0.16 to 0.24
4	3	0.24 to 0.32
5	4	> 0.32 g

As per the Building Code of Pakistan (BCP), 2007 (Seismic Provisions), Section 7 (ICT section) fall entirely within zone-2B (Moderate Hazard) with a PGA 0.16 to 0.24g, as shown in **Figure 5-7** respectively. Therefore, all the applicable provisions of BCP should be met during the design and construction for safety against seismic hazards.⁷

⁷ Building Code of Pakistan (Seismic Provisions – 2007), Ministry of Housing and Works

5.2.4 Climate and Meteorology

The climate and meteorology data is obtained from the published data of Climate Normal of Pakistan (1991 to 2020) for each section. For Section 7 (ICT section) reliance is made on Islamabad weather station (coordinates 33° 42' N and 73° 05'E). The monthly data for temperature, rainfall, relative humidity and wind speed from year (1991-2020) for the above mentioned Weather Stations for the Phase 1A (ICT section) Project Area are presented in subsequent section.

i. Temperature

Table 5-2 shows mean minimal and maximal temperatures observed for each month between 1991 and 2020 in the Study Area for Sections 7 (ICT section). The highest temperature measured between 1991 and 2020 was 46.5°C in June 21, 1994, and the lowest temperature was measured in January 26, 2008, i.e., -2.8°C.

Table 5-2: Mean Minimal and Maximum Temperatures between 1991 and 2020

Sr. No.	Months	Mean Minimal Temperature (°C)	Mean Maximum Temperature (°C)
1	January	10.2	18.0
2	February	13.3	20.1
3	March	17.4	24.8
4	April	22.5	30.4
5	May	27.4	35.8
6	June	30.3	37.9
7	July	29.4	35.1
8	August	28.6	33.5
9	September	26.8	33.0
10	October	22.2	30.5
11	November	16.5	25.4
12	December	12.0	20.6

Source: Climate Normal of Pakistan (1991-2020)

ii. Precipitation (Rainfall)

Table 5-3 shows mean monthly precipitation observed in the Study Area from 1991 to 2020. The recorded annual average rainfall in this section is 1320.7 mm.

Table 5-3: Mean Monthly Precipitation (1991-2020)

Sr. No.	Month	Precipitation (mm)
1.	January	62.2
2.	February	96.0
3.	March	95.7
4.	April	63.7
5.	May	40.0
6.	June	78.4
7.	July	329.6

Sr. No.	Month	Precipitation (mm)
8.	August	332.0
9.	September	144.4
10.	October	33.4
11.	November	16.4
12.	December	28.7
13.	Annual	1320.7

Source: Climate Normal of Pakistan (1991-2020)

iii. Relative Humidity

Table 5-4 shows mean relative monthly humidity observed in the study area from 1991 to 2020 for Section 7 (ICT section). The data reveals that at 00:00 hours, the relative humidity levels are generally higher while lower relative humidity levels are recorded at 12:00 hours.

Table 5-4: Mean Relative Humidity (1991-2020)

Sr. No.	Months	Section 7 (ICT)		
		00 UTC	03 UTC	12 UTC
1.	January	91.5	90.8	52.7
2.	February	88.6	86.7	48.4
3.	March	86.9	80.7	43.3
4.	April	83.1	69.0	38.3
5.	May	71.8	54.3	30.9
6.	June	72.7	56.1	34.3
7.	July	86.7	77.3	56.2
8.	August	92.1	84.6	64.5
9.	September	91.5	82.9	58.4
10.	October	91.4	84.8	53.2
11.	November	92.7	89.8	56.4
12.	December	92.6	92.1	55.3

Source: Climate Normal of Pakistan (1991-2020)

iv. Wind Speed

Table 5-5 depicts average wind speed and gust on a monthly basis in the Study Area from 1991 to 2020.

Table 5-5: Average Wind Speed (knots) (1991-2020)

Sr. No.	Months	Section 7 (ICT)		
		00 UTC	03 UTC	12 UTC
1.	January	0.2	0.2	1.4
2.	February	0.3	0.3	2.4
3.	March	0.5	0.4	2.9
4.	April	0.5	0.6	2.5
5.	May	0.6	0.5	2.5
6.	June	0.4	0.6	2.8
7.	July	0.7	0.6	2.1

Sr. No.	Months	Section 7 (ICT)		
		00 UTC	03 UTC	12 UTC
8.	August	0.5	0.5	1.3
9.	September	0.2	0.2	0.9
10.	October	0.1	0.2	0.7
11.	November	0.1	0.1	0.4
12.	December	0.1	0.1	0.7

Source: Climate Normal of Pakistan (1991-2020)

5.2.5 Surface Water Hydrology

The proposed Phase 1A (ICT section) Project is crossed by several major streams, and drainage systems that will affect the hydrological assessment of the Phase 1A (ICT section) Project. Hydrological map of the Phase 1A (ICT section) Project sections is shown in below **Figure 5-3** Major water bodies crossing include Bahudra Khas and other local Nullahs. The flow and quantities are provided in hydrological report (refer Vol. 3: Climate Change Assessment Report).

Considering the slopes, topography of the subproject area and development on the sides of the road at some locations the hydraulic analyses for the cross drainage structures have been taken up. As per hydraulic design guidelines the hydraulic design and review have been carried for the culverts against 25 year return period flood and checked to pass 50 year return period flood, while, 100 year return period flood is used for the bridges Here, in this reach the structures with individual estimated discharge have been reviewed for capacity check and proposed additional barrel where required. Some structures are moderately choked and filled with mud. At some locations, the existing cross drainage structures with mud blockage and minor damages are required cleaning, repair and periodic maintenance for the proper drainage of the design floods. Culvert at three (03) locations are required an additional barrel for each of the size mentioned above for safely pass the flood discharge with climate change effect.

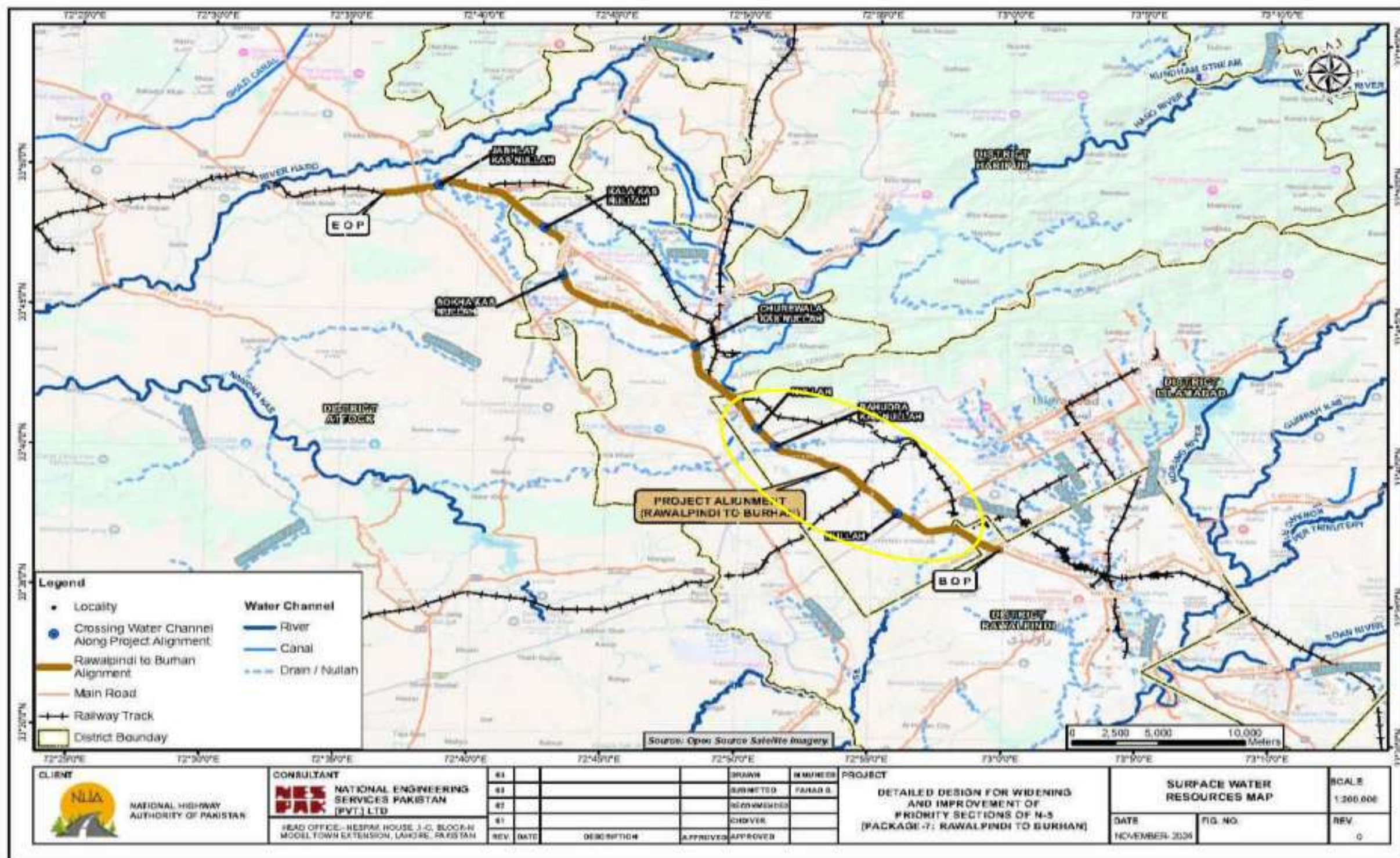


Figure 5-3: Surface Water Resources Map of the Rawalpindi to Hassanabdal Section (Including ICT Section)

5.2.6 Groundwater

Groundwater resources are generally better, with fresh water available in many areas. However, in flood-prone zones (as mentioned in section 5.2.9), the groundwater table may rise during the monsoon season.

5.2.7 Solid Waste

The waste generated in Rawalpindi to Hassanabdal (ICT section), section is primarily municipal, including household, commercial, and some industrial waste. The quantity of waste is substantial, with a significant portion being organic. The primary sources of waste in each sections include residential areas, commercial centers, and industrial sites. The types of waste include organic waste, plastics, paper, glass, and metals. Additionally, there may be construction waste from ongoing domestic projects or past projects and potentially hazardous waste from industrial activities. Capital Development Authority (CDA) is responsible for waste management in the ICT area. They focus on collection, transportation, and disposal. Section face issues with littering and pollution. Inadequate waste collection and disposal systems lead to open dumping, which contributes to environmental degradation and health risks. There is also a lack of proper management for hazardous and construction waste, exacerbating pollution concerns. The situation has been deteriorating due to increasing population, inadequate waste management infrastructure, and insufficient enforcement of waste disposal regulations. The proposed Phase 1A (ICT section) Project itself will generate construction waste, which needs to be managed effectively to prevent environmental impacts.

5.2.8 Environmental Quality

The environmental monitoring of parameters like ambient air quality, noise level, surface water, wastewater and groundwater help us to analyze the prevailing environment conditions in and around the study area, and to protect it from any adverse activities due to the proposed Phase 1A (ICT sections) Project implementation.

The environmental parameters for ambient air, noise level, surface water, wastewater and groundwater were monitored/sampled at different locations of the proposed Phase 1A (ICT sections) Project site in January and February, 2025 for establishing the baseline profile of the Study Area. The monitoring locations are presented in **Figure 5-4** for Section 7 (ICT sections). Third-party laboratories were procured for this activity. The detailed reports are attached as Vol. 4.

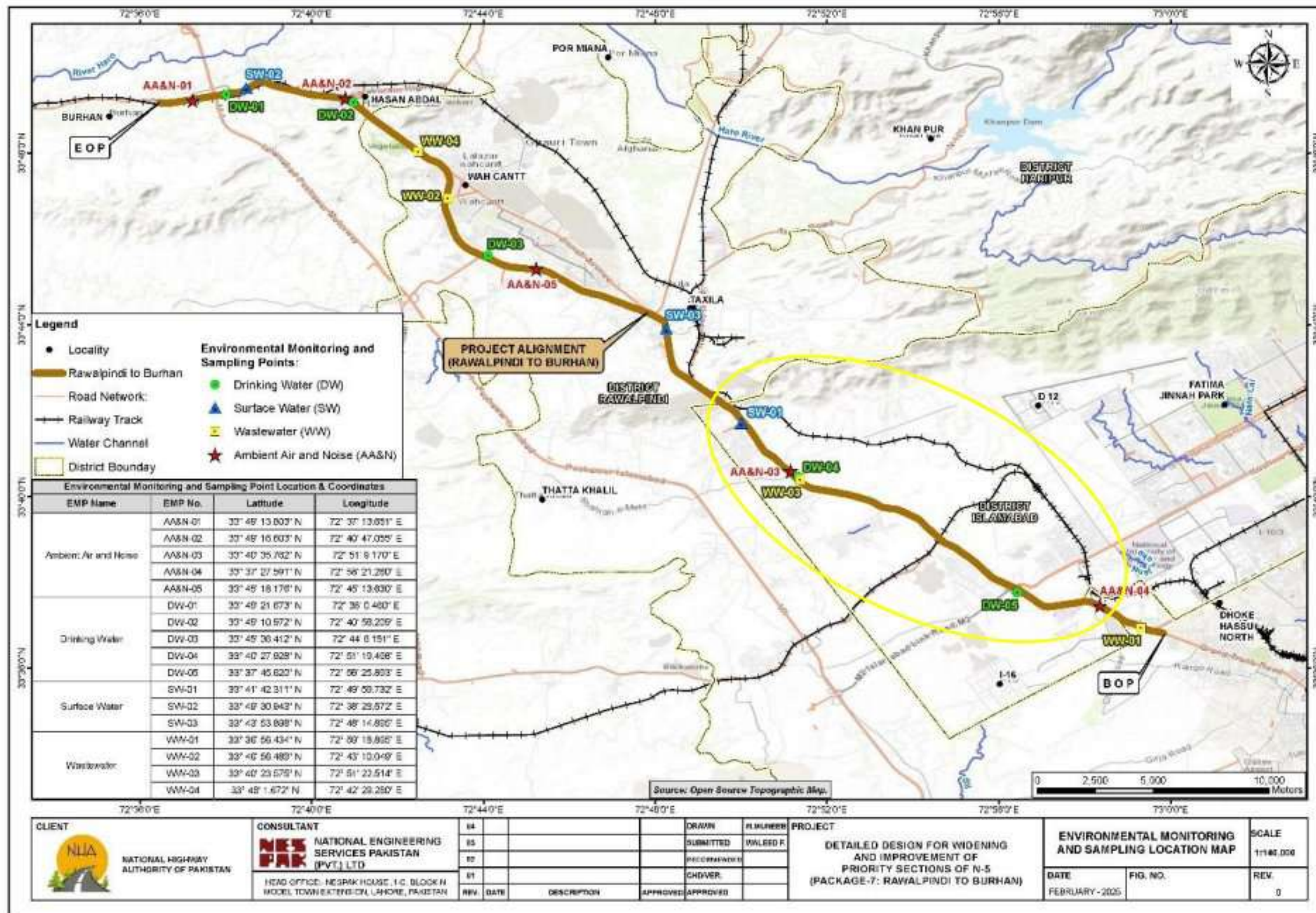


Figure 5-4: Environmental Quality Monitoring Locations (Section 7 ICT sections)

5.2.8.1 Air Quality

Ambient air quality monitoring for Nitrogen Dioxide (NO₂), Nitrogen Oxide (NO), Sulfur Dioxide (SO₂), Carbon Monoxide (CO), and Particulate Matter (PM_{2.5} and PM₁₀) was conducted at the Phase 1A (ICT section) Project Site. Sampling was carried out over a 24-hour period, with measurements recorded at one-hour intervals for all parameters. The results indicate that concentrations of SO₂, PM_{2.5}, and PM₁₀ exceed the stringent emission standards (WHO, NEQS, IFC), likely due to the high traffic volume on the Phase 1A (ICT section) highway, particularly from diesel-powered vehicles.

5.2.8.2 Noise Level

Noise level monitoring was carried out at designated locations using a BENTECH Sound Meter. All measurements adhered to the guidelines outlined in BS 7445:2003. The monitoring process utilized 1/1 Octave band analysis in compliance with IEC 61260-1:2014 and ANSI S1.11-2004. To ensure accuracy, the meters were calibrated and verified before and after each measurement period using a sound level calibrator. Noise levels in all sections of the Phase 1A (ICT section) highway exceeds the stringent emission standards (WHO, NEQS, IFC).

5.2.8.3 Water Quality

Drinking water, surface water and wastewater samples were also collected in the study area and were analyzed for physical, chemical and microbiological parameters. The results of drinking water are in compliance with the stringent limits except for odour and taste issues in a few samples. The results of surface water are in compliance with the stringent limits except for COD issues in a few samples. The results of wastewater are in compliance with the stringent emission standards (WHO, NEQS, IFC) limits except for BOD, COD and TSS issues in a few samples.

5.2.9 Land Use Pattern

The land use of the Phase 1A (ICT section) Project area mainly includes existing road, agricultural land, water bodies, vegetation, residential and commercial areas, masjid, health facilities and educational institutions within the Col. N5 is an existing road so subproject area/ROW is in same condition since long. However, around the N5/Col, the settlements have expanded and commercial activities are increasing with time. The detailed land use maps are provided in **Vol. 5**.

5.2.10 Environmental and Social Sensitive Receptors

Sensitive receptors are people/places more susceptible to the adverse effects of exposure to the pollutants and social disturbance, due to the developmental projects. Thus, sensitive receptors are necessary to be identified, to evaluate the potential impacts of the proposed Phase 1A Project on public health and the environment and adopt necessary mitigation measures to minimize the impact.

The sensitive receptors identified within the Phase 1A (ICT section) Project Aol are: educational institutions, health institutes and religious places. They are prone to sensitivity during construction phase, due to emission of air pollutants, noise and vibration, temporary edifice of construction camps and mobilization issues. There is only one environmental/ecological sensitive receptor in the Aol of Section 7 (ICT section), located beyond the Aol, i.e., buffer zone of Margalla Hills National Park.

The sensitive receptor map of the proposed Phase 1A (ICT section) Project Section 7 is shown in **Figure 5-5**. The detailed list of sensitive receptors for all Sections is attached as **Annex 5-2**.

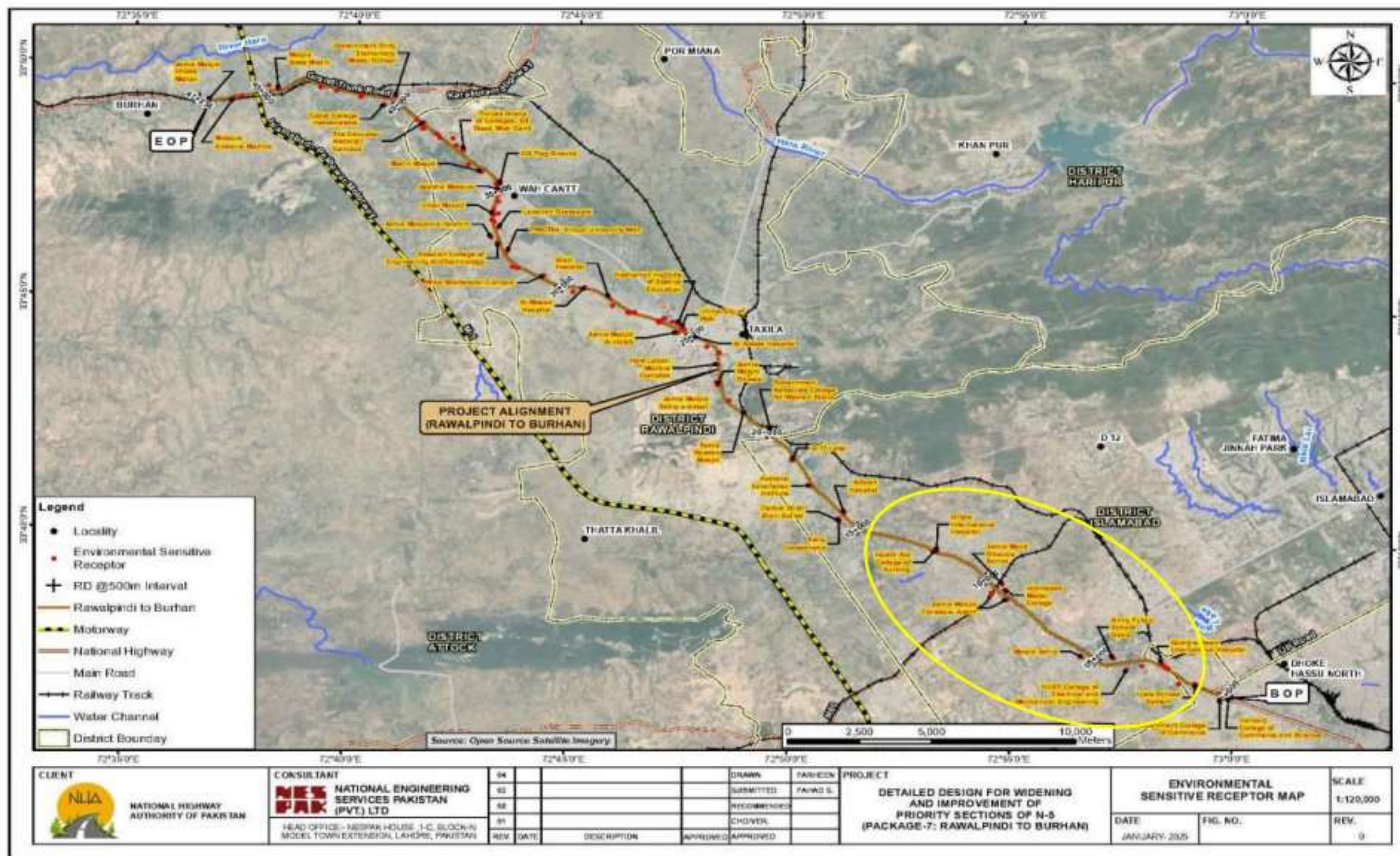


Figure 5-5: Sensitive Receptor Map of Rawalpindi to Hassanabdal Section (ICT section)

5.3 Ecological Resources

5.3.1 Methodology

All the available literature was thoroughly reviewed to have a better understanding of the Phase 1A (ICT section) Project area and its surroundings including habitat, flora, and fauna. The route alignment was thoroughly examined based on the primary and secondary data⁸. This survey broadly covers ecosystem sensitivities (If any), vegetation, other flora, and fauna. Consultations and field visits revealed that some areas of N5 (Section 7: Area between Sangjani Toll Plaza and Taxila bypass) contain dense vegetation and trees within the right-of way.

Ecosystem and Habitat

The climate of the Phase 1A (ICT section) Project area of Section 7 has a typical version of a humid subtropical and dry climate, with five seasons. The study area majorly lies in the sub-tropical scrub zone. The dominant trees species of this natural zone are, Kau (*Olea ferruginea*), Phulai (*Acacia modesta*) and Sanatha (*Dodonaea viscosa*).

The subproject area is under immense anthropogenic/human pressure causes disturbance (illicit tree cuttings, Illegal hunting) and degradation to the natural resources of the zone falling

⁸ Secondary data included but not limited to "Flora of Pakistan by MI-Sheikh", "Birds of Pakistan by ZB-Mirza", "Mammals of Pakistan by TJ Roberts" and "Manual of silviculture for Pakistan [1965] by Champion, Sir H.G.; Pakistan Forest Inst., Peshawar eng; Seth, S.K. Khattak, G.M."

under fully modified criteria. These areas having issues of conversion of green land into agricultural lands, road constructions, residential buildings and also possesses the considerable value of barren land due to external pressures. In this, the natural/original landscape and eco services of the area is almost vanishing and disappeared. Concretes and development by the locals and business development have altered the original conditions. The native species of flora and fauna both were observed and recorded in deteriorated and degraded conditions.

The entire local areas are under degradation due to hazards such as illegal tree cutting, overgrazing, over exploitation of resources, and other biotic factors. Greenery is being lost at a substantially greater rate than regeneration. The Study Area in general is under significant biotic pressure and under retrogression due to various factors such as unsustainable practices, Natural hazards causing the habitat loss, soil erosion and lack of proper functioning of ecosystems. For practical reasons, rarity is often the criterion by which a habitat's value is determined.

Floristic Composition (Flora)

The study area falls in the sub-tropical broad-leaved evergreen scrub forest zone. Dominant tree species include Phulai (*Acacia modesta*), Wild olive (*Olea ferruginea*), Sanatha (*Dodonaea viscosa*), Black Berries (*Monothea buxifolia*), *Reptonia buxifolia*, Beri (*Zizyphus mauritiana*), Royle's Spike Thorn (*Gymnosporia royleana*), Baikarh (*Adhatoda vasica*), Zebrawood (*Pistacia integerrima*), *Tecoma undulate*, and *Capparis decidua* on drier slopes. These are low-branching, small evergreen trees with varying densities. Some of these tree species are thorny. Most of these tree and shrub species produce substantial feed and fodder for wildlife and livestock.. The details of vegetative species of the region are given in **Table 5-6** below:

Table 5-6: Names of Trees/shrubs & Herbs of the Region

Sr. No.	Common Name	Scientific Name
1.	Banyan/Bhor	<i>Ficus benghalensis</i>
2.	Phulai	<i>Acacia modesta</i>
3.	Sanatha	<i>Dodonaea viscosa</i>
4.	Dhak	<i>Butea frondosa</i>
5.	Sukh Chain	<i>Pongamia pinnata</i>
6.	Bottle Brush	<i>Callistemon spp</i>
7.	Jasmine	<i>Jasminum humile</i>
8.	Beri	<i>Zizyphus mauritiana</i>
9.	Baikarh	<i>Adhatoda vasica</i>
10.	Poplar	<i>Populus sp.</i>
11.	Devil Tree	<i>Alstonia scholaris</i>
12.	Bougainvillea	<i>Bougainvillea spectabilis</i>
13.	Dharek	<i>Melia azedarach</i>
14.	Eucalyptus	<i>Eucalyptus camaldulensis</i>
15.	Shisham	<i>Dalbergia sissoo</i>
16.	Mulberry	<i>Morus rubra</i>

The surroundings, in which the Phase 1A (ICT section) Project site exists, were once covered with native vegetation consisting, of trees and a thick cover of bushy vegetation, with the onslaught of civilization, this vegetation was cleared for different commercial and agricultural purposes along the highway due to direct access and expansion of settlements.

The present ecological conditions of the Phase 1A (ICT section) Project area is considered in the category of degraded. The study area is dominated by commercial or residential land use, so no major activities were considered in the past to keep the ecological balance.

The Phase 1A (ICT section) Project area/both sides of the road are dominated by eucalyptus species which are artificially planted. It is important to note that these trees are located within the NHA-owned ROW and are therefore the property of NHA. The felling or uprooting of these trees will be carried out by the contractor engaged under the project, and the felled trees will subsequently be handed over to the Forest Department. The respective Forest Department will be responsible for conducting the auction of the removed trees, ensuring that NHA is duly involved and consulted throughout the auction process.

Fauna/Wildlife

Different areas in the district are home to various species of wildlife, including, exotic birds and carnivores, but specifically, the Phase 1A (ICT section) Project area is found degraded and does not support any designated habitats.

Mammals

There are no wild mammalian species observed in the Phase 1A (ICT section) Project area except some domesticated animals. However, the following **Table 5-7** shows the list of mammalian species present in the region, as the Phase 1A (ICT section) Project area is to be considered highly degraded in terms of wild fauna. The following species are reported in the region.

Table 5-7: List of Mammals

Sr. No.	Mammals	Scientific Name	IUCN Status
1.	Jackal	<i>Canis aureus</i>	Least Concern (LC)
2.	Fox	<i>Vulpes vulpes</i>	LC
3.	Jungle Cat	<i>Felis chaus</i>	LC
4.	Palm Squirrel	<i>Funambulus palmarum</i>	LC
5.	Mongoose	<i>Herpestes auropunctatus</i>	LC
6.	Indian Mole Rat	<i>Rattus rattus</i>	LC
7.	Field Mouse	<i>Funambulus pennant</i>	LC
8.	Porcupine	<i>Hystrix indica</i>	LC
9.	Rabbit	<i>Oryctolagus cuniculus</i>	LC
10.	Cape Hare	<i>Lepus capensis</i>	LC
11.	Masked Palm Civet	<i>Paguma larvata</i>	LC
12.	Wild Boar	<i>Sus scrofa</i>	LC

Amphibians

The amphibians that are found near or around the Phase 1A (ICT section) Project area are given in the **Table 5-8** below.

Table 5-8: Amphibians of the Study Area

Sr. No.	Local/ English Name	Scientific Name	IUCN Status
1	Common Frog	<i>Rana tigrine</i>	LC
2	Common Toad	<i>Bufo bufo</i>	LC
3	Marble Frog	<i>Uperodon systoma</i>	LC

Reptiles

Common Krait is the most common reptile in nearby areas and is occasionally witnessed by the locals. The reptiles that are found near or around the Study Area are given in **Table 5-9**.

Table 5-9: Reptiles of the Study Area

Sr. No.	Local/ English Name	Scientific Name	IUCN Status
1.	Fringed toed Lizard	<i>Acanthodactylus cantoris</i>	LC
2.	Common Krait	<i>Bungarus caeruleus</i>	LC
3.	Viper	<i>Vipera xanthina</i>	LC

Birds – Avifauna

Many bird species have been reported in and around the Aol. These include passage migrants, vagrant, resident, breeding and irregular visitors. The migratory birds descend from higher altitudes during the winter months. It is pertinent to mention that specifically in the subproject area, there is no major water ponds exist in the Aol and no migratory birds were observed. Furthermore, nests of common birds are also exist on the trees within the Aol and median of the road The common birds observed and reported are given in the **Table 5-10** below:

Table 5-10: Birds Found in Study Area

Sr. No.	Common Name	Scientific Name	IUCN Status
1.	Rock Pigeon	<i>Columba livia</i>	LC
2.	Myna	<i>Acrida therestrutis</i>	LC
3.	House Sparrow	<i>Passer domesticus</i>	LC
4.	Red-billed Chough	<i>Pyrrhocorax pyrrhocorax</i>	LC
5.	Magpie	<i>Pica pica</i>	LC
6.	Grey Shrikes	<i>Lanius excubitor</i>	LC
7.	Spotted Doves	<i>Spilopelia chinensis</i>	LC

Endangered Fauna

There are no endangered species of fauna in the Aol of subproject area.

Wetlands

There are no notified wetlands in and around the Phase 1A (ICT section) Project area of Section 7. However, an artificial private lake (B17) exist (location shown in landuse map **Vol. 5**) along the N5 which is not directly impacted by the proposed subproject.

Game Reserves/ Wildlife Sanctuaries

There is no key biodiversity area, game reserve and wild sanctuaries present in and around the Aol as proposed subproject fall in modified habitat as mentioned in section 5.3.2.1. The Margalla Hills National Park buffer area is near to Aol. The National Park buffer area is located 2,017 m away from the RoW. However, Project Aol falls 17 m away from the National Park buffer. The national park buffer will not be affected directly due to the proposed Phase 1A Project activities. The above details are considered after consultation with the Director of Islamabad Wildlife Management Board (IWMB) followed by a joint field visit to verify the relevant boundaries and details/impacts.

5.4 Critical Habitats and Species of Conservation Significance

The Project area predominantly passes through urban settlements. Based on field evaluations, secondary data review, and stakeholder consultations, the area is classified as a "Modified Habitat." Significant anthropogenic activities have altered the primary ecological functions and species composition within the Project Aol. No critical or natural habitats are present in the Project Aol, and no conservation-significant species have been reported. Additionally, the Phase 1A (ICT section) Project sections do not fall within any recognized biodiversity hotspots or key biodiversity areas.

6 SOCIOECONOMIC BASELINE

This section describes the socioeconomic baseline of the project area that covers Rawalpindi – Hassanabdal ICT section (Section 7). The description has been prepared based on census and socioeconomic survey data collected through field research using quantitative and qualitative techniques. The information also gathered through consultation meetings and focused group discussions with project affected people as part of the environmental and social assessments conducted for the project. The data collection process was started during the last quarter of 2024 and completed in February 2025.

6.1 Methodology

A mixed method approach was used in the data collection. The data collection began with a census of all affected households within the project areas. Then, a sample survey of selected PAPs was carried out to gather socioeconomic information at household-level. Finally, a series of focus group discussions (FGDs), including separate FGDs for women were conducted. The FGDs provided avenues to present concerns by the project affected households and communities. The following sections describe the socioeconomic baseline including issues specific to women in each subproject location.

6.2 SOCIOECONOMIC STATUS OF CENSUS HOUSEHOLDS

Section 7: Rawalpindi-Hassanabdal (ICT section) falls in the administrative jurisdiction of the Islamabad Capital Territory (ICT).

Islamabad Capital Territory- Islamabad, the capital city of Pakistan, is the country's tenth-most populous city and is administered directly by the federal government as part of the Islamabad Capital Territory. It was established in 1967 as a planned city to replace Karachi as the national capital. Islamabad is located at 33.43°N, 73.04°E, at the northern edge of the Pothohar Plateau and at the foot of the Margalla Hills. The city's elevation is 540 meters (1,770 feet).

Islamabad, along with the ancient Gakhar city of Rawalpindi, forms a conurbation commonly referred to as the "Twin Cities." To the northeast of Islamabad lies the colonial-era hill station of Murree, while to the north is the Haripur District of Khyber Pakhtunkhwa. Kahuta is situated to the southeast, and Taxila, Wah Cantt, and Attock District are located to the northwest. Gujar Khan, Rawat, and Mandraha are to the southeast, and the metropolis of Rawalpindi lies to the south and southwest.

The city covers an area of 906 square kilometers (350 square miles), with an additional 2,717 square kilometers (1,049 square miles) designated as the Specified Area, which includes the Margalla Hills in the north and northeast. The southern portion of Islamabad consists of an undulating plain, drained by the Kurang River, on which the Rawal Dam is located. As of the 2023 census, Islamabad district has a population of 2,363,863. According to census the male population was 51.48% and 48.51% were female, with a sex ratio of 106.12.

6.2.1.1 Demographic Characteristics of Studied Households

The population of the surveyed households comprised of 1,272 persons and among them, there were more males (53%) than females (47%). The sex ratio is an important demographic indicator, which is defined as the “number of males per hundred females”. As per the social survey, the sex ratio based on the household is 112.7 men per 100 women. **Table 6-1** depicts the demographic characteristics of the studied households.

Table 6-1: Population and Household Size of the AHs

Total Respondents	Population				Total Population	%
	Male	%	Female	%		
187	674	53	598	47	1,272	100

As far as family structure is concerned, about 54% of AHs are living in a joint family system where grandparents also live under the same roof, while 46% percent of respondents reported that they live in a nuclear family system.

6.2.1.2 Age composition of Respondents

Survey shows that 18% of the respondents are up to 25 years of age, 22% of the respondents are between 26 – 35 years, 35% are 36 – 45 years and the remaining 25% are more than 45 years of age. **Table 6-2** depicts the age composition of the respondents.

Table 6-2: Age Composition of Respondents

Sr. No.	Age Composition	Number of Respondent	Percentage
1	18-25	33	18
2	26-35	41	22
3	36-45	65	35
4	Above 45	48	25
Total		187	100

6.2.1.3 Social Background

All the affected persons reported their religion as Islam. Hindko and Pashto are the predominant languages spoken by most respondents, with 88% using these languages as their primary language. Punjabi is also a major language spoken by a significant portion of the population. Additionally, Urdu is widely spoken and understood by most respondents, highlighting its importance as a national language. This bilingual and, in some cases, trilingual proficiency ensures effective communication across diverse social and cultural settings.

The socioeconomic survey also found that various tribes live within the project area. In the districts of Islamabad, the PAPs belong to tribes such as Rajpoot, Syed, Khattar, Dar, Raja, Abbasi, and several others, while other PAPs belong to families like Awan and Gheba. These tribes, with their diverse cultural and regional backgrounds, enrich the cultural fabric of the area. The area’s cultural diversity is not only a source of strength but also adds to its beauty, as it fosters a dynamic blend of traditions, languages, and customs that coexist harmoniously.

6.2.1.4 Educational and Literacy

The census survey revealed that 18% of the population of the AHs are illiterate. The literate population in the surveyed households is 82%, which is higher than the national literacy rate which is 59.13% according to census survey 2023 for both sexes. **Table 6-3** depicts the education and literacy level among AH's members.

Table 6-3: Educational Status AH's Members

Sr. No.	Educational Status	Number	Percentage
1	Illiterate	227	18
2	Primary	197	15
3	Middle	210	17
4	Matric	156	12
5	Intermediate	319	25
6	Graduation	107	8
7	Masters	56	4
Total		1,272	100

6.2.1.5 Occupational Status

Out of the total AH members, 44% of the population consists of children under 10 years, housewives, and unemployed individuals who are not working. The remaining members are engaged in various income earning activities such as daily wage labour and private sector jobs as well as shop keepers for livelihood. **Table 6-4** depicts the occupational status of the AH's members.

Table 6-4: Occupations of AH's Members

Sr. No.	Professional Status	Number	Percentage
1	Up 10 year/unemployed	554	44
3	Shopkeeper	123	10
4	Business	107	8
5	Labor	89	7
6	Govt Job	63	5
7	Private job	265	21
9	Retired/Old	71	6
Total		1,272	100

6.2.1.6 Household Income and Expenditure

The income level of the surveyed AHs was grouped in five ranges. Around 25% of the AHs earn up to rupees 37,000 per month, while 43% AHs earn between rupees 45,001 to 55,000 per month. However, the details on household income are summarized in **Table 6-5**

Table 6-5: Average Monthly Household Income

Sr. No.	Household Average Monthly Income (PKR.)	Number	Percentage
1	Up to 37,000	47	25
2	37,001 to 45,000	23	12

Sr. No.	Household Average Monthly Income (PKR.)	Number	Percentage
3	45,001 to 55,000	46	43
4	55,001 to 65,000	45	24
5	Above 65,000	26	14
Total		187	100

Approximately 11% of the respondents reported a monthly expenditure of up to PKR 37,000. The average monthly income of sizable number of people (43%) ranged between PKR 45,001 and 55,000.

6.2.1.7 Housing Condition and Ownership

People in the project area live in various types of houses. More than half (53%) of the respondents are living in permanent (Pacca) houses which are constructed with superior materials and workmanship. Around 6% of PAPs live in temporary houses with minimal facilities. Out of 187 survey respondents, the majority (88%) indicated that they live in self-owned houses and the remaining 12% live in rented/leased houses. The details on housing condition of the AHs are given in the **Table 6-6**

Table 6-6: Housing Construction Pattern

Sr. No.	Type of House	Number of Respondent	Percentage
1	Pacca	99	53
2	Semi Pacca	77	41
3	Katcha	11	6
Total		187	100

6.2.1.8 Access to Infrastructure Services

Social infrastructure and amenities are readily available and in good condition. People have good household's dwelling, household amenities such as electricity and modern appliances, access to water, fuel for cooking (which is primarily a task for women), and the type of sanitation facilities available as primary indicators for assessing the standard of living. Findings of the survey show that majority of people have good access to health care, centrality schools etc. The details of available social amenities is provided in the **Table 6-7**.

Table 6-7: Access to Social Amenities

Sr. No.	Facility	Number of Respondent	Available (%)
1	Electricity	187	100
2	School	187	100
3	Hospital	187	100
4	Gas	147	79
5	Water Supply	117	63
6	Sewerage	182	97
7	Telephone/ Mobile	184	98

Households depend on several sources of water for domestic use. Public water supply is the main source of water for domestic use in the proposed project area so majority of the respondents, i.e., obtained water from this source, and 37% respondents use public water

supply as source of drinking water. The majority (58%) of respondents are satisfied with the quality of water while 42% of respondents indicated that the quality of water is not satisfactory.

6.2.1.9 Access to credit

There are two types of credit sources available to people: formal sources, such as banks and microfinance NGOs, and non-institutional sources, such as loans from friends and relatives. The survey findings revealed that 12% of the households (AHs) availed the facility of credit, while 88% of the respondents did not borrow but use informal credit sources for urgent need of money.

6.2.1.10 Gender Assessment and Outcome

Women in the subproject areas, like in other project locations, face various challenges, such as limiting women's participation in economic activities, underreporting of sensitive issues like domestic violence or limited job opportunities for women' economic empowerment.

According to the gender assessment, there are several concerns that could potentially affect women within the subproject area. These concerns include access to resources, safety in public spaces, livelihood disruptions during construction, and the adequacy and fair treatment in compensation for affected women. Women also expressed their concern related to the unequal access to employment opportunities under the project, and the potential safety and protection from workers during the project implementation. The FGDs with women group suggested that targeted actions and strategies to be devised to ensure that women are equally informed and supported throughout the project's implementation. A detailed gender action plan has been devised in this regard and included in the subproject RAP.

7 STAKEHOLDER CONSULTATION AND DISCLOSURE

7.1 Introduction

Stakeholder engagement is an inclusive process that actively involves relevant stakeholders throughout the entire project lifecycle. This process requires open, transparent communication, coordination, and consultation to gather input and feedback on project planning, design, and implementation. As outlined in ESS1, “stakeholder consultation ensures that projects and policies align with the needs, expectations, and concerns of all relevant stakeholders. These consultations promote transparency, inclusivity, and sustainability in AIB-funded initiatives.” The Project proponent, NHA, also places significant importance on engaging stakeholders at every stage of the project.

This chapter outlines the objectives, process, and outcomes of the consultations conducted with various stakeholder groups as part of the environmental and social impact assessment. It provides a summary of the concerns and demands raised by stakeholders during the consultation meetings, along with the responses from the project proponent detailing the actions to be taken throughout the project lifecycle to address these concerns. Additionally, the chapter presents the rationale for any concerns or demands that were not accommodated by the project proponent.

7.2 Objectives of Stakeholders Consultations

The core objective of the consultation and participation of the stakeholders was to identify the concerns of the stakeholders about the impacts of the project and to address such issues as early as possible. The specific objectives of the consultation were:

- (i) To obtain knowledge about the people living in the project vicinity and specifically in Aol.
- (ii) Interaction with the local communities to get their views, concerns, and feedback about the Project.
- (iii) Interaction with other interested parties to get their views, feedbacks, and concerns.
- (iv) Collection of primary and secondary data about socio-economic conditions of people.
- (v) To discuss the Project benefits and impacts.
- (vi) Ensure public and community participation for social sustainability.
- (vii) Increase transparency, stakeholders’ understanding and their involvement in decision-making process.

7.3 Stakeholder Identification and Mapping

According to ESS1, “stakeholder” refers to the individuals or groups who: (i) are affected or likely to be affected by the Project (project-affected parties) (ii) may have interest in the Project (other interested parties or organization), (iii) development partners, and (iv) the disadvantaged (disability, literacy and/or language) and vulnerable groups (such as, women). The stakeholders for the N5 Project potentially include affected communities in the project vicinity, government departments and other interested parties, the details are given below:

7.3.1 Project-Affected Parties

Persons, groups and other entities within the project area that are directly influenced (actually or potentially) by the project and/or have been identified as most susceptible to change associated with the project, and who need to be closely engaged in identifying impacts and their significance, as well as in decision-making on mitigation and management measures. Though, FPV does not have any influence on the physical displacement or resettlement, however, the Project Affected Parties (PAPs) are categorized as the affected people residing in the surroundings. **Table 7-1** provides a broad overview of the stakeholder groups identified as PAPs of the Project.

Table 7-1: Project Components and Stakeholder Group and its Impacts including Influence

Project Component	Key Stakeholders	Interest	Influence
Section 7: Rawalpindi to Hassanabdal (ICT section)	Residents and businesses situated along the road corridor and within the AoI - including those near construction camps, batching and bitumen mixing plants, or encroaching on the NHA-owned right-of-way - may experience direct impacts such as livelihood disruptions, social and cultural disturbances, increased noise and dust levels, and heightened vehicular traffic due to the rehabilitation work.	H	M
	Individuals whose businesses might be affected due to roadworks, access issues, or relocation.	H	M
	Communities in the vicinity of the road, including those who depend on the road for access to markets, healthcare, education, etc.	H	M
	Community Leaders in the main settlements	H	H
	Local Government Departments i.e., Tehsil Municipal Administration Offices, NHA field Offices, PIU-HQ, RIU.	H	H
	NGOs focused on environmental and social issues that may be affected by, or have a role in, the project's development.	H	M
Access Road	Squatters and petty businessmen around the access Road-AoI	H	L
	People residing or having land in project AoI, if any	H	L
Definitions: H = High (The peak level of interest and as per the law the highest power of influence, M = Moderate (Greater than normal/usual level of power and interest, L = Low (No/Less than the normal/usual level of interest and power)			

7.3.2 Disadvantaged/Vulnerable Individuals or Groups

Persons who may be disproportionately impacted or further disadvantaged by the project(s) as compared with any other groups due to their vulnerable status, and that may require special engagement efforts to ensure their equal representation in the consultation and decision-making process associated with the project. Engagement with all identified stakeholders will help ensure the greatest possible contribution from the stakeholder parties toward the successful implementation of the project and will enable the project to draw on their pre-existing expertise, networks, and agendas. The vulnerable individuals in the settlements along

the Project AOI include and are not limited to the following:

- Women-headed households or single mothers with underage children.
- Elderly people, especially if they are living alone.
- Young unemployed persons especially from marginal families or communities.
- Persons with physical and mental disabilities and their care givers.
- Minority and transgender community (if any) within the area of influence of the project area.
- Low-income families' dependent on social allowances.
- Internally displaced group due to other interventions of NHA and its allied projects.

7.3.3 Other interested parties

Individuals/groups/entities that may not experience direct impact from the project but who consider or perceive their interests as being affected by the project and/or who could affect the project and the process of its implementation in some way. The projects' stakeholders other than PAPs are categorized as other interested parties and presented in **Table 7-2**.

Table 7-2: Types of Stakeholders' Interest and Influence Concerning the Project

Key Stakeholders	Interest (High/Low)	Influence/Power (High/Low)
Different Government Bodies (permitting and regulatory agencies at the federal and provincial levels) government officials.	May be interested to have a say in the Project from administrative and policy/regulatory point of view, EPA -Pak, Wildlife, Forest Departments, etc.	Have the power and influence of permitting and regulatory issues including environmental, technical, social protection and labor authorities.
Residents of the nearby settlements within the project area but beyond the Aol.	Can get benefit from employment and training opportunities stemming from the Project.	May be impacted but have limited power and influence to the Project.
NGOs on the international, regional, national, and local levels that pursue environmental, socio-economic, and gender related interests,	May have high interest in the project and mobilization of local/national and even international opinion and intervention.	Organizations within this group are likely to be located outside the project's Direct Area of Influence.
Locally influential people (political leaders, Community leaders not from the main settlements in Aol).	May be interested to have a strong say to keep their leadership and stronghold in the local power structure.	Have highest level of influence in the community.
Truck and bus companies, traders and trade bodies both at local and national level.	Would be interested to have a share from the Project.	Business owners and providers of services, goods and materials within the Project area that will be involved in the Project's wider supply chain.
Mass media and associated interest groups, including local, regional, and national printed and broadcasting media, digital/web-based entities, and their associations.	May be interested to have a say in the Project and mobilize for and/or against the Project.	Can influence the Project activity by publishing news and views, including construction.

7.4 Consultations Process and Methods Used

For stakeholders' consultations, the following main principles were followed:

- (i) The scope, benefits and impacts of the Project are clarified at the outset.
- (ii) The participation of stakeholders must be meaningful, fair and effective.
- (iii) Inclusion of all relevant stakeholders including interested parties and making them understand the ownership of the project.
- (iv) Be specific and do not oversell.

7.4.1 Scoping Sessions

The Consultants' team consisting of environment and social experts along with NHA/ESAL staffs conducted these sessions. The major stakeholders include business, households of the Project area, local residents, local Government representatives and other interested parties, i.e., local NGOs working in the Project area. Efforts were made to share Project information with the resident of local community about Phase 1A (ICT) road Sections.

The scoping sessions were also held with the relevant government officials and institutional stakeholders. The Government offices consulted included the NHA, Departments of Wildlife, Climate Change, Communication and Works, Forest, and Fishery Officials.

7.4.2 Social Surveys, Meetings and Group Discussions

The consultations have been performed as part of the socioeconomic surveys by following three modes that include; 1) Individual Household Socio-economic Surveys; 2) meetings with PAPs, 3) community meetings/consultations and semi-structured interviews, 4) one-on-one meeting/ interviews with the government, private and civil society institutions. The details of the consultation methods with different stakeholders are given in **Table 7-3**.

Table 7-3: Stakeholders Consultation Methods

Type of Stakeholder	Methods	Points Discussed
PAPs and Local Communities	- Meetings at designated place in the Community - Semi-structured interviews - Group Discussion with elders, local leaders, and businesses. - Household Surveys	- Participants were briefed about the Project objectives and scope. - Project components, activities, and main Social and Environmental impacts.
Local Government Bodies	- Meetings through official communication - Group discussions	Needs, priorities and feedbacks on project interventions.
Women	- Meetings in their respective homes - FGDs at place where women were conveniently available and were comfortable for discussions.	- Grievances redress mechanism/ procedure - General information about project benefits.
Surrounding Communities	Focused group discussions with communities along the access road	Socio-economic conditions and general information

Type of Stakeholder	Methods	Points Discussed
Other Interested Parties	Surveys	about concerned villages in AOI.
	Consultative meetings with the officials of different Government Departments were done in their respective district and provincial offices.	Minutes of the consultations with other interested parties are presented in Annex 7-1.

For community consultations, the community members were notified in advance to assemble in common/designated places. Mainly key informants were consulted for these meetings which were carried out in an open and frank atmosphere conducive to appreciation of the basic elements of the project and dissemination of information on beneficial and adverse impacts and mitigation for adverse impacts. Information on positive and negative impacts associated with construction and operational stage and proper mitigation of adverse impacts were shared at these consultations.

The main focus of the consultations remained mainly associated with the local communities living in the vicinity of the Phase 1A (ICT section), Section 7 road. Locations of the settlements / urban areas where the household socioeconomic surveys, community consultations. and focus group discussions have been conducted are outlined in Error! Reference source not found..

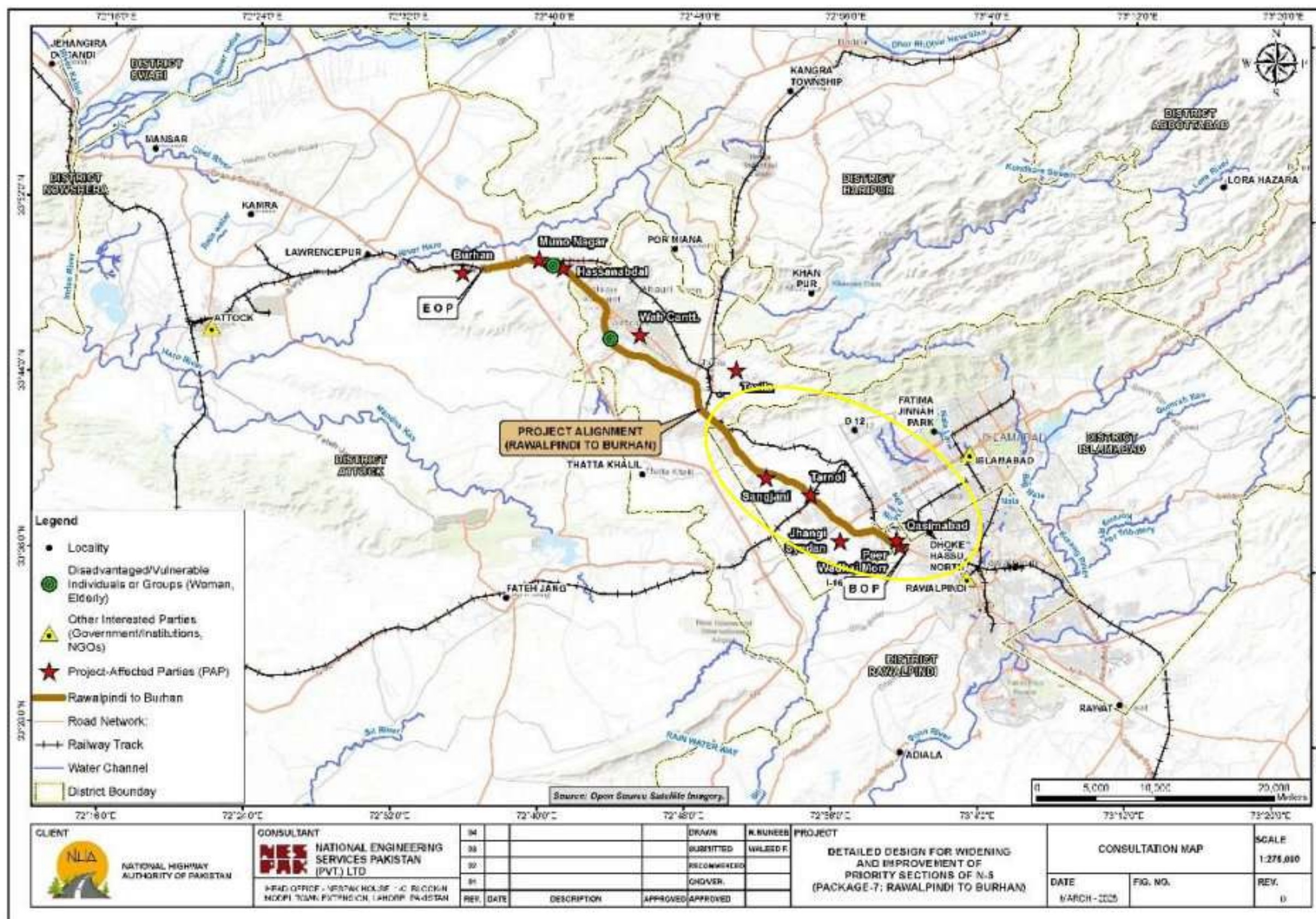


Figure 7-1: Consultation locations, Section 7 Project Area (ICT section)

7.5 Details of Consultations

The two stages consultation were carried out or planned, as:

- (i) The consultations were conducted by the Social & Environment Team of the Design Consultant during September and November, 2024, in the project area while preparation of the design basis report. Total thirteen group discussions were carried out including with the women in the project area.
- (ii) During the review and updating of EIA by the Independent Review Consultant during February to April 2025.

A total of 1,327 people were consulted during the Project preparatory stage by various team, including during the socioeconomic survey. Around 21% of Section 7 households belongs to ICT section's settlements and urban centers, have been consulted. In addition, 15 people consulted from different government departments and NGOs. The details are presented in **Table 7-4**.

Table 7-4: Consultation Meetings – Summary

Consultations	Type of Stakeholders	Number of persons Consulted
Section 7: September and October, 2024 April 2025	Community / PAPs/Vulnerable	1,327
Section 7 October and November 2024	Other interested parties	15

7.5.1 Consultations – Scoping Sessions

The consultations during scoping session, held for the purpose of scoping and awareness, were held during September and November 2024. During Scoping Sessions, the consultations were held with the community including vulnerable groups, urban centers, Government Departments and NGOs in the project area. There was a total of 13 sessions held with the community, with a total of 113 participants. As for the government and NGOs, a total of 32 sessions were held. The main findings of the consultations and the response is summarized in Section 7.5.3 below and the detailed Minutes of Meetings are presented in Annex 7-1.

List of the stakeholders and their signatures are presented in Annexure I of SEP, copies of the official communications to various government departments and NGOs in Annexure II of SEP, and photos taken during institutional and community consultations are presented in Annexure III of the SEP.

7.5.2 Consultations/Public Hearing- EIA Disclosure

The public hearing to fulfil the requirements of EPAs to obtain Environmental Approval/NOC and further community consultations, including women, will be held in the Project area.

7.5.3 Outcome of Consultations, views/concerns/Feedback

Feedback from the consultations was overall supportive of the project from both local communities and the government agencies, but a general request was made to enhance the

benefits of the project to the local communities through the provision of social development services.

Table 7-5 summarizes the issues raised, suggestions/demands from the community and the commitments made by the Project Proponent to address the issues raised. The main suggestions from institutions and responses are summarized in **Table 7-6**.

Table 7-5: Feedback from Affected Communities

Issue Raised by Participants	Suggestions from Participants	Commitments by Project Proponent
Access problems due to construction	Local people should not be restricted from their settlements and farmland.	Proper access will be provided to the local people to reach surrounding areas easily.
Disturbance to social amenities	Social amenities should be restored after the construction completes to avoid inconvenience.	Social amenities will be restored after construction and before the operation of the road.
Restricted movement, especially for women, due to labor influx	Construction should be scheduled to allow free movement after working hours.	People should be informed about construction schedules to ensure safe movement.
Dust and noise disturbances to residential and commercial areas	Protective measures should be taken to safeguard the local community.	Contractors must follow dust suppression measures as per the recommendation of the ESMP and other precautionary measures to protect public health and property.
Employment opportunities for local workers	Skilled and unskilled labor should be hired from the local community to improve project acceptance.	Contractors will be encouraged to prioritize hiring local workers. The EIA aims for up to 70% local workforce, and ESMP will propose training programs through a skill development program for the local unemployed youths.
Poor drainage system causing waterlogging	A proper drainage system should be designed alongside the road.	The Design Consultant evaluated the drainage system, identifying bottlenecks based on 2022 flood damages and future projections. To improve climate resilience, cross-drainage structures and mitigation measures were incorporated into the design. Many culverts and bridges were clogged with mud, obstructing flow. The climate change assessment recommended increasing capacity for 10 bridges and 10 culverts, clearing mud from 8 culverts and 7 bridges, and replacing 1 bridge and 8 culverts.
Minimizing disruption during civil works	Construction should be done in small patches and completed quickly to reduce community disturbance.	Contractor's construction schedule will be sustainable in nature to minimize delays and disruptions and allow diversion route to detour traffic.
Traffic congestion due to construction vehicles	A traffic management plan should be prepared, and alternative routes should be provided.	Contractors will be required to prepare and implement a Traffic Management Plan (TMP).

Issue Raised by Participants	Suggestions from Participants	Commitments by Project Proponent
Dust pollution causing health issues	Regular water sprinkling should be done to control dust.	Contractors must follow dust suppression measures as per the recommendation of the ESMP and other precautionary measures to protect public health.

Table 7-6: Feedback from other interested parties

Key Concern	Response/Action
<i>Islamabad Capital Territory</i>	
Officials highlighted that the Phase 1A, Section 7: Rawalpindi to Hassanabdal of N5 passes near Margalla National Park, requiring wildlife protection measures during design and construction. Approval from Islamabad Wildlife Management Board (IWMB) will be required before construction begins.	Consultation with IWMB revealed that the Margalla Hills National Park buffer area is located 2,017 m away from the RoW. However, Project Aol falls 17 m away from the National Park buffer. The national park buffer will not be affected directly due to the Project construction. Thus, no direct impact on the protected area and endangered species of Flora and Fauna are expected.
The Federal EPA handles EIA/IEE matters and no cultural heritage sites were identified near the N5, though verification will be conducted after the final design. Officials recommended including a chance-find procedure and consulting stakeholders at every stage.	A chance-find procedure is included in the ESMP.
Key environmental considerations include minimizing tree cutting, identifying locations for construction camps, traffic diversion plans, material storage arrangements, dust control, and proper demolition of waste disposal.	EIA has been addressed these issues in greater details with mitigation and compensation measures

Two consultation sessions were conducted with vulnerable groups, especially with women. During consultations with women, a number of issues were raised, such as, design considerations for enhance safety, economic opportunities, and overall well-being for women, while minimizing cultural disruptions. A well-planned approach that respects religious sensitivities, ensures women's security, and mitigates resettlement impacts will lead to greater social acceptance and long-term sustainability of the project.

Table 7-7 presents the feedback received from the vulnerable groups and corresponding responses.

Table 7-7: Feedback from the vulnerable group (women)

Key Concerns	Response/Action
Gender-Sensitive Highway Planning: Dedicated waiting areas for women should be constructed at transport stops to ensure safety, privacy, and comfort. These stops should be well-lit, equipped with seating, and located in secure areas.	Engineering design will consider dedicated waiting areas for women, sufficient benches, shade structures, and accessibility ramps for elderly women, pregnant women, and women with disabilities.

Key Concerns	Response/Action
• Safe Routes to Schools: Schools, especially those with female students, should have pedestrian-friendly access with zebra crossings, road over-bridges, and speed restrictions in school zones. • Security Measures: Deployment of female security personnel, CCTV surveillance, and emergency helpline numbers at transport stops to prevent harassment and ensure a safe commuting experience.	• Enhancing pedestrian-friendly access in the engineering design, such as, zebra crossings and marked pathways in the selected urban locations or pedestrian bridges and underpasses, and drop-off zones and walkability. • NHA will consider recruiting female security personnel in the woman only bus stops. • CCTV surveillance will be considered in all bus stops in urban centers. • Sign for emergency helpline numbers are considered in the design.
• Pink lanes and separate bus stops for women to prevent overcrowding and harassment. • Addressing women's essential needs, such as, clean drinking water, health facilities • Training and employment opportunities	• Pink lanes may not be possible, however, separate bus stops will be considered for women in the engineering design. • Clean drinking water and health facilities are beyond the jurisdiction of NHA. • ESMP has considered skill development program under Phase 1A and woman can have access to this training.
• Addressing resettlement issues and livelihood concerns • Privacy and security concerns during construction work • Avoid child labor	• RAP will address the resettlement, compensation and livelihood restoration. • The Project has considered Sexual Exploitation and Abuse (SEA)/Sexual Harassment (SH) and Gender Based Violence (GBV) Prevention Procedures in the LMP. • Child and Forced Labor Avoidance Procedures are developed in the LMP

7.6 Future Consultation

The primary objectives of the stakeholder engagement plan are to:

1. **Build and maintain constructive relationships** with identified stakeholders.
2. **Assess stakeholder interest and support** for the project while ensuring their views are considered in project design, as well as in environmental and social performance.
3. **Provide timely and accessible project-related information**—especially regarding potential impacts—in a clear, understandable, and appropriate format.
4. **Establish an inclusive grievance mechanism** that allows stakeholders to raise concerns and ensures that the National Highway Authority (NHA) can respond and manage grievances effectively.

As a standard practice, key project documents—including the ESIA/EIA, Environmental and Social Management Plan (ESMP)/EMP, Environmental and Social Management Framework (ESMPF), Stakeholder Engagement Plan (SEP), and Labor Management Plan (LMP)—will be made publicly available through NHA field offices, the project's dedicated website, and the official NHA website.

A comment register will be maintained for stakeholders to provide feedback, which will be formally documented by the Environmental, Social, Health, and Safety Section (ESHS Section). This approach will also be applied to any additional environmental and social (E&S) appraisal materials developed during the project.

To ensure accessibility, executive summaries of the ESIA/EIA, ESMPF, SEP, and other E&S documents will be made available in Urdu for public review. Additionally, the SEP will be published simultaneously with other E&S documents, including the ESIA/EIA and ESMPF reports.

For wider public access, free printed copies of project summaries, ESIA/EIA, ESMPF reports, and other E&S documents will be provided in Urdu and English at the following key locations, ensuring transparency and inclusivity in the engagement process:

- The Project Management Unit in Islamabad
- The district administration office – Khairpur, Sukkur, Rawalpindi, Attock, ICT, Nowshera and Peshawar.
- Project ESHS Section
- Other designated public locations to ensure wide dissemination of the materials
- Newspapers, posters, radio, television
- Information centers and exhibitions or other visual displays
- Brochures, leaflets, posters, nontechnical summary documents and reports.

Electronic copies of the E&S documents (ESIA/EIA, ESMPF, SEP, LMP, etc.) on the project website will allow stakeholders with access to Internet to view the information about the planned development and to initiate their involvement in the public consultation process. The website will be equipped with an on-line feedback feature that will enable readers to leave their comments in relation to the disclosed materials. The mechanisms which will be used for facilitating input from stakeholders will include press releases and announcements in the media, notifications of the disclosed materials to local, regional, and national NGOs as well as other interested parties.

7.7 Stakeholder Engagement Plan

A Stakeholder Engagement Plan has been developed in accordance with the AIIB ESF guidelines. The SEP serves as a structured approach for the NHA and other relevant stakeholders to conduct socially and gender-inclusive consultations with both primary and secondary stakeholders. It facilitates the systematic documentation of stakeholder views and concerns while ensuring the implementation of appropriate mitigation measures.

The plan is designed to promote active and meaningful engagement, particularly among PAPs and vulnerable groups. It also guarantees the timely disclosure of project-related information. By effectively implementing the SEP, the project will enhance stakeholder relations, mitigate risks, and maintain transparent communication with PAPs and other affected communities throughout the project lifecycle.

7.8 Access to Information

The EIA and its Executive Summary will be disclosed to stakeholders and submitted to the AIIB for publication on its external website. Additionally, the Urdu version of the Executive Summary will be shared with the community to ensure accessibility.

For public access, hard copies of these documents will be made available at local administration offices, the NHA Islamabad office, and NHA field offices.