Initial Environmental Examination

Date: April 2026

Pakistan: Khyber Pakhtunkhwa Health Systems Strengthening Program (KPHSSP)

Revamping of Non-Teaching District Head Quarters (DHQs) Hospitals across KP, Phase-I

Volume I

Prepared by Project Management Implementation Unit (PMIU), Communication and Works (C & W) Department, Government of Khyber Pakhtunkhwa, Pakistan for the Asian Development Bank (ADB).

CURRENCY EQUIVALENTS

(As of 15 April 2026)

Currency unit	**Pakistani Rupees (PRs)**
PRs1.00	= $ 0.0036
$1.00	= PRs 279

UNIT CONVERSIONS

1 gallon (US)	_	3.785 liter
1 gallon/day	_	0.003785 m^3/day
1 m^3/day	_	0.0416 m^3/hr
1 Cusec	_	28.31 liters/sec
1km	–	1000 m
1ft	–	12 inches
1 acre	–	4,046.8 m^2

LIST OF ABBREVIATIONS

AOI	Area of Influence
ADB	Asian Development Bank
AJ&K	Azad Jammu and Kashmir
AIP	Access to Information Policy
AHUs	Air Handling Units
AVVSU	Area Valve Service Unit
BCP	Building Code of Pakistan
CAP	Corrective Action Plan
CCTV	Closed-Circuit Television
CCU	Coronary Care Unit
CoC	Code of Conduct
COP	Conference of Parties
CPID	Consultations, Participation and Information Disclosure
CUs	Condensing Units
C&W	Communication and Works
DMCs	Developing Member Countries
DHQ	District Head Quarter
EA	Environmental Assessment
EIA	Environmental Impact Assessment
EPA	Environmental Protection Agency
EMP	Environmental Management Plan
E&S	Environmental and Social
ELV	Extra-Low Voltage
ERP	Emergency Response Plan
GBV	Gender-Based Violence
GHGs	Green House Gases
GoP	Government of Pakistan
GOKP	Government of Khyber Pakhtunkhwa
GRM	Grievance Redress Mechanism
GRC	Grievance Redress Committees
HSE	Health, Safety and Environment
HVAC	Heating, Ventilation and Air Conditioning
ICT	Information and Communication Technology
ICU	Intensive Care Unit
IEE	Initial Environmental Examination
IFC	International Finance Corporation
IPC	Infection Prevention and Control
IUCN	International Union for Conservation of Nature
JICA	Japan International Cooperation Agency
KDA	Karak Development Authority
KPHSSP	Khyber Pakhtunkhwa Health Systems Strengthening Program
KP	Khyber Pakhtunkhwa
Km/h	Kilometer Per Hour
LAAP	Local Area Alarm Panel
NCS	National Conservation Strategy
NEQS	National Environmental Quality Standards
NESPAK	National Engineering Services Pakistan
NDMA	National Disaster Management Authority
NOC	No Objection Certificate
NPO	No Project Option

NS	Not Specified
Mm	Millimeter
OIC	Organization of the Islamic Conference
O&M	Operation and Maintenance
OT	Operation Theater
OPD	Outpatient Department
OHS	Occupational Health and Safety
PCC	Plain Cement Concrete
PDA	Peshawar Development Authority
PEPA	Pakistan Environmental Protection Act
PHED	Public Health Engineering Department
PMIU	Project Management Implementation Unit
PPE	Personal Protective Equipment
PM	Particulate Matter
PGA	Peak Ground Acceleration
PVC	Polyvinyl Chloride
RCC	Reinforced Cement Concrete
SAARC	South Asian Association for Regional Cooperation
SC	Supervision Consultant
SH	Sexual Harassment
SGCs	Site Grievance Committees
SDGs	Sustainable Development Goals
SPS	Safeguard Policy Statement
SSEMP	Site Specific Environmental Management Plan
SEA	Sexual Exploitation and Abuse
SLGFPs	Site-Level Grievance Focal Points
Sq. Kms	Square Kilometers
TMA	Tehsil Municipal Administration
UNFCCC	United Nations Framework Convention on Climate Change
USEPA	United States Environmental Protection Agency
UNO	United Nations Organization
UG	Underground
VOCs	Volatile Organic Compounds
WSSP	Water and Sanitation Services Peshawar
SWM	Solid Waste Management
WHO	World Health Organization

WEIGHTS AND MEASURES

^{o}C	–	Degree Celsius
dB	–	Decibel
Km	–	Kilometer
Kph	–	Kilometer per hour
LAeq	–	Equivalent Continuous Sound Level 'A weighting' – 'A'- weighting = correction by factors that weight sound to correlate with the sensitivity of the human ear to sounds at different frequencies
m	–	Meter

NOTES

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

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Khyber Pakhtunkhwa Health Systems Strengthening Program (KPHSSP)

Revamping of Non-Teaching DHQ Hospitals across KP, Phase-I

INITIAL ENVIRONMENTAL EXAMINATION

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EXECUTIVE SUMMARY

INTRODUCTION

1. Khyber Pakhtunkhwa faces persistent healthcare challenges, including limited access to quality services and overburdened tertiary hospitals. To address these issues, the Government of Khyber Pakhtunkhwa has launched the Revamping of Non-Teaching DHQ Hospitals Program to strengthen secondary healthcare services through infrastructure upgrades, improved equipment, and enhanced service delivery.

POLICY, LEGAL AND ADMINISITRATIVE FRAMEWORK

2. The proposed project has been prepared in line with ADB Safeguard Policy Statement (SPS) 2009 and classified as Category B. The project complies with applicable national laws and policies, including environmental protection, water, labor, heritage, building, and waste management regulations, as well as provincial frameworks under the KP Environmental Protection Act (2014) and Environmental Assessment Rules (2021). International obligations, including ADB SPS (2009) and relevant ILO conventions, are also adhered to, ensuring compliance with environmental assessment, labor standards, and social safeguards.

DESCRIPTION OF THE PROJECT

3. The proposed project includes upgradation of six secondary healthcare facilities in Peshawar, Charsadda, Karak, Haripur, and Abbottabad including rehabilitation of existing infrastructure, installation of modern medical and support systems, and improvement of utilities such as water supply, sanitation, electricity, drainage, and healthcare waste management. The project integrates civil, mechanical, electrical, ICT, and environmental interventions without any additional land requirements.

4. The project will be implemented over 24 months with an estimated cost of Rs. 3,952.451 million, involving about 150 personnel across sites. Construction activities will use standard equipment and temporary arrangements in line with applicable codes and specifications.

DESCRIPTION OF THE ENVIRONMENT

5. Baseline conditions were established using primary and secondary data. Field surveys conducted by the NESPAK team in October 2025 and February 2026 covered physical, biological, and socio-economic aspects, and were supplemented with secondary sources and field observations to ensure reliability and comprehensive impact assessment.

6. The hospital sites are located in five districts of Khyber Pakhtunkhwa namely; Peshawar, Charsadda, Karak, Haripur, and Abbottabad. encompassing diverse physiographic zones ranging from fertile alluvial plains in Peshawar and Charsadda to semi-arid plateau conditions in Karak and hilly, mountainous terrain in Haripur and Abbottabad,

including parts of the Lesser Himalayan region. This variation is reflected in the corresponding differences in geology, soils, and water availability across the project area.

7. The project area shows marked variation in geology and soils, ranging from fertile alluvial, fluvial, and lacustrine deposits in Peshawar and Charsadda to mixed sandy loam and silt loam soils in Karak with alkaline conditions. Haripur features loess and piedmont deposits, while Abbottabad is characterized by complex alluvial and mountainous formations with gravel, sand, and silty soils reflecting Himalayan geology. Overall, soil fertility and geological complexity decrease from productive plains to structurally complex upland areas.

8. The project districts are supported by diverse surface water resources, including rivers, canals, dams, and seasonal streams, serving irrigation, drinking water, hydropower, and flood management needs. Peshawar and Charsadda benefit from the Kabul and Swat river systems and associated canals, while Karak remains relatively water-scarce, relying on small dams and seasonal flows. Haripur and Abbottabad have abundant river systems and major dams fed by mountainous catchments. Overall, hydrological conditions vary significantly, from water-rich northern districts to comparatively dry southern areas.

9. The project districts exhibit distinct climatic regimes ranging from semi-arid to humid temperate conditions, with marked seasonal variations in temperature, rainfall, humidity, and wind patterns. Peshawar and Charsadda experience hot summers exceeding 40°C, mild winters, and monsoon-driven rainfall, while Charsadda receives comparatively higher precipitation with occasional extreme rainfall events. Karak is predominantly arid to semi-arid, characterized by very high summer temperatures, low and erratic rainfall, and high evaporation rates, resulting in water scarcity. In contrast, Haripur has a humid subtropical climate with stronger monsoon influence and relatively higher rainfall, while Abbottabad experiences a humid to sub-humid temperate climate with cooler winters, frequent frost conditions, and the highest precipitation among the districts. Across all areas, wind speeds remain generally moderate, and climatic conditions are strongly seasonal, influencing agriculture, water availability, and construction planning, particularly in terms of heat stress management, drainage design, and scheduling of works.

10. Water supply in the project districts primarily depends on groundwater through tube wells, but is affected by declining water tables, infrastructure inefficiencies, and localized shortages, particularly in Karak and Abbottabad.

11. Sewerage and drainage systems are generally underdeveloped, with limited or no wastewater treatment facilities. Most districts, including Peshawar, Charsadda, Karak, Haripur, and Abbottabad, rely on inadequate networks that result in direct discharge of untreated wastewater into drains, rivers, or natural streams, posing environmental and public health risks.

12. Solid waste management systems across all districts are inadequate, characterized by irregular collection, lack of sanitary landfills, and widespread open dumping.

13. Field surveys at healthcare facilities revealed improper disposal of medical waste including waste water and absence of designated hazardous waste storage areas.

14. Environmental monitoring conducted in March 2026 indicated that ambient air quality is generally within limits for gaseous pollutants; however, particulate matter (PM_{10} and $PM_{2.5}$) exceeds permissible levels at Peshawar, Haripur, and Abbottabad, reflecting urban traffic and dust conditions. Noise levels at all locations exceed NEQS limits for silence zones, largely due to surrounding traffic and commercial activities. Wastewater quality exceeded limits of BOD_5 and COD in Haripur and Abbottabad, indicating organic pollution in discharged effluents, while other parameters remain within limits. Groundwater samples indicated microbiological contamination at Maulvi Jee, Karak, and Abbottabad hospitals, highlighting inadequate sanitation and distribution system hygiene.

15. The proposed project will be implemented within existing hospital premises on already designated institutional land, with no requirement for land acquisition or change in land use. Surrounding areas are mainly residential, commercial, and mixed-use, and have been considered in assessing potential indirect impacts such as noise, dust, and temporary traffic disruption during construction.

16. Key sensitive receptors include hospital facilities such as wards, outpatient department (OPDs), emergency units, and operation theatres, along with on-site prayer areas. Nearby staff housing and mosques are also noted as external receptors; however, they are unlikely to experience significant impacts due to their distance from active construction zones.

ECOLOGICAL ENVIRONMENT

17. The project districts exhibit diverse vegetation ranging from agricultural and subtropical thorn vegetation in Peshawar and Charsadda, to semi-arid scrublands in Karak, subtropical forests in Haripur, and moist temperate Himalayan forests in Abbottabad. Flora is largely influenced by agriculture and human settlement, while faunal diversity is limited to common, adaptable species. No protected areas, critical habitats, or significant wildlife populations were identified within the project area.

SOCIO-ECONOMIC ENVIRONMENT

18. The project districts (Peshawar, Charsadda, Karak, Haripur, and Abbottabad) operate under the administrative framework of Khyber Pakhtunkhwa with decentralized governance through district, tehsil, and local councils responsible for service delivery and development. All districts experienced population growth between 2017 and 2023, with Peshawar as the most densely populated and Karak the least, and a generally balanced gender distribution with slight male predominance.

19. The socio-economic survey of 121 households (1,278 individuals) further indicates large, extended families with a predominantly young and economically active population, relatively high literacy levels, and moderate to strong engagement in formal employment, with incomes and expenditures largely concentrated in middle to higher

brackets. While access to basic services such as water, sanitation, and transport is available, its quality and reliability vary across locations, reflecting a moderately stable socio-economic context with persistent infrastructure and service delivery gaps.

ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

20. The proposed hospital revamp project is expected to yield significant positive outcomes, including improved healthcare infrastructure, enhanced service delivery, strengthened infection prevention and control, and improved patient safety and quality of care. During the design phase, considerations such as functional layout optimization, segregation of clean and contaminated zones, integration of infection control measures, selection of durable and easy-to-clean materials, energy- and water-efficient systems, and optimized utility planning will support sustainable and resilient healthcare operations.

21. During the construction phase, potential impacts include localized air and noise pollution, waste generation, temporary disruption to hospital services and access, occupational health and safety risks, and potential impacts on patient safety. These will be minimized through implementation of dust suppression and noise control measures, safe material storage, traffic and access management, scheduling of works to avoid critical hospital hours, installation of physical barriers, strict adherence to personal protective equipment (PPE) usage, and effective segregation, handling, and disposal of construction and demolition waste. Additional measures such as emergency preparedness, worker training, and grievance redress mechanisms, and continuous coordination with hospital administration will further reduce risks.

22. During the operational phase, potential risks include increased healthcare waste generation, higher demand for water and energy, and lapses in maintenance and infection control practices. These will be addressed through structured operation and maintenance (O&M) systems, routine inspections, preventive maintenance schedules, implementation of healthcare waste management rules, wastewater treatment and safe disposal, resource efficiency measures, staff training, and regular audits of infection prevention and control practices.

ANALYSIS OF ALTERNATIVES

23. The hospital revamp project assessed multiple alternatives, including no-project, simultaneous, and phased implementation options. The no-project option is not viable due to continued service deterioration, while simultaneous implementation would create higher environmental and operational pressures. A phased implementation approach with integration of solar energy is considered most suitable, as it minimizes disruptions, improves resource efficiency, and allows gradual infrastructure upgrades. This option ensures environmental sustainability, operational continuity, and long-term improvements in healthcare services.

INFORMATION DISCLOSURE, CONSULTATION AND PARTICIPATION

24. Stakeholder consultations for the hospital revamp project were conducted in February 2026 at institutional and community levels to ensure inclusive participation and

integration of feedback into project design. Stakeholders included government departments, hospital staff, patients, and local communities, and consultations identified key concerns such as waste management, wastewater treatment, infrastructure gaps, service delivery, and basic facility needs. In response, the project incorporates improved healthcare waste systems, sanitation and water supply upgrades, enhanced design features, and inter-agency coordination. A continuous engagement mechanism, including regular consultations and a grievance redress system, will be maintained throughout implementation to ensure transparency and sustainability.

GRIEVANCE REDRESS MECHANISM

25. A Grievance Redress Mechanism (GRM) has been established to address environmental and social concerns arising from the project in a timely and transparent manner. It is designed to receive, review, and resolve grievances related to construction activities and associated impacts. The GRM comprises a three-tier system, including Health center level (Tier-I GRC), PMIU level (Tier-II GRC) and Department of Health Level (Tier-III GRC) to address any grievances Multiple channels (in-person, helplines, written complaints, email, and complaint boxes) will ensure accessibility for all stakeholders. Grievances will be documented, investigated, and resolved within defined timelines, with escalation provisions for unresolved cases. The mechanism will operate in compliance with national regulations and ADB SPS (2009), and will remain functional throughout project implementation, supported by consultations, awareness, and information disclosure to ensure effective engagement and accountability.

ENVIRONMENTAL MANAGEMENT PLAN

26. The Environmental Management Plan (EMP) has defined institutional arrangements, mitigation measures, monitoring, reporting requirements, and provisions for training and capacity building for the project. The Contractor will implement the EMP during construction under the supervision of the Supervision Consultant (SC) and Project Management Implementation Unit (PMIU), while hospital management will ensure compliance during operation. EMP costs, estimated at Rs. 55.59 million, are included in the project budget and linked to verified implementation. The IEE and EMP will form part of the contractor's contractual obligations. Environmental due diligence identified several pre-existing environmental management gaps at the hospitals, including deficiencies related to healthcare waste management, wastewater management, occupational health and safety, fire safety, environmental monitoring, and institutional capacity. A hospital-specific Corrective Action Plan (CAP) has been prepared to address these gaps, with defined mitigation measures, responsibilities, implementation timelines, monitoring indicators, and budget requirements. CAP implementation will be monitored and reported through project environmental monitoring reports.

CONCLUSIONS AND RECOMMENDATIONS

27. The IEE identifies potential environmental and social impacts of the hospital revamp project during construction and operation, including localized air and noise pollution,

temporary service disruptions, waste generation, increased resource use, and patient safety risks. An EMP has been developed to mitigate these impacts through defined measures and monitoring requirements, with contractors bound to comply with national and provincial regulations and hospital management ensuring operational adherence. With effective implementation and coordination, the project is expected to remain environmentally and socially acceptable while improving healthcare service delivery.

1 INTRODUCTION

1.1 PROJECT BACKGROUND

28. Khyber Pakhtunkhwa (KP) continues to face significant healthcare challenges, with key health indicators remaining below desired levels and requiring substantial improvement to achieve the Sustainable Development Goals (SDGs). Neonatal, infant, and under-five mortality rates are estimated at 41, 53, and 64 per 1,000 live births, respectively, while the maternal mortality ratio stands at 175 deaths per 100,000 live births and is considerably higher in the merged districts. Limited access to quality healthcare services, particularly at the primary and secondary levels, has led many patients to seek care directly from tertiary hospitals. This places considerable pressure on higher-level facilities, resulting in overcrowding, increased healthcare costs, and reduced efficiency of service delivery across the health system.

29. To address these challenges, the Government of Khyber Pakhtunkhwa (GoKP) has launched the Revamping of Non-Teaching DHQ Hospitals Program to strengthen secondary healthcare services across the province. The program focuses on upgrading hospital infrastructure, modernizing medical equipment, improving service delivery, and enhancing operational efficiency to provide better quality healthcare and reduce pressure on tertiary hospitals. The initiative is aligned with Asian Development Bank (ADB) Strategy 2030 and the Pakistan Country Partnership Strategy (2021–2025), supporting improved healthcare access, institutional capacity, and health system resilience.

1.2 PROJECT OBJECTIVES

30. The project seeks to strengthen healthcare infrastructure, modernize medical equipment, improve human resource capacity, enhance emergency and diagnostic services, upgrade hospital operations and support systems, and improve patient safety and experience. In addition, the project will promote efficient hospital management through the use of information technology, standardized service delivery protocols, reliable utility systems, and improved healthcare waste management practices, thereby enhancing the overall quality, accessibility, and sustainability of secondary healthcare services across the province.

1.3 SCOPE OF WORK

31. The project will be implemented in four phases. This Report covers Phase I, which includes Naseerullah Babar Memorial Hospital and Maulvi Jee Hospital in Peshawar, and DHQ Hospitals in Charsadda, Karak, Haripur, and Abbottabad.

32. The proposed interventions involve rehabilitation and renovation of existing hospital facilities, civil and architectural improvements, upgrading of electrical, mechanical, plumbing, and fire-fighting systems, installation of medical and support equipment, and associated external development works. All activities will be undertaken within existing

hospital premises, and no major expansion beyond existing hospital boundaries or significant land acquisition is anticipated.

1.4 APPROACH AND METHODOLOGY

33. The Initial Environmental Examination (IEE) for the proposed upgradation of hospitals under Phase I of the Khyber Pakhtunkhwa Health Systems Strengthening Program was conducted in accordance with the ADB's Safeguard Policy Statement (SPS), 2009, and relevant national and provincial environmental requirements. The study adopted a structured and stepwise approach to assess potential environmental and social impacts associated with rehabilitation and upgradation works within existing hospital premises.

34. The assessment was based on both primary and secondary data sources. Primary data was collected through detailed site visits, field observations, and structured consultations with hospital administrations, medical staff, patients, and local stakeholders. These interactions helped in understanding site-specific conditions, operational constraints, and key environmental and social concerns. Secondary data was obtained from project design documentation, technical reports, relevant government records, and published literature to establish the baseline context of the project areas.

35. The methodology included a comprehensive review of proposed project components to identify activities with potential environmental implications during pre-construction, construction, and operational phases. Baseline environmental conditions were characterized in terms of physical environment (air quality, noise, water, and soil conditions), biological environment (flora and fauna, where applicable), and socio-economic environment, including healthcare service delivery, traffic conditions, and community health and safety aspects.

36. Potential environmental impacts were systematically identified and evaluated with particular emphasis on issues relevant to hospital rehabilitation projects, such as construction-related dust and noise, waste generation and disposal, occupational health and safety risks, disruption to hospital operations, infection control, utility interruptions, and increased pressure on existing services during construction activities.

37. Stakeholder consultations formed an integral part of the assessment process and were conducted to gather feedback, understand public concerns, and ensure that the views of affected parties were considered in project planning and impact mitigation. The outcomes of these consultations were incorporated into the environmental assessment and mitigation planning.

38. Based on the findings, an Environmental Management Plan (EMP) was developed outlining practical mitigation measures, monitoring requirements, institutional roles and responsibilities, reporting mechanisms, and capacity-building needs to ensure effective environmental management throughout the project lifecycle. The overall approach ensured that environmental considerations were integrated into project design and implementation in line with ADB safeguard requirements and good international industry practice.

1.5 STRUCTURE OF REPORT

39. The IEE report is organized into the following sections:

Section 1: Introduction provides the project background, objectives, scope of assessment, study approach, and methodology.

Section 2: Policy, Legal and Administrative Framework describes the applicable environmental policies, legislation, regulations, and ADB safeguard requirements relevant to the project.

Section 3: Description of the Project presents details of the proposed hospital upgradation works, project components, implementation arrangements, and associated activities.

Section 4: Description of the Environment: describes the existing physical, biological, and socio-economic conditions of the project sites and surrounding areas.

Section 5: Anticipated Impacts and Mitigation Measures identifies and evaluates potential environmental impacts and presents corresponding mitigation measures.

Section 6: Analysis of Alternatives evaluates the alternatives considered during project planning, including the no-project option and alternative design and implementation approaches, and provides the rationale for the selected option.

Section 7: Information Disclosure, Consultation and Participation summarizes stakeholder consultations, key concerns raised, and disclosure activities undertaken during project preparation.

Section 8: Grievance Redress Mechanism outlines the procedures for receiving, addressing, and resolving project-related grievances.

Section 9: Environmental Management Plan presents environmental mitigation, monitoring, institutional arrangements, reporting requirements, and implementation responsibilities.

Section 10: Conclusions and Recommendations summarizes the key findings of the IEE and provides recommendations for environmentally sustainable project implementation.

2 POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

40. This chapter provides an overview of the policy framework and legislation that applies to control the environmental consequences as a result of project implementation and operation. The project needs to comply with all the applicable environmental policies, laws, guidelines, acts and legislations of Government of Pakistan and the provincial government. The proposed project is being funded by the ADB, so ADB policies and guidelines related to the project have also been discussed.

2.1 SUMMARY OF RELEVANT STRATEGIES, POLICIES, ACTS AND LEGISLATION

41. The summary of major relevant strategies, policies, acts and legislation from environmental perspective are briefly described in **Tables 2.1 & 2.2** below:

Table 2.1: Main Strategies/Policies Related to Environment and their Relevance to the Project

Sr. No.	Policy/Strategy	Brief Coverage	Relevance to Project
1.	National Conservation Strategy, 1992	Pakistan National Conservation Strategy (NCS), which was approved by the federal cabinet in March 1992, is the principal policy document on environmental issues in the Country. The NCS outlines the Country's primary approach towards encouraging sustainable development, conserving natural resources and improving efficiency in the use and management of resources. The NCS has 68 specific programs in 14 core areas in which policy intervention is considered crucial for the preservation of Pakistan's natural and physical environment.	The core areas that are relevant in the context of the proposed project are pollution prevention during construction, conserving biodiversity and supporting forestry and plantation.
2.	National Environmental Policy, 2005	In March 2005, GoP launched its National Environmental Policy, which provides a framework for addressing the environmental issues. Section 5 of the policy commits for integration of environment into development planning as instrument for achieving the objectives of National Environmental Policy. It also provides broad guidelines to the Federal Government, Provincial Governments, Federally Administered Territories and Local Governments to address their environmental concerns and to ensure effective management of their environmental resources.	Clause (b) of sub-section 5.1 states that Environmental Assessment related provisions in Environmental Protection Act, 1997, will be diligently enforced for all developmental projects.
3.	National Drinking Water Policy, 2009	The National Drinking Water Policy provides a framework for addressing the key issues and challenges facing Pakistan in the provision of safe drinking water to the people. Drinking water is the constitutional responsibility of the	This policy is applicable for the proposed project Phase-I hospitals during construction and

Sr. No.	Policy/Strategy	Brief Coverage	Relevance to Project
		provincial governments and the specific provision function has been devolved to specially created agencies in cities and Town and Tehsil Municipal Administrations under the Local Government Ordinance 2001.	operation phase in terms of regular water quality monitoring.
4.	National Water Policy, 2018	The National Water Policy aims at efficient management and conservation of existing water resources, optimal development of potential water resources, steps to minimize time and cost overruns in completion of water sector projects, improving urban water management by increasing system efficiency and reducing non-revenue water through adequate investments to address drinking water demand, sewage disposal, handling of wastewater and industrial effluents; equitable water distribution in various areas and canal commands, measures to reverse rapidly declining groundwater levels in low-recharge areas, increased groundwater exploitation in high-recharge areas, effective drainage interventions to maximize crop production, improved flood control and protective measures, steps to ensure acceptable and safe quality of water, minimization of salt build-up and other environmental hazards in irrigated areas, institutional reforms to make the managing organizations more dynamic and responsive.	The core areas that are relevant in the context of the proposed project Phase-I are drinking water demand, sewage disposal, and handling of wastewater.
5.	National Forest Policy, 2015	The goal of this policy is to expansion, protection and sustainable use of national forests, protected areas, natural habitats and watersheds for restoring ecological functions, improving livelihoods and human health in line with the national priorities and international agreements. In line with the Federal functions of national policy, planning and implementation of international agreements, specific objectives of the National Forest Policy include: a) Promoting ecological, social and cultural functions of forests through sustainable management and use of forest produce including wood and non-wood forest products; b) Implementing a national level mass afforestation programme to expand and maintain optimum forest cover; c) Maximizing forest areas by investing in available communal lands/ shamlat, and Guzara forests and urban forestry; d) Facilitating and harmonizing inter-provincial movement, trade and commerce of wood	The proposed Project Phase-I dose not involves any national forests, protected areas, natural habitats and watersheds, so this policy is not applicable.

Sr. No.	Policy/Strategy	Brief Coverage	Relevance to Project
		and non-wood forest products through the Federal Forestry Board; e) Inter-linking natural forests, protected areas, wetlands and wildlife habitats to reduce fragmentation; f) Enhancing role and contribution of forests in reducing carbon emissions and enhancing forest carbon pools; g) Facilitating implementation of international conventions and agreements related to Forestry, Wetlands, Biodiversity and Climate Change; and h) Promoting standardized and harmonized scientific forest planning, research and education including for community-based management.	
6.	Khyber Pakhtunkhwa Health Policy (2018-2025)	The Khyber Pakhtunkhwa Health Policy (2018–2025) provides a comprehensive framework for strengthening the provincial health system through improved healthcare infrastructure, service delivery, governance, and quality of care. The policy emphasizes equitable access to essential health services, development of health facilities, infection prevention and control, and improved environmental health standards in healthcare institutions. Health service delivery is a devolved provincial subject, implemented through the Department of Health, Khyber Pakhtunkhwa, and its attached departments and healthcare facilities.	This policy is applicable to the proposed project Phase-I hospitals during the design, construction, and operational phases, particularly in terms of compliance with healthcare infrastructure standards, provision of safe and hygienic facilities, proper waste management arrangements, and ensuring that the hospital design supports quality healthcare delivery in line with provincial health objectives.
7.	Pakistan Labour Policy, 2010	The main objective of the Labour Policy, 2010 is the social and economic well-being of the labour of Pakistan. The Labour Policy, 2010 has following 4 parts: • Legal Framework; • Advocacy: rights of workers and employers; • Skill development and employment; and • Manpower export.	The labour force will be employed for construction of the proposed Project Phase-I. The provision of policy will apply to all the employed labourers.
8.	National Disaster Risk Reduction Policy, 2013	NDMA, being the lead focal agency for disaster preparedness and management, has therefore, embarked upon formulation of a comprehensive National Disaster Risk Reduction Policy through wider consultations with all stakeholders including all provinces, state of AJ&K and regions.	This policy will be elicit if any unforeseen natural and man-made disaster occurs during construction and operation phase of

Sr. No.	Policy/Strategy	Brief Coverage	Relevance to Project
		This policy covers disasters risk reduction in a more holistic way and introduces a proactive and anticipatory approach by laying special emphasis on risk assessment and prevention.	proposed Project Phase-I
9.	KP Climate Change Policy 2022	Following the 18th Constitutional Amendment, Khyber Pakhtunkhwa was the first province to develop a Provincial Climate Change Policy that was consistent with the updated National Climate Change Policy (2021). The Policy emphasizes the province of Khyber Pakhtunkhwa vulnerability to Climate Change and how to take protective measures such as adaptation and mitigation in relevant sectors of the economy. It focuses on the effects of Climate Change on the province's natural economy and emphasizes the need for the province to adapt and mitigate the effects of Climate Change. It also focuses on Climate Change awareness in the province. The adaptation approach to Climate Change seeks to reduce the vulnerability of natural and human systems or to capitalize on anticipated changes in climatic conditions, whereas mitigation seeks to reduce greenhouse gas emissions through technological advancement or by reducing activities that generate greenhouse gases. A salient feature of the Policy is the specific recommendations and strategies for the sectors where adaptation and Mitigation is required.	This policy will accelerate due to the emissions from the construction machinery and equipment.

Table 2.2: Main Legislation/Acts Related to Environment and their Relevance to the Project

Sr. No.	Act	Brief Coverage	Relevance to Project
1.	Khyber Pakhtunkhwa Environmental Protection Act 2014	Following the adoption of the 18th Constitutional Amendment in 2011, the subject of environment was devolved, and the provinces have been empowered for environmental protection and conservation. Subsequently, the KP Government amended PEPA 1997 as KP Environmental Protection Act 2014, and KP-EPA is responsible for ensuring the implementation of provisions of the Act in KP's territorial jurisdiction. KP-EPA is also required to ensure compliance with the NEQS and establish monitoring and evaluation systems.	The provision of the act is applicable to proposed Project for conducting an IEE/EIA according to section 13 and to obtain environmental approval from the EPA. The section 11 of this act prohibits certain discharges or emissions into the environment. Section 13 of this act also enables the agency to carry out strategic environmental assessment if the plan involves transport and infrastructure, whereas section 14 prohibits the import of hazardous substances. Similarly, the provisions of section 17 are also

Sr. No.	Act	Brief Coverage	Relevance to Project
		In case any project falls under Schedule I or II of this Act, the relevant IEE (or EIA where required) will be developed and submitted to EPA-KP for issuing NOC before commencing any physical work. This law will enforce the implementation of environmental legislations at provincial level and will be responsible for issuing No Objection Certificates (NOCs).	applicable to comply with the discharge or emission of any effluent, waste, air pollutant or noise or disposal of waste or handling of hazardous substance. Under section 18, penalties will apply if anyone fails to comply with the provisions of section 11, 12,13,14 and 17.
2.	Khyber Pakhtunkhwa Environmental Assessment Rules, 2021	These regulations set out: • Key policy and procedural requirements for filing an EIA / IEE; • The purpose of environmental assessment; • The responsibilities of proponents; • Duties of responsible authorities; • Provides schedules of proposals that the project requires IEE, EIA or GEA	As per Khyber Pakhtunkhwa Environmental Assessment Rules, 2021 the proposed project, KP-EPA has clarified that revamping, renovation, and internal repair activities, where no expansion or other scheduled components are involved, do not require submission of an IEE/EIA under the Khyber Pakhtunkhwa Environmental Assessment Rules, 2021; however, project implementation shall be carried out in accordance with the applicable environmental laws, regulations, and prescribed mitigation measures.
3.	The Khyber Pakhtunkhwa Public Health (Surveillance and Response) Act, 2017	The Khyber Pakhtunkhwa Public Health (Surveillance and Response) Act, 2017 establishes a legal framework for the surveillance, prevention, control, and response to public health risks and infectious diseases in the province. The Act mandates systematic monitoring of disease outbreaks, reporting from healthcare facilities, coordination of public health response mechanisms, and management of health hazards. It defines the responsibilities of health authorities and health institutions in notifying, recording, and managing communicable diseases and environmental health threats.	This Act is applicable to the proposed Project Phase-I hospitals during the construction and operational phases in terms of ensuring that the design and functioning of the hospitals incorporate provisions for disease surveillance, reporting systems, infection prevention and control measures, and compliance with public health safety standards. During construction, the project must coordinate with relevant health authorities to ensure that facilities for surveillance and response (such as isolation areas, waste management systems, infection control infrastructure, and reporting mechanisms) are aligned with the requirements of the Act to protect patient, worker, and community health.
4.	KP Climate Action Board Act (2025)	The 2025 KP Climate Action Board Act creates a robust, independent institution with the mandate, capacity, and resources to	Proposed Project, will be expected to comply with the latest environmental standards and integrate low-carbon design, green building codes, and

Sr. No.	Act	Brief Coverage	Relevance to Project
		spearhead provincial climate resilience—bridging policy, data, finance, and cooperation under a unified framework.	energy-efficient systems.
5.	KP Wildlife and Biodiversity Act, 2015	KP Wildlife Act is expedient to provide for the protection, preservation, conservation and management of wildlife in KP. The aims and objects of this Act are the: • Strengthening the administration of the organization to effectively manage wild animals and their habitats; • To holistically manage Protected Areas in sustainable manners for the best interest of the indigenous communities and local stakeholders; • Securing appropriately the goods and services produced from wild animals and their habitats at the level of local communities; • Fulfilling the obligations envisaged under the biodiversity related multilateral environmental agreements ratified by the Government of Pakistan; • Promotion of public awareness and capacity building for proper appreciation of the environmental significance and socio-economic values of wildlife; and • Conservation of biological diversity and realization of its intrinsic and extrinsic values through sustainable use and community participation.	The proposed Project Phase-I may involve the cutting of trees/bushes which may result in loss of habitat, therefore, the provisions of this law are applicable.
6.	KP Forest Ordinance 2022	This Ordinance prohibits construction of any building or shed, road or enclosure, or any infrastructure, or altering or enlarging any existing infrastructure in a reserved forest. It also bans any cutting, felling or uprooting any tree or brushwood listed in Schedule –I Furthermore, it also disallows to quarry stone from reserved forests. Due to the close proximity with a number of reserved forests, the mentioned provisions of this law will	This act might be trigged as the proposed Project Phase-I may involves the cutting of trees/bushes.

Sr. No.	Act	Brief Coverage	Relevance to Project
		need to be considered.	
7.	Khyber Pakhtunkhwa Antiquities Act, 2016	This act pertains to protect, preserve, develop and maintain antiquities in the Province the KP. It extends to the whole of the Province of the KP. This act contains VII Chapters. Clause 55& 56 of Chapter IV, Development Schemes, New Construction and use of Movable Antiquities is applicable and require NOC from Directorate in case of vicinity of any protected immovable antiquity.	The provisions of this act would also be applicable, if any accidental archaeological discoveries may occur during the excavation works for the construction of proposed Project Phase-I.
8.	KP Commission on Status of Women	The KP Commission on the Status of Women is a statutory advisory body established under the Khyber Pakhtunkhwa Act XIX of 2009 which was amended by the Khyber Pakhtunkhwa Assembly under the new Act XXVIII of 2016. The Commission in KP is the first ever Provincial Level Commission in the country, established with functions to oversee implementation of laws, policies and programs related to women and propose new measures where gaps exist. The third term of the Provincial Commission on the Status of Women was notified in January 2017	It is applicable as the proposed Project Phase-I may involve female labor force.
9.	Pakistan Penal Code, 1860	The Code deals with the offences where public or private property or human lives are affected due to intentional or accidental misconduct of an individual or organization. The Code also addresses control of noise, noxious emissions and disposal of effluents.	The provisions of the Penal Code, 1860 are applicable to the project in terms of penalties for effecting human lives and public property. It also addresses the control of noise, air emissions and effluent disposal.
10.	The Protection against Harassment of Women at the Workplace Act, 2010	The Protection Against Harassment of Women at the Workplace Act (2010) refers to sexual harassment at the workplace.	This Act will be applicable to the proposed Project Phase-I if women are employed for the construction activities.
11.	Labour Laws as part of Constitution of Pakistan 1973	The Constitution of Pakistan, 1973 provides the overarching legal framework for protection of labour rights and welfare. Key constitutional provisions include prohibition of forced and child labour (Article 11), freedom of association and unionization (Article 17), equality before law and non-discrimination (Article 25), and provision of just and humane working conditions including	These constitutional provisions and applicable labour laws are relevant to the proposed Project Phase-I during construction and operational activities to ensure fair employment practices, occupational health and safety, non-discrimination, prohibition of forced and child labour, and protection of workers' rights. Key applicable provincial labour laws include: • The Khyber Pakhtunkhwa Occupational Safety and Health Act, 2022; • Khyber Pakhtunkhwa Minimum

Sr. No.	Act	Brief Coverage	Relevance to Project
		maternity benefits (Article 37(e)). Labour matters are regulated through federal and provincial legislation governing employment conditions, occupational health and safety, wages, working hours, child labour prohibition, workers' welfare, and compensation.	Wages Act, 2013; • KP Workers Compensation Act, 2013; • Khyber Pakhtunkhwa Bonded Labour System (Abolition) Act, 2015; and KPK Factories Act, 2013.
12.	The Khyber Pakhtunkhwa Prohibition of Employment of Children Act, 2015	The Khyber Pakhtunkhwa Prohibition of Employment of Children Act, 2015 prohibits the employment of children under 14 years in any establishment, including construction and other hazardous work. The Act defines a child as anyone below 14 years and an adolescent as a person aged 14–18 years. It regulates working hours, weekly holidays, and health and safety measures for adolescents, specifies hazardous occupations they cannot engage in, and prescribes penalties for violations.	The relevance of this act to the Proposed Project Phase-I will be to prohibit child employment for construction and operation of the proposed project.
13.	Pakistan Climate Change Act, 2017	This Act aims to meet obligations under international conventions relating to climate change and to provide for adoption of comprehensive adaptation and mitigation policies, plans, programmes, projects and other measures required to address the effects of climate change and for matters connected herewith and ancillary thereto	This Act will be triggered due to the emissions from the construction machinery.
14.	Cutting of Trees (Prohibition) Act, 1975	The Act was enforced in 1975 to place restrictions on cutting of trees in order to restrain unchecked trend of tree felling without replacement plantations.	This act will be applicable to the subject Project Phase-I where the cutting of tree will be involved.
15.	The Khyber Pakhtunkhwa Protection of Trees and Brushwood Act, 1949	This act was enforced in 1949 to protect the trees and brushwood belonging to the Government and Local bodies.	This act will be applicable to the subject project Phase-I where the cutting of tree will be involved.

Sr. No.	Act	Brief Coverage	Relevance to Project
16.	Hazardous Substance Rule, 2003	The rule describes the procedure of handling, transportation and disposal of hazardous substances and hazardous waste. Inter alia, general safety precautions for handling hazardous substances as well as safety precautions for workers, and notification requirements in the event of an accident are described in these rules. Requirements for project waste management plans are also defined. These include a requirement for updating the plan every three years, the need to provide for management of hazardous waste in a manner that will prevent adverse environmental impacts and to ensure that hazardous and non- hazardous waste are not mixed.	This rule is applicable to the proposed Project Phase-I due to involvement of hazardous waste handling, use and disposal during the construction stage.
17.	Building Code of Pakistan, 2021	The provision of BCP shall apply for engineering design of building like structure and related components. The construction in violation of the building code shall be deemed as violation of professional engineering work. Moreover, a certificate for the proposed action will be obtained from Provincial Building Control Authority.	These codes shall be used in structural design of building area components constructed under this proposed project.
18.	The Peshawar Development Authority Building Control Regulations, 2024	The Peshawar Development Authority Building Control Regulations, 2024 establish technical and regulatory standards for all construction within PDA's jurisdiction. These regulations mandate prior submission and approval of building plans aligned with zoning, safety, structural integrity, fire protection, sanitation, and environmental standards. They set clear requirements for building heights, proper setbacks, parking provisions, structural and public safety, and specify penalties for non-compliance such as fines, suspension of construction, or demolition ensuring orderly, safe, and sustainable urban development	The PDA will be applicable to the proposed project Phase-I as it involves the development of Naseer Ullah Babar Hospital and Molvi Jee Hospital within the jurisdiction of Peshawar.

Sr. No.	Act	Brief Coverage	Relevance to Project
		in Peshawar.	
19.	The Hospital Waste Management Rules, 2005	The Hospital Waste Management Rules, 2005, framed under the Pakistan Environmental Protection Act, 1997, provide procedures for segregation, collection, storage, transportation, treatment, and disposal of healthcare waste in an environmentally sound manner. The Rules also require record keeping, waste minimization, and monitoring of healthcare waste management practices.	These Rules are directly applicable during the operational phase of the proposed Project Phase-I, and partially during construction activities, to ensure proper handling, segregation, storage, transportation, treatment, and disposal of infectious, hazardous, and general healthcare waste generated by the upgraded hospital facilities.
20.	Khyber Pakhtunkhwa Minimum Wages Act, 2013	This Act provides for the establishment of minimum wage rates for workers through the Minimum Wage Board and prohibits payment below the notified minimum wage. As of September 2025, the minimum monthly wage in KP is Rs. 40,000.	This Act will apply to all contracted and hired labor engaged under Project Phase-I to ensure compliance with provincial minimum wage requirements and fair labor practices during construction and operational activities.
21.	Khyber Pakhtunkhwa Occupational Safety and Health Act, 2022	This Act provides for the occupational safety and health of workers at the workplace and protects them against risks arising from occupational hazards. It promotes a safe and healthy working environment that addresses the physiological and psychological well-being of employees.	This Act be applicable during rehabilitation activities under the proposed project Phase-I to ensure implementation of occupational health and safety measures, provision of PPE, emergency preparedness, and safe working conditions for workers and staff.
22.	KP Workers Compensation Act, 2013	The KP Workers Compensation Act, 2013 requires employers to compensate workers for injuries, disabilities, or death arising out of and during the course of employment, subject to prescribed conditions. Compensation is determined based on the nature of injury and wage level of the worker.	This Act is relevant during both construction and operational phases of project Phase-I to ensure compensation and legal protection for workers in case of work-related accidents, injuries, or occupational incidents.

2.2 ASIAN DEVELOPMENT BANK REQUIREMENTS

42. The proposed project is funded by ADB, hence ADB's safeguard requirements must be complied with in all aspects.

2.2.1 ADB's Requirements for Preparation of Environmental Assessments of Projects

43. This IEE study is fully committed to the requirements of the ADB SPS 2009. The environmental studies carried out by NESPAK on behalf of Health Department, Khyber Pakhtunkhwa (KP) have been essentially guided by these rules as enunciated in the "Outline of an Initial Environmental Examination Report".

44. A project is classified as Category 'B' if it is likely to have less adverse environmental impacts than those of category A. These impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for category A projects. In the light of significance devoted by ADB to various environmental impacts, the proposed project is to be assigned Category 'B', wherein an IEE is required.

45. The main rationale to assign Category 'B' is that the proposed hospital facility may result in limited and site-specific environmental and social impacts, including minor impacts on surrounding communities, land use, and existing vegetation such as trees or orchards, which are largely reversible and can be effectively managed through standard mitigation measures.

46. During the design, construction, and operation of the project, the borrower/client will implement pollution prevention and control technologies and practices consistent with international good practice, as reflected in internationally recognized standards. These standards contain performance levels and measures that are normally acceptable and applicable to projects. When host country regulations differ from these levels and measures, the proponent will comply with whichever requirement is more stringent.

2.2.2 ADB's Access to Information Policy (AIP) 2018

47. ADB's new Access to Information Policy (AIP), reflects the ADB's ongoing commitment to transparency, accountability, and participation by stakeholders. The policy contains principles and exceptions to information sharing with external stakeholders, led by a new overarching principle of "clear, timely, and appropriate disclosure."

2.2.3 ADB's Accountability Mechanism Policy 2012

48. The objectives of the Accountability Mechanism is providing an independent and effective forum for people adversely affected by ADB-assisted projects to voice their concerns and seek solutions to their problems, and to request compliance review of the alleged noncompliance by ADB with its operational policies and procedures that may have caused, or is likely to cause, them direct and material harm. The Accountability Mechanism is a "last resort" mechanism.

2.2.4 ADB's Safeguard Policy Statement, 2009

49. ADB affirms that environmental and social sustainability is a cornerstone of economic growth and poverty reduction in Asia and the Pacific region. ADB's Strategy, 2020

therefore emphasizes assisting Developing Member Countries (DMCs) to pursue environmentally sustainable and inclusive economic growth.

50. The objectives of ADB's safeguards are to:

- Avoid adverse impacts of projects on the environment and affected people, where possible;
- Minimize, mitigate, and/or compensate for adverse project impacts on the environment and affected people when avoidance is not possible; and
- Help borrowers/clients to strengthen their safeguard systems and develop the capacity to manage environmental and social risks.

51. ADB's SPS sets out the policy objectives, scope and triggers, and principles for three key safeguard areas:

- Environmental safeguards;
- Involuntary resettlement safeguards; and
- Indigenous Peoples safeguards.

52. To achieve the policy objectives and deliver the policy principles, ADB carries out the actions described in the subsection i.e. "B. Policy Delivery Process". To help borrowers/clients and their projects achieve the desired outcomes, ADB adopts a set of specific safeguard requirements that borrowers/clients are required to meet in addressing environmental and social impacts and risks. ADB staff, through their due diligence, will review, supervise and ensure that borrowers/clients comply with these requirements during project preparation and implementation. These safeguard requirements are as follows:

- Safeguard Requirements 1: Environment (Appendix 2 of SPS, 2009);
- Safeguard Requirements 2: Involuntary Resettlement (Appendix 3 of SPS, 2009);
- Safeguard Requirements 3: Indigenous Peoples (Appendix 4 of SPS, 2009); and
- Safeguard Requirements 4: Special Requirements for Different Finance Modalities (Appendix 5 of SPS, 2009).

Table 2.3: ADB Safeguard Policies 2009 Relevant to Project

Sr. No.	Safeguard Policies	Key Requirements	Remarks
1.	Environment	Projects and subprojects need Environmental Assessment to address important issues not covered by any applicable regional or sectoral EA.	Applicable to proposed project.
2.	Involuntary Resettlement	Involuntary resettlement should be avoided where feasible, or minimized, exploring all viable alternative project designs. Where it is not feasible to avoid resettlement, resettlement activities should be conceived and executed as sustainable development programs, providing sufficient investment	As of now, no involuntary resettlement is envisaged for the proposed project therefore, this policy does not apply to the proposed project.

Sr. No.	Safeguard Policies	Key Requirements	Remarks
		resources to enable the persons displaced by the project to share in project benefits. Displaced persons should be assisted in their efforts to improve their livelihoods and standards of living or at least to restore them, in real terms, to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher	
3.	Indigenous Peoples	Measures to avoid potentially adverse effects on the Indigenous People's communities; and when avoidance is not feasible, minimize, mitigate, or compensate for such effects. Bank-financed projects are also designed to ensure that the Indigenous People receive social and economic benefits that are culturally appropriate and gender and inter generationally inclusive.	As per the ADB definition, there are no groups of people in the project area who could be categorized as indigenous people, therefore this policy does not apply to the proposed project.

2.2.5 Implications of ADB's safeguard policies on proposed project

53. The objectives of ADB's safeguards are to:

- Avoid adverse impacts of projects on the environment and affected people, where possible;
- Minimize, mitigate, and/or compensate for adverse project impacts on the environment and affected people when avoidance is not possible; and
- Help borrowers/clients to strengthen their safeguard systems.

54. The objective of the environmental safeguards is to ensure the environmental soundness and sustainability of projects and to support the integration of environmental considerations into the project decision-making process. ADB's policy principles are summarized in **Table 2.4** below.

Table 2.4: ADB Policy Principles

Sr. No.	Policy principle	Summary
1	Screening and categorization	Screening process initiated early to determine the appropriate extent and type of environmental assessment.
2	Environmental assessment	Conduct an environmental assessment to identify potential impacts and risks in the context of the project's area of influence.
3	Alternatives	Examine alternatives to the project's location, design, technology, and components and their potential environmental and social impacts, including no project alternative.
4	Impact mitigation	Avoid, and where avoidance is not possible, minimize, mitigate, and/or offset adverse impacts and enhance positive impacts. Prepare an EMP.
5	Public consultations	Carry out meaningful consultation with affected people and facilitate their informed participation. Involve stakeholders

Sr. No.	Policy principle	Summary
		early in the project preparation process and ensure that their views and concerns are made known to and understood by decision makers and taken into account. Continue consultations with stakeholders throughout project implementation. Establish a grievance redress mechanism.
6	Disclosure of environmental assessment	Disclose a draft environmental assessment in a timely manner, in an accessible place and in a form and language(s) understandable to stakeholders. Disclose the final environmental assessment to stakeholders.
7	Environmental management plan	Implement the EMP and monitor its effectiveness. Document monitoring results, and disclose monitoring reports.
8	Biodiversity	Do not implement project activities in areas of critical habitats.
9	Pollution prevention	Apply pollution prevention and control technologies and practices consistent with international good practices. Adopt cleaner production processes and good energy efficiency practices. Avoid pollution, or, when avoidance is not possible, minimize or control the intensity or load of pollutant emissions and discharges. Avoid the use of hazardous materials subject to international bans or phaseouts.
10	Occupational health and Community safety.	Provide workers with safe and healthy working conditions and prevent accidents, injuries, and disease. Establish preventive and emergency preparedness and response measures to avoid, and where avoidance is not possible, to minimize, adverse impacts and risks to the health and safety of local communities
11	Physical cultural resources	Conserve physical cultural resources and avoid destroying or damaging them. Provide for the use of “chance find” procedures.

2.2.6 Comparison of International and Local Environmental Legislations

55. The ADB SPS requires application of pollution prevention and control technologies and practices consistent with international good practice, as reflected in internationally recognized standards. The SPS states that when host country regulations differ from these standards, the EA will achieve whichever is more stringent.

56. In order to select the most stringent standards applicable, a mix of local (NEQS) and international (IFC) regulations have been selected. The IFC Environmental, Health, and Safety (EHS) Guidelines, General EHS Guidelines: Environmental, Noise Management has noise level guidelines for daytime and night time, which are applicable. Considering the high baseline noise levels in the project area, it shall be ensured that the increase in noise levels is minimized as far as possible. Also, project related noise levels in the project area are not allowed to increase the existing levels by 3 dB or more. Furthermore, it shall be ensured that all necessary noise mitigation measures are implemented to minimize the noise levels in the project area.

57. The **Table 2.5** presents IFC workplace noise standards that are applicable to the construction workers. It should also be noted that IFC EHS guidelines advise that where existing ambient noise levels already exceed thresholds, the Project should not

result in an increase of more than 3 dB over existing ambient noise at the nearest receptor location off-site.

Table 2.5: IFC Work Environment Noise limits

Sr. No.	Type of Work, workplace	IFC General EHS Guidelines
1	Heavy Industry (no demand for oral communication)	85 Equivalent level Leq,8h
2	Light industry (decreasing demand for oral communication)	50-65 Equivalent level Leq,8h

58. A comparison of applicable local and international guidelines for ambient air quality has been provided in **Table 2.6** below. In the case of most pollutants, the NEQS standards for ambient air quality are more stringent in comparison to USEPA and WHO/IFC standards. The applicable and most stringent parameters for each respective pollutant are highlighted in green.

Table 2.6: Comparison of International and local Air Quality Standards*

Sr. No.	Pollutants	USEPA		WHO/IFC		Pak. NEQS	
		Avg. Time	Standard	Avg. Time	Standard	Avg. Time	Standard
1	SO_2	3 hrs 1 hr	0.5 ppm 75 ppb	24 hr 10 min	20 ug/m^3 500 ug/m^3	Annual Mean 24 hrs	80 ug/m^3 120 ug/m^3
2	CO	8 hrs 1 hr	9 ppm (11 mg/m^3) 35 ppm (43 mg/m^3)	-	-	8 hrs 1 hr	5 mg/m^3 10 mg/m^3
3	NO_2	Annual Mean 1 hr	100 ug/m^3 (53 ppb) 100 ppb	1 yr 1 hr	40 ug/m^3 200 ug/m^3	Annual Mean 24 hrs	40 ug/m^3 80 ug/m^3
4	O_3	8 hrs	0.07ppm (148 ug/m^3)	8 hrs	100 ug/m^3	1 hr	130 ug/m^3
5	TSP	-	-	-	-	Annual Mean 24 hrs	360 ug/m^3 500 ug/m^3
6	PM_{10}	24 hrs	150 ug/m^3	1 yr 24 hr	20 ug/m^3 50 ug/m^3	Annual Mean 24 hrs	120 ug/m^3 150 ug/m^3
7	$PM_{2.5}$	Annual Mean 24 hrs	15 ug/m^3 35 ug/m^3	1 yr 24 hr	10 ug/m^3 25 ug/m^3	Annual Average 24 hrs 1 hr	15 ug/m^3 35 ug/m^3 15 ug/m^3

**: The standards highlighted in green for each respective pollutant are the most stringent based on a comparison between local and international regulations and thus shall be applicable for the proposed project.*

** In instances where the airshed is significantly degraded and the pollutant levels are already exceeding the ambient pollutant concentrations provided in the table above, it shall be ensured that the project activities cause as small an increase in pollution levels as feasible and amounts to a fraction of the applicable short term and annual average air quality guidelines or standards as established in the project specific environmental assessment.*

59. Similar to the standards for air quality, the comparison of noise standards provided in **Table 2.7** clearly shows that NEQS standards for noise are more stringent in comparison to the IFC standards. The only exception is the daytime noise level standard for Industrial areas where the IFC standard is more stringent (70 dB(A)) in comparison to NEQS (75 dB(A)) and so for this particular parameter, the IFC standard will be used. Apart from this one exception, the NEQS standards have been used for the proposed Biogas plant project.

Table 2.7: Comparison of International and Local Noise Standards

Sr. No.	Category of Area/Zone	Limit in dB(A) Leq			
		NEQS		WHO/IFC	
		Day Time 06:00 – 22:00	Night Time 22:00-06:00	Day Time 07:00 – 22:00	Night Time 22:00-07:00
1	Residential area (A)	55	45	55	45
2	Commercial area (B)	65	55	70	70
3	Industrial area (C)	75	65	70	70
4	Silence zone (D)	50	45	55	45

**: The standards highlighted in green for each respective Area/Zone are the most stringent based on a comparison between local and international regulations and thus shall be applicable for the proposed project.*
** In instances where baseline noise levels are already exceeding the standards above, it will need to be ensured that the project activities do not cause an increment of more than 3 dB(A) from the baseline noise levels.*

60. The comparison of water quality standards provided in **Table 2.8** and **Table 2.9** clearly shows the NEQS standards for surface and drinking water quality as compare to WHO and FAO standards.

Table 2.8: Comparison of National and International Drinking Water Standards

Sr. No	Parameter	Units	Pak. NEQS	WHO Standards
1	Temperature (During Sample Collection)	^{O}C	NS	NS
2	Color	Pt-Co	≤15TCU	<15TCU
3	pH	pH unit	6.5-8.5	6.5-8.5
4	Turbidity	NTU	<5	<5
5	Total Hardness	mg/L	<500.00	NS
6	Total Dissolved Solid (TDS)	mg/L	<1000.00	<1000.00
7	Total Suspended Solid (TSS)	mg/L	NS	NS
8	Ammonia	mg/L	NS	NS
9	Fluoride F^-	mg/L	<1.50	1.50
10	Sulfate (SO_4^{-2})	mg/L	NS	NS
11	Chloride (Cl^-)	mg/L	<250.00	250
12	Nitrate $(NO_3)^-$	mg/L	<50.00	50.00
13	Odor	-	Non-Objectionable / Acceptable	Non-Objectionable / Acceptable
14	Taste	-	Non-Objectionable / Acceptable	Non-Objectionable / Acceptable

Sr. No	Parameter	Units	Pak. NEQS	WHO Standards
15	Sodium	mg/L	NS	NS
16	Iodine	ppm	NS	NS
17	Arsenic (As)	mg/L	< 0.05	0.01
18	Iron (Fe^{3+})	mg/L	NS	NS
19	Zinc (Zn^{2+})	mg/L	5.0	3.0
20	Conductivity	µS/cm	NS	NS
21	Bicarbonate	mg/L	NS	NS
22	Nitrite	mg/L	<3	3
23	Magnesium	mg/L	NS	NS
24	Calcium as Ca	mg/L	NS	NS
25	Phosphate	mg/L	NS	NS
26	Potassium	mg/L	NS	NS
27	Boron	mg/L	<0.3	0.3
28	SAR Iodine (I)	mg/L	NS	NS
29	Aluminum	mg/L	< 0.2	0.2
30	Antimony	mg/L	<0.005	0.02
31	Cadmium	mg/L	0.01	0.003
32	Mercury	mg/L	<0.001	0.001
33	Nickel	mg/L	<0.02	0.02
34	Selenium	mg/L	0.01	0.01
35	Barium	mg/L	0.7	0.7
36	Total Chromium	mg/L	<0.05	0.05
37	Copper	mg/L	2	2
38	Lead	mg/L	<0.05	0.01
39	Cyanide (CN)	mg/L	<0.05	0.07
	Manganese	mg/L	<0.5	0.5
40	Total Coliforms	cfu/100ml	0/100 ml	0/100 ml
41	Fecal Coli forms (E.Coli)	cfu/ml	0/100 ml	0/100 ml

NS = Not Specified
** The standards highlighted in green for each respective pollutant are the most stringent based on a comparison between local and international regulations and thus shall be applicable for the proposed project. Other are same in both case.*

Table 2.9: Comparison of National and International Surface Water Standards

Sr. No.	Parameter	Units	NEQS (National)	WHO Class V (Agriculture)	FAO Standards
1	Temperature	^{O}C	--	--	--
2	pH	pH unit	6-9	<5.3	6.0-8.5
3	COD	mg/L	150	>30	--
4	(BOD_5)	mg/L	80	--	--
5	Solids, Total dissolved (TDS)	mg/L	3500	--	0-2000
6	Solids, Total suspended (TSS)	mg/L	200	--	--
7	Chloride	mg/L	1000	--	0-1065
8	Fluoride (F^-)	mg/L	10	--	--
9	Oil & grease	mg/L	10	--	--

Sr. No.	Parameter	Units	NEQS (National)	WHO Class V (Agriculture)	FAO Standards
10	Phenols, Total (Phenolic Compounds)	mg/L	0.10	--	--
11	Cyanide(CN-)	mg/L	01.00	--	--
12	Anionic Detergents as MBAS	mg/L	20.00	--	--
13	Sulfate (SO_4^{-2})	mg/L	600	--	0-960
14	Sulfide (S)	mg/L	01.00	--	--
15	Ammonia NH_3	mg/L	40.00	--	--
16	Cadmium (Cd)	mg/L	0.10	>0.0039 mg/L	--
17	Chromium (Cr) as Hexavalent & Trivalent	mg/L	1.00	>0.016 mg/L	--
18	Copper (Cu)	mg/L	1.00	>0.018 mg/L	--
19	Lead	mg/L	0.50	>0.082 mg/L	--
20	Nickel	mg/L	1.00	>1.4 mg/L	--
21	Zinc	mg/L	5.00	>0.12 mg/L	--
22	Iron	mg/L	8.00	--	--
23	Manganese	mg/L	1.50	--	--
24	Selenium	mg/L	0.50	--	--
25	Silver	mg/L	1.00	--	--
26	Arsenic	mg/L	1.00	>0.36 mg/L	--
27	Barium	mg/L	1.50	--	--
28	Magnesium	mg/L	--	--	0-61
29	Nitrate	mg/L	--	--	0-10
30	Sodium	mg/L	--	--	0-920
31	Boron	mg/L	6.00	--	0-2
32	Mercury	mg/L	0.01	>0.0024 mg/L	--
33	Chlorine	mg/L	01.00	--	--
34	Total Toxic Metals	mg/L	02.00	--	--
35	Turbidity	NTU	NS	--	--
36	Oxygen, Dissolved	mg/L	NS	--	--
37	Pesticides	µg/L	NS	--	--
38	Nutrients as Potassium	mg/L	--	--	0-2
39	Nutrients as Nitrogen	mg/L	--	--	--
40	Nutrients as Phosphorous	mg/L	--	--	--
41	Total Coliform	MPN/100ml	--	--	--
42	Fecal Coliform	MPN/100ml	--	--	--

NS = Not Specified

** The standards highlighted in green for each respective pollutant are the most stringent based on a comparison between local and international regulations and thus shall be applicable for the proposed project. Other are same in both case.*

61. Based on the above comparison, local regulations or environmental quality standards (NEQS) are more stringent and consider more parameters than other and thus shall be applicable for the proposed project as far as regulations regarding other environmental parameters are concerned such as acceptable effluent disposal parameters, the local regulations i.e. NEQS take precedence over any other international regulations such as IFC.

2.3 INTERNATIONAL PROTOCOL / CONVENTIONS

62. As Pakistan is a member of a number of international organizations such as United Nations Organization (UNO), Organization of the Islamic Conference (OIC), South Asian Association for Regional Cooperation (SAARC), Economic Cooperation Organization (ECO) etc., so it has to follow the international protocols and obligations related to the environment. The major protocols, ratification dates by Pakistan and obligations related to the proposed project are provided in the **Table 2.10** below:

Table 2.10: International Agreements/Conventions Relevant to the Project

Sr. No.	Agreement/ Convention	Ratification	Description/Relevance
1.	UNESCO Convention on the Protection of the World's Cultural and Natural Heritage, 1972 Web Link: http://whc.unesco.org/en/%20convention%20text/	Pakistan ratified this convention on 23 July 1976.	Convention concerning the Protection of the World Cultural and Natural Heritage - requires parties to adopt a general policy on the protection of the natural and cultural heritage, to set up services for such protection, to develop scientific and technical studies, to take appropriate legal, technical, scientific and administrative measures and to foster training and education for such protection. The chance find procedure will be implemented if any cultural and heritage site is found within Project Area during construction.
2.	Sustainable Development Goals (SDGs) – 2015-2030 Web Link: https://sustainabledevelopment.un.org/focussdgs.html	Pakistan was the first country to adopt SDGs 2030 agenda through a unanimous resolution of the Parliament of Pakistan.	The Sustainable Development Goals (SDGs) are a good collection of 17 global goals set by the United Nations in 2015. Pakistan has recently committed to Agenda 2030 and has become signatory to SDGs where Goal 6 calls, among others, for ensuring availability and sustainable management of water and sanitation for all, water use efficiency and integrated water resources management. The SDG 5 on gender equality and women's empowerment emphasizes to ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life.
3.	United Nation Framework Convention on Climate Change (UNFCCC), 1992 Web Link: https://unfccc.int/process-and-meetings/the-convention/status-of-	Signed on 13 Jun 1992 and ratified on 1 Jun 1994.	The UN Framework Convention on Climate Change (UNFCCC) is a multilateral agreement to address the issue of climate change. The Convention, was sets out and opened for signature at the June 1992 UN Conference on Environment and Development (UNCED), also known as the Rio Earth Summit. The UNFCCC entered

Sr. No.	Agreement/ Convention	Ratification	Description/Relevance
	ratification/status-of-ratification-of-the-convention		into force on 21 March 1994. Pakistan being signatory of this treaty is bound to control the GHG emissions and climate change. Recent conference of parties (COP) for UNFCCC was held from 6 to 17 Nov, 2017 in Bonn Germany. This is relevant as the proposed project will emit GHG emissions which will contribute to global warming and greenhouse effect.
4.	Paris Agreement, 2016 Web Link: https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement	Paris Agreement was signed on 22 April 2016 and ratified on 10 November 2016.	The Paris Agreement's long-term temperature goal is to keep the increase in global average temperature to well below 2 °C above pre-industrial levels; and to pursue efforts to limit the increase to 1.5 °C, recognizing that this would substantially reduce the risks and impacts of climate change. It also aims to increase the ability of parties to adapt to the adverse impacts of climate change, and make "finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development." Under the Paris Agreement, each country must determine, plan, and regularly report on the contribution that it undertakes to mitigate global warming. The proposed project will consider using green and sustainable design to reduce GHG emissions.
5.	International Union for Conservation of Nature and Natural Resources Red List, 2000 Web Link: https://www.iucnredlist.org/		This enlists wildlife species experiencing various levels of threats internationally. Some of the species indicated in the IUCN red list are also present in the wetlands of Pakistan. However, no wildlife species experiencing various levels of threats are present in and around the surroundings of Project Area.

63. The following international conventions and frameworks are relevant to the project and support its implementation in line with Pakistan's commitments to social inclusion, labor rights, gender equality, disability inclusion, stakeholder engagement, and human rights.

- Convention on the Elimination of All Forms of Discrimination against Women (CEDAW) Ratified (1996) Ensures gender equality, non-discrimination, equal access to healthcare services, employment opportunities, and participation of women in project consultations and benefits.
- Convention on the Rights of the Child (CRC) Ratified (1990) Relevant to maternal and child healthcare services, protection of children from construction-related risks, and maintenance of safe hospital environments.

- Convention on the Rights of Persons with Disabilities (CRPD) Ratified (2011) Requires accessibility and inclusive design of hospital facilities for persons with disabilities, including ramps, accessible sanitation facilities, signage, and service delivery.
- International Covenant on Economic, Social and Cultural Rights (ICESCR) Ratified (2008) Supports the right to health, safe working conditions, adequate standards of living, and equitable access to healthcare services.
- International Covenant on Civil and Political Rights (ICCPR) Ratified (2010) Promotes stakeholder participation, access to information, consultation processes, and grievance redress mechanisms.
- Universal Declaration of Human Rights (UDHR) Endorsed Provides overarching principles relating to human dignity, equality, non-discrimination, and access to public services.
- ILO Convention No. 100 Equal Remuneration Convention Ratified Supports equal pay for equal work among project workers.
- ILO Convention No. 111 Discrimination (Employment and Occupation) Convention Ratified Prevents discrimination based on gender, religion, ethnicity, disability, or social status during recruitment and employment.
- ILO Convention No. 138 Minimum Age Convention Ratified Prohibits child labor in project construction activities.
- ILO Convention No. 182 Worst Forms of Child Labour Convention Ratified Prevents engagement of children in hazardous construction and waste-handling activities.
- ILO Convention No. 29 Forced Labour Convention Ratified Prohibits forced or compulsory labor in project activities.
- ILO Convention No. 105 Abolition of Forced Labour Convention Ratified Reinforces prohibition of coercive labor practices.
- ILO Convention No. 190 Violence and Harassment Convention International good practice Relevant to prevention of workplace harassment, gender-based violence (GBV), and sexual harassment during project implementation.
- Beijing Declaration and Platform for Action Endorsed Supports gender mainstreaming, women's participation, and equitable access to project benefits.
- 2030 Agenda for Sustainable Development Adopted Particularly relevant to SDG 3 (Good Health and Well-Being), SDG 5 (Gender Equality), SDG 6 (Clean Water and Sanitation), SDG 8 (Decent Work), and SDG 10 (Reduced Inequalities).

3 DESCRIPTION OF THE PROJECT

64. This section provides an overview of the proposed project for revamping secondary healthcare hospitals in different districts of Khyber Pakhtunkhwa. The initiative focuses on upgrading infrastructure, improving operational efficiency, and equipping hospitals with modern healthcare technologies. Secondary healthcare hospitals serve as a critical link between primary healthcare facilities and tertiary care institutions. These facilities receive a large number of patients from surrounding rural and urban areas and therefore require functional infrastructure, reliable utilities, and adequate medical equipment.

65. The project involves rehabilitation and renovation of existing hospital infrastructure, installation of advanced medical systems, and improvement of supporting services such as electricity, water supply, drainage, and waste management. The works will be carried out within the existing premises of the hospitals. The revamping initiative is expected to significantly improve healthcare service delivery and patient satisfaction across the targeted districts.

66. This section provides a comprehensive overview of the proposed project, detailing its core objectives, location and accessibility, workforce and water requirements etc.

3.1 OBJECTIVES OF THE PROJECT

67. The primary objective of the project is to upgrade and modernize secondary healthcare hospitals in order to improve accessibility, efficiency, and quality of healthcare services. It aims to make secondary hospitals fully equipped hospitals with pleasant buildings, qualified human resource and quality services to create patient-centered healthcare facilities that provide safe, efficient, and affordable medical services to the community.

68. The specific objectives of the project include:

- To provide high quality emergency services to the general public especially the low socio-economic strata of population.
- To improve the patient care by improving the number of medical staff including consultants, doctors, nurses and other health professionals in the system.
- To improve the doctor to patient ratio and nurse to bed ratio in secondary healthcare hospitals.
- To equip the secondary healthcare hospitals especially the emergency units and gynae & obstetrics Wards with the state-of-the-art equipment so as to enable them to provide higher end medical services.
- To improve the Outpatient Department (OPD) services by reducing the patient waiting time through introducing IT based queue management & sequencing systems.
- To improve the quality of consultation between the doctor and the patient by decreasing the load on the consultant through introducing intermediary filtering mechanism.

- To improve the hospitals environment by renovating, improvising and remodeling the existing hospitals structures, as far as possible
- To ensure that hospital operations are run on 24/7 basis and they are not hampered by any power outage or failure of other supplies
- To improve the hospital environment by improving the support services in the hospital through engaging private sector.
- To improve the quality of allied clinical services like pathology and radiology by outsource these services as far as possible.
- To improve the general feel of the hospitals from the perspective of a patient by providing him better non-clinical facilities at the hospital.
- To make the hospital soothing and comfortable places by improving the hospital interior decor.
- To ensure that the consumables used in the hospitals are internationally acceptable medical grade and not injurious to the safety of the patients.
- To make the hospital monitoring systems more robust, efficient and effective through the use of IT solutions.
- To ensure that the gaps in existing financial systems and inventory processes are plugged as far as possible.
- To institute a regime of periodical testing of services by 3rd parties for their conformance to the Minimum Health Services Delivery Package.
- To standardize the hospital protocols throughout the province so as similar patient anywhere get similar treatment.
- To document the treatment log of all patients so as to make all the clinical processes auditable at given time.
- To assimilate and dove-tail the hospital services with the services offered under the umbrella of vertical programs.
- To institute a comprehensive end-to-end waste management system with a view to arrest the spread of infection from the hospital waste.

3.2 LOCATION OF THE PROJECT

69. The Department of Health KP has planned a multi-phased plan to revamp the secondary healthcare hospitals. The project will be implemented in four phases, this report has been prepared for Phase I. Following is **Table 3.1** showing names of hospitals assessed and their respective locations under Phase I are shown in **Figure 3.1.**

Table 3.1:-Locations of Hospitals Assessed under Phase I

Sr. No.	Phase	Name of the Hospital	Coordinates
1.	I	Naseerullah Khan Babar Hospital, Peshawar	33°59'00"N, 71°33'38"E
2.		Molvi Jee Hospital, Peshawar	34°00'59"N, 71°34'42"E.
3.		DHQ Hospital, Charsadda	34°09'16"N, 71°44'44"E.
4.		DHQ Hospital, Karak	33°07'40"N, 71°09'06"E.
5.		DHQ Hospital, Haripur	33°59'58"N, 72°54'56"E
6.		DHQ Hospital (Women and Children), Abbottabad	34°08’45” N, 73°12’51” E

70. These hospitals are located within urban or district headquarters areas and serve large populations from surrounding rural and semi-urban communities.

3.3 ACCESSIBILITY OF THE PROJECT

71. The phase-I hospitals are accessible through existing provincial and district road networks. These facilities are connected with nearby residential areas, public transport routes, and major highways. Accessibility ensures convenient movement of patients, hospital staff, emergency vehicles, and supply vehicles transporting medical equipment and construction materials.

3.3.1 Naseerullah Khan Babar Hospital, Peshawar

72. Naseer Ullah Babar Memorial Hospital is located along Kohat Road, Akbar Colony, Peshawar. The hospital is accessible through link roads connected with Kohat Road from both northern and southern directions. The approximate geographic coordinates of the hospital are 33°59'00"N latitude and 71°33'38"E longitude.

3.3.2 Molvi Jee Hospital, Peshawar

73. Maulvi Jee Hospital is also known as Maulvi Ameer Shah Hospital is located on Main GT Road. BRT station Hushtnagri is located right next to hospital. Main gates have entrance from main GT road and flyover road. The hospital is located at 34°00'59"N, 71°34'42"E.

3.3.3 DHQ Hospital, Charsadda

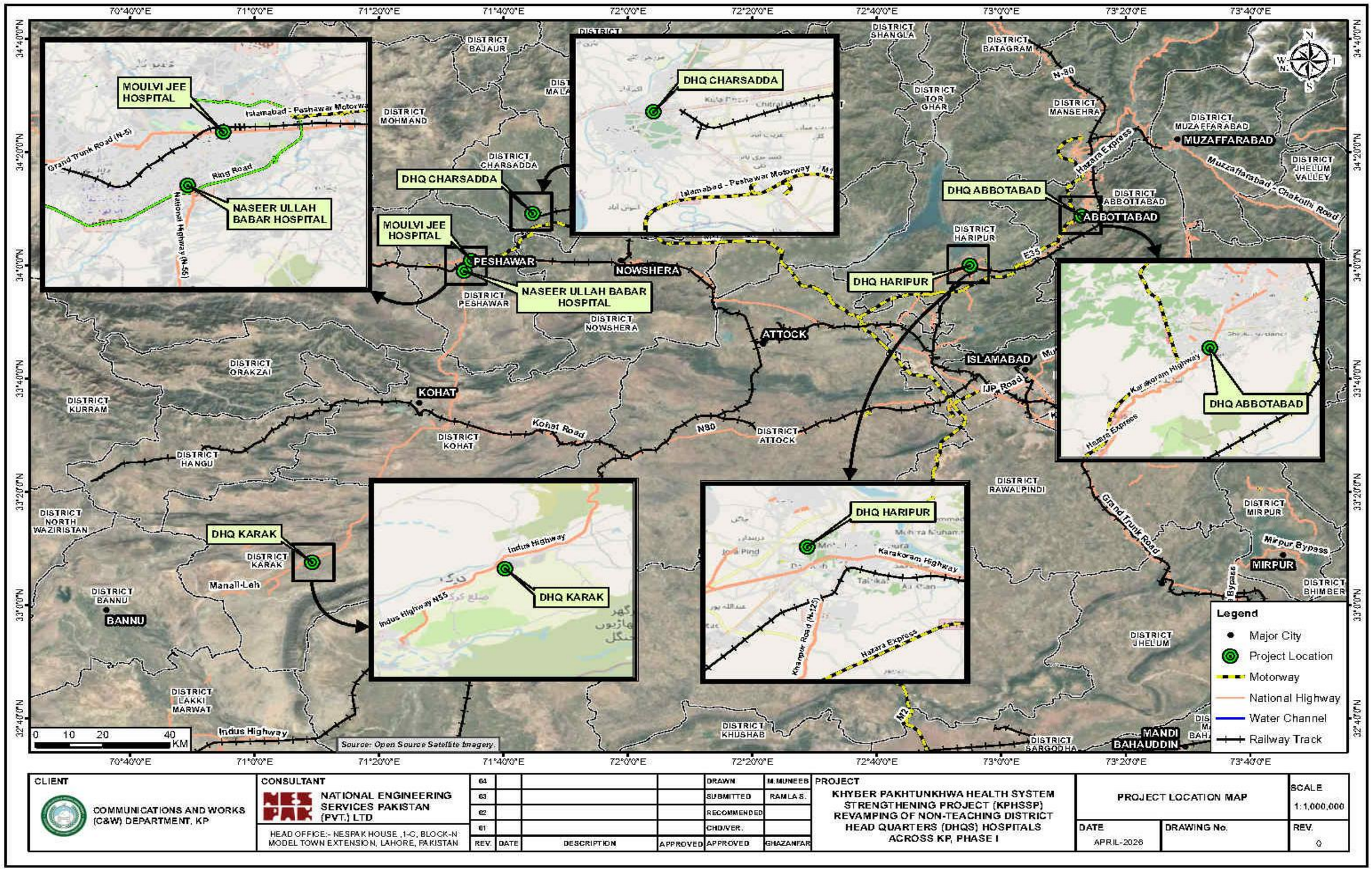
74. DHQ Charsadda Is located on Charsadda Road near Farooq-e-Azam Chowk, Charsadda. The hospital is connected with the main district road network, ensuring accessibility for patients from surrounding areas. The hospital is located at 34°09'16"N, 71°44'44"E.

3.3.4 DHQ Hospital, Karak

75. District Headquarter (DHQ) Hospital Karak is located on Karak Development Authority (KDA) Road and is 1 km from Jail Chowk situated on main Indus Highway N55. The hospital is located at 33°07'40"N, 71°09'06"E.

3.3.5 DHQ Hospital, Haripur

76. The site is located at 2 different locations. The main block is along Dheenda Road (33°59'58"N, 72°54'56"E), while the other one housing newly constructed Trauma



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		03			SUBMITTED	RAMLA S.
		02			RECOMMENDED	
		01			CHD/VER.	
		REV.	DATE	DESCRIPTION	APPROVED	APPROVED GHAZANFAR

PROJECT: KHYBER PAKHTUNKHWA HEALTH SYSTEM STRENGTHENING PROJECT (KPHSSP) REVAMPING OF NON-TEACHING DISTRICT HEAD QUARTERS (DHQS) HOSPITALS ACROSS KP, PHASE I

PROJECT LOCATION MAP

SCALE: 1:1,000,000

DATE: APRIL-2026

DRAWING No.

REV.: 0

Figure 3.1: Project Location Map

77. Centre and an under-construction Women & Children Hospital is located along National Highway N35 (33°59'58"N, 72°54'55"E). Women & Children Hospital and Trauma Center are not included in scope of Work.

3.3.6 DHQ Hospital (Women and Children), Abbottabad

78. The site is located at 2 different locations. One is main DHQ Hospital Abbottabad now known as Benazir Bhutto Shaheed DHQ Teaching Hospital (34.1457° N, 73.2216° E) while the other one is Benazir Bhutto Shaheed Women & Children Teaching Hospital (34°08’45.09” N, 73°12’51.92” E) including a separate Children OPD Block at the rear side accessed by gate on Gumani Road. Main DHQ Hospital is not included in scope of Work.

3.4 COMPONENTS OF THE PROJECT

79. The project includes civil, electrical, mechanical, and environmental infrastructure improvements within the existing hospital premises. The scope of work to be performed, which is attached as **Annex-I**, consists of revamping hospital buildings and associated infrastructure development, including dismantling works, civil, architectural, plumbing, electrical, mechanical and firefighting works, and external development works. Additionally, for execution of these works deployment of all necessary Material, Labor (s), Formwork, Tools & Machinery is also included.

80. The project encompasses comprehensive upgrades and service improvements across secondary healthcare hospitals in Khyber Pakhtunkhwa which includes;

3.4.1 Internal Upgrades

81. Internal improvements will include renovation of all patient related areas which includes burn units, isolation wards outpatient departments, washrooms, and administrative areas. Flooring, painting, ceiling systems, lighting fixtures, and ventilation systems will also be upgraded to enhance functionality and patient comfort.

3.4.2 External Works and Services

82. Rehabilitation of sewerage and drainage networks, electrification systems, installation of water filtration units, and integration of solar energy solutions to ensure reliable and sustainable utility services.

3.4.3 Specialized Units

83. Establishment of emergency stabilization rooms and pandemic response infrastructure to strengthen emergency preparedness and rapid response capacity.

84. Additional facilities such as isolation wards, emergency stabilization rooms and patient waiting areas will also be improved. Mechanical systems including Heating, Ventilation, and Air Conditioning (HVAC) units, firefighting systems, and medical gas pipelines will be installed to support safe hospital operations.

3.5 SALINET FEAUTRES OF THE PROJECT

85. Key features of the proposed project include infrastructure rehabilitation, installation of modern healthcare equipment, improved patient management systems, and enhanced environmental health and safety practices. The project will introduce energy-efficient lighting systems, improved water supply and sanitation infrastructure, rehabilitation and improvement of wastewater and drainage systems, strengthened firefighting and emergency safety systems, and universal accessibility measures, and reliable backup power systems. These improvements will enhance hospital functionality, reduce operational risks, and create a cleaner and safer environment for patients and healthcare staff. Major works/activities involve:

3.5.1 Civil and Building Works

86. This scope covers the renovation and upgrading of the existing building and surrounding areas. It includes repair and improvement of structural elements, roofing, flooring, surface finishes, painting, and interior spaces. External works include upgrading pavements, landscaping, boundary walls, waiting areas, and parking sheds. The scope also covers refurbishment of underground tanks for fire-fighting, sewage, and rainwater harvesting systems, as well as the elevated water tank. Additionally, roadways, walkways, paved areas, storm drainage, sewerage systems, and other civil works will be renovated to ensure the facility functions efficiently and safely.

87. Universal accessibility measures will also be incorporated to facilitate the safe and smooth movement of patients, persons with disabilities, elderly persons, and other persons with limited mobility within the hospital premises. These measures will include access ramps at relevant entrances and circulation areas, handrails and grab bars, accessible toilets, improvement of walkways and paved areas to facilitate wheelchair and patient movement, and maintenance of safe and unobstructed access routes within the hospital premises.

3.5.2 WATSAN and Fire-Fighting Works

88. This scope of work covers the installation of internal plumbing systems required for proper water supply and drainage throughout the building. Existing septic tanks will be rehabilitated/improved, while new septic tanks will be constructed at DHQ hospitals where such facilities are not available. It also includes the installation of the fire-fighting system, along with all necessary pipelines, valves, and related components to ensure compliance with safety standards. Fire protection arrangements will include dedicated fire-fighting water storage tanks, standby tanks, fire-fighting pumps, hose cabinets/hose reels, fire-fighting piping, valves, and associated fittings for distribution of fire-fighting water throughout the relevant hospital areas. Fire extinguishers and fire alarm systems, including smoke/heat detectors, manual call points, and audible/visual alarms, will also be provided or improved to strengthen fire detection and emergency response.

89. In addition, the work involves connecting the building to external water supply lines, drainage systems, and the rainwater harvesting network to support effective water management. The associated sewerage, drainage, and stormwater drainage networks

will also be improved to ensure proper collection and conveyance of wastewater and stormwater and to minimize leakage, blockage, and localized flooding. The installation of natural gas piping is also included, ensuring the safe and efficient distribution of gas to the designated areas of the building.

90. The hospital waste treatment including waste water and solid waste is not included in the scope of the project.

3.5.3 Electrical and Information and Communication Technology (ICT) Works

91. This scope includes the installation of the building's main electrical distribution system, internal wiring, and power supply networks to ensure a reliable and efficient electricity supply throughout the facility. It also involves the installation of Information and Communication Technology (ICT) infrastructure, including data and communication networks to support modern connectivity and communication needs. In addition, the works cover the installation of Extra-Low Voltage (ELV) systems such as security systems, Closed-Circuit Television (CCTV), access control, and public address systems, which contribute to the overall safety, security, and effective operation of the building.

3.5.4 Mechanical Works

92. This scope of work includes the installation of Heating, Ventilation, and Air Conditioning (HVAC) systems to ensure a comfortable indoor environment by maintaining proper temperature, ventilation, and air quality within the building. It also involves the installation of the medical gas system necessary for hospital operations, providing a safe and reliable supply of essential medical gases to designated healthcare areas in accordance with relevant standards and operational requirements.

3.5.5 Climate-Responsive Design:

93. The project integrates climate-responsive design measures to enhance the resilience of healthcare facilities against identified climate hazards and strengthen their capacity to maintain safe, reliable, and uninterrupted healthcare services under current and future climate conditions. The key climate adaptation objectives include:

- Improved stormwater drainage, site grading, and rainwater harvesting systems to reduce flood risk, prevent waterlogging, and enhance water resource management.
- Rehabilitation of water supply, storage, and sanitation infrastructure to improve water security and maintain reliable services during periods of water scarcity.
- Installation of energy-efficient HVAC systems and rooftop solar photovoltaic (PV) systems to enhance thermal comfort, improve energy efficiency, and increase resilience to power outages.
- Upgrading of electrical, utility, and fire-fighting systems to strengthen the reliability of critical infrastructure and support uninterrupted hospital operations during emergencies.

- Rehabilitation and strengthening of buildings and associated civil infrastructure, including roads, walkways, drainage, and utility networks, to improve durability and resilience to climate-related stresses.

3.6 LAND ACQUISITION

94. All the work will be carried out within the existing premises of the hospitals; therefore, no land acquisition is required.

3.7 PROJECT ADMINISTRATIVE JURISDICTION

95. The proposed project falls under administrative jurisdiction of Peshawar, Charsadda, Karak, Haripur and Abbottabad, Khyber Pakhtunkhwa.

3.8 PROJECT IMPLEMENTATION SCHEDULE

96. The proposed project is expected to be completed within 24 months.

3.9 COST OF THE PROJECT

97. Total Cost of infrastructure improvement for Phase-I has been estimated Rs. 3,952.451 Million whereas project cost is estimated to be Rs. 20,088.134 Million.

3.10 CONSTRUCTION MATERIAL

98. Major construction materials required for the project would include but not limited to; cement, sand, crushed aggregate, bricks and concrete blocks, reinforcing steel, structural steel sections, ceramic and porcelain tiles, marble and granite finishes, aluminum frames, glass panels, paints and coatings, gypsum boards, electrical wiring, Polyvinyl Chloride (PVC) and GI pipes, plumbing fixtures, insulation materials, and waterproofing compounds. These materials will be procured from approved suppliers and will comply with national construction standards and quality specifications.

99. Details of the materials to be used in the proposed project are given in the following **Table 3.2**

Table 3.2:-Construction Material for the proposed project

Sr. No.	Category	Sub-Category	Materials Included
1	Civil Construction Materials (Building Works)	Structural Materials	Cement (OPC / Sulphate Resistant Cement), Sand (Fine Aggregate), Crush / Gravel (Coarse Aggregate), Reinforcement Steel Bars (Deformed Bars), Plain Cement Concrete (PCC), Reinforced Cement Concrete (RCC), Brick Masonry, Stone Masonry
2		Finishing Materials	Cement Plaster, Gypsum Plaster / POP, Ceramic Tiles, Porcelain Tiles,

Sr. No.	Category	Sub-Category	Materials Included
			Marble / Granite, Skirting Tiles, Ceiling Boards, False Ceiling Framework
3		Doors & Windows	Aluminum Windows, UPVC Windows, Wooden Doors, Flush Doors, Steel Doors, Glass Panels, Door Hardware (Hinges, Locks, Handles)
4		Painting & Surface Treatment	Primer, Emulsion Paint, Enamel Paint, Weather Shield Paint, Waterproofing Chemicals
5	Plumbing Materials	Water Supply & Sanitary Fixtures	PPRC Water Supply Pipes, GI Pipes, PVC Pipes, HDPE Pipes, Valves (Gate Valves, Ball Valves), Faucets / Taps, Wash Basins, WC Units, Urinals, Shower Sets, Floor Traps, Water Tanks, Pipe Fittings (Elbows, Tees, Reducers)
5	Drainage & Sewerage Materials	Sewerage Network	RCC Sewer Pipes, PVC Sewer Pipes, Manhole Covers, Manhole Rings, Drain Channels, Concrete for Manholes, Inspection Chambers, Gully Traps, Bedding Sand
6	Road Works Materials	Pavement Construction	Subgrade Soil, Granular Sub Base (GSB), Aggregate Base Course, Crushed Aggregate, Asphalt / Bitumen, Prime Coat, Tack Coat, Asphalt Concrete, Road Marking Paint, Kerb Stones
7	Electrical Materials	Electrical Infrastructure	Electrical Cables, PVC Conduits, Cable Trays, Distribution Boards, Switches and Sockets, LED Lights, Panel Boards,

Sr. No.	Category	Sub-Category	Materials Included
			Earthing System, Circuit Breakers
8	ICT / Low Voltage System	Communication & Security	Data Cables (CAT-6/Fiber Optic), Network Racks, CCTV Cameras, Access Control System, Fire Alarm Cables, Communication Panels
9	HVAC Materials	Heating, Ventilation & Air Conditioning	Air Handling Units (AHU), Ducting Sheets, Insulation Material, Copper Pipes, Refrigerant Gas, Diffusers and Grills, Chillers / Split Units, Exhaust Fans
10	Solar System Materials	Solar Power System	Solar Panels, Solar Inverters, Mounting Structures, DC Cables, Batteries, Charge Controllers, Earthing System
11	Medical Gas System Materials	Medical Gas Infrastructure	Oxygen Pipelines, Copper Medical Gas Pipes, Pressure Regulators, Gas Outlets, Alarm Panels, Vacuum Pumps

3.11 EXPECTED EQUIPMENT FOR CONSTRUCTION

100. Construction and renovation activities will require the use of various types of machinery, equipment, and tools to support the planned construction and installation works. The list of the major equipment expected to be used for the propose project are provided in **Table 3.3.**

Table 3.3: Major Equipment Required for the Project

Sr. No.	Machinery Name	Sr. No.	Machinery Name
1	Grinding Machine	2	Concrete mixer machine
3	Vibratory Roller	4	Forklift
5	Water Tankers	6	Mini / Standard Excavator
7	Generators	8	Dump Truck
9	Scaffolding (Modular)	10	Concrete Vibrator

3.12 CONSTRUCTION CAMPS

101. For the hospital revamping project, one (01) construction camp will be established for each hospital site. The camps will be located outside the core operational areas of the

hospitals or within designated zones that do not disrupt ongoing healthcare services. Prior to the commencement of construction activities, the Contractor will identify and establish camp sites in accordance with the following criteria:

- Camp sites must be situated away from sensitive receptors, including patient wards, residential areas, and critical healthcare service zones, to avoid disturbance.
- The selected sites must be in close proximity to the respective hospital, with proper access to main and link roads for efficient transportation of materials and workforce.
- Camps should be located in areas where drainage will not contaminate or adversely affect domestic or hospital water supply systems.
- Each camp site should be adequate in size to accommodate all required facilities, ensuring no overcrowding of structures or personnel.
- Site selection should avoid any damage to existing infrastructure, utilities, vegetation, and hospital services, including water supply and sewerage systems.
- Camp sites should not be located in flood prone or waterlogged areas;
- Environmentally and socially sensitive areas (if any) in the vicinity should be avoided to minimize adverse impacts.

3.13 WORKFORCE REQUIREMENTS

102. The estimated manpower required for Phase I is 150 personnel, which corresponds to 25 workers allocated per hospital to ensure efficient and timely execution of the revamping activities. This workforce distribution has been planned to maintain adequate labor availability at each site, enabling simultaneous progress of construction and renovation works across all Phase 1 hospitals.

3.14 SOURCE OF WATER

Construction Phase

103. The Contractor shall ensure that water is used in a manner that does not jeopardize existing hospital operations, community water supply, or any designated water uses, and that water quality is not adversely affected or deteriorated. The source of water for construction and operational activities shall be identified and finalized subject to prior approval from the PMIU and the SC, based on technical verification and compliance with applicable environmental requirements and safeguard standards.

Operation Phase

104. The water requirement during the operational phase will be met through existing hospital water supply systems, ensuring efficient use without affecting existing users or water quality.

3.15 WATER REQUIREMENT

Construction Phase

105. The water consumption for Phase 1 is estimated to be 1250 gallons/day at each site and for phase 1 it will be 7500 gallons/day for 150 workers during construction phase of the proposed project.[1]

Operational Phase

106. The water consumption during operation phase for the existing Phase I hospitals has been estimated based on a standard requirement of 250 gallons per bed per day. Accordingly, the daily water demand is estimated at 37,500 gallons for Naseerullah Khan Babar Hospital, 26,000 gallons for Maulvi Jee Hospital, 60,500 gallons for DHQ Charsadda, 52,500 gallons for DHQ Karak, 26,000 gallons for DHQ Abbottabad, and 83,000 gallons for DHQ Haripur, resulting in a cumulative demand of approximately 285,500 gallons per day.[1]

3.16 WASTEWATER GENERATION

Construction Phase

107. During construction, wastewater generation is primarily from domestic use by workers. For each site, with an estimated workforce of 25 workers, wastewater generation is approximately 1,000 gallons per day. For Phase I (six sites), the total wastewater generation is estimated to be approximately 6,000 gallons per day, to be managed through appropriate on-site sanitation facilities.[2]

Operation Phase

108. The wastewater generation during operation phase for the existing Phase I hospitals has been estimated based on the anticipated operational water use. Accordingly, the daily wastewater discharge is estimated at 30,000 gallons for Naseerullah Khan Babar Hospital, 20,800 gallons for Maulvi Jee Hospital, 48,400 gallons for DHQ Charsadda, 42,000 gallons for DHQ Karak, 20,800 gallons for DHQ Abbottabad, and 66,400 gallons for DHQ Haripur, with a cumulative generation of approximately 228,400 gallons per day.[2]

[1] Design and Construction of Small Water Systems: A Guide for Managers, American Water Works Association, 1984, and Planning for an Individual Water System. American Association for Vocational Instructional Materials, 1982

[2] Design Criteria of Public Health Engineering for Water Supply, Sewerage and Storm Water Drain (Domestic sewage generation = 80% of water consumed/day).

3.17 SOLID WASTE ESTIMATION

Construction Phase

109. The solid waste generation in each hospital facility is estimated to be 11.25 kg/capita/day. The solid waste generation for phase-I is estimated to be 67.5 kg/day waste for 150 construction workers.[3]

Operational Phase

110. Each The operational solid waste generation for Phase I hospitals has been estimated based on a standard rate of 2 kg/bed/day. Accordingly, the daily solid waste generation is estimated at 300 kg for Naseerullah Khan Babar Hospital, 208 kg for Maulvi Jee Hospital, 484 kg for DHQ Charsadda, 800 kg for DHQ Karak, 420 kg for DHQ Abbottabad, and 664 kg for DHQ Haripur, resulting in a cumulative solid waste generation of approximately 2,876 kg/day.[4]

3.18 POWER REQUIREMENT/ POWER SOURCE

Construction Phase

111. During the construction/renovation phase, electrical power required for construction/renovation machinery and equipment will be arranged through temporary power connections from the existing utility supply available at the hospital premises. Diesel generator sets will also be used as standby power sources to operate construction equipment when required. The use of energy-efficient equipment will be encouraged to minimize power consumption during activities.

Operational Phase

112. During Operational Phase power would be supplied through temporary electrical connections from the local utility network or portable diesel generators where necessary. Proper wiring, Earthing, and safety arrangements will be ensured to prevent electrical accidents.

[3] The World Bank Report 2012 – What a Waste: A global review of solid waste management. Based on UNEP estimates for waste generation in the Asia Pacific. Average is 0.45 kg/capita/day.
[4] A waste generation rate of 2 kg/bed/day has been adopted based on WHO guidelines and regional studies for developing countries.

4 DESCRIPTION OF THE ENVIRONMENT

113. For any development project, the prevailing environmental conditions need to be assessed prior to the stages of planning, designing and execution of the project. Identification of physical, ecological and social aspects of environment and collection of relevant data is essentially important for the evaluation of impacts as well as for the suggestion of adequate mitigation measures, which forms the basis for the implementation of the proposed project in terms of prevailing environmental conditions in the study area.

4.1 PROJECT STUDY AREA

114. The existing environmental conditions have been assessed within the hospital premises and the immediate surrounding areas. The proposed interventions are limited to revamping and rehabilitation of existing buildings within the hospital boundary. No expansion, extension, or construction of new buildings is planned. Accordingly, the Area of Influence (AOI) is confined to the hospital premises and its adjacent areas.

115. The information has been collected from variety of sources, including published literature, previous environmental studies of the nearby areas, field observations, monitoring and surveys, conducted specifically for this project have been analyzed for this study.

116. Consultations were also held with the general public and stakeholders of the project area in order to seek the public opinion on the implementation of the proposed project. Map of AOI of the proposed project are attached as **Annex-II**

4.2 FIELD VISIT

117. For the primary data acquisition, the NESPAK team conducted the detailed field visits to the proposed project site in October 2025 and February, 2026. The major objective of the field visit was to collect the baseline data on physical, biological and social aspects along with identification, assessment and categorization of the significant environmental impacts of the proposed project. The secondary data was collected from published sources/reports and relevant departments, which were also verified through visual observations during detailed surveys.

4.3 PHYSICAL ENVIRONMENT

118. The following section provides an overview of the information on physical environment of the proposed Project study area collected from primary as well as secondary sources. The major parameters covered include Physiographic and Topography, Geology, Soil, Seismicity, Climate and Meteorology, Water Resources, Solid Waste, and Land Use etc.

4.3.1 Physiography and Topography

Peshawar

119. Peshawar is the economic and administrative capital of Khyber Pakhtunkhwa. It is situated at the entrance of the Khyber Pass. The district lies between 33°44′N and 34°15′N latitude, and 71°22′E and 71°42′E longitude. It is bounded by the Charsadda district in the east and Kohat district in the west. The tribal areas of Khyber and Mohamed Agencies are also west of Peshawar. The total area of District Peshawar is 1,257 km^2. District Peshawar has a planar valley topography. The average elevation of the city is approximately 357 m above sea level. Topography of Project Area is presented in **Figure 4.1.**

Charsadda

120. Charsadda is located in the west of KP and surrounded by the districts Mera Prang, Fazlabad and Geedar Kalay. Charsadda, positioned in western Khyber Pakhtunkhwa, lies between 71° 53’ to 71° 28’ East longitudes and 34° 03’ to 34° 38’ North latitudes, with an average elevation of 982 feet above sea level. Charsadda’s topography is shaped by a surrounding belt of high terrain descending from foothills, including the irrigated plains of “Doaba” and “Hashtnagar.”

Karak

121. The district is located between 70° 40' to 71° 30' north latitudes and 32° 48' to 33° 23' east longitudes. It is bounded by Mianwali district (punjab province) on the southeast, Lakki Marwat district on the south, Hangu and Kohat districts on the north, and Waziristan Agency and Bannu district on the west.

122. Topographically, the area is a part of the Kohat–Potowar Plateau, characterized by almost parallel ridges (chain of hills) and valleys. General elevation of the district is 600 to 1,400 m above sea level. The general trend of the hills is from east to west. [5]

123. Two other important hill ranges are located in the southeast of the district. The first one is the Surghar Range which is in the southeastern part of the district along the boundary of Karak and Mianwali. The other important range is the Shinghar Range located further northwest. This is an off-shoot of the Suleiman Hills. The average height of these hills is about 1,000 m above sea level. The highest peak is 1,482 m.

Haripur

124. Haripur district is located at 33° 44′ to 34° 22′ north latitudes and 72° 35′ to 73° 15′ east longitudes and about 610 m above mean sea level. The district is bounded by Mardan district on the northwest, Abbottabad district on the northeast, Margalla Hills Range on the southeast, Swat Valley in the northwest, and Buner and Swabi districts on the west of Haripur. Islamabad is in the south of the district.

[5] https://pakistanalmanac.com/kp-karak

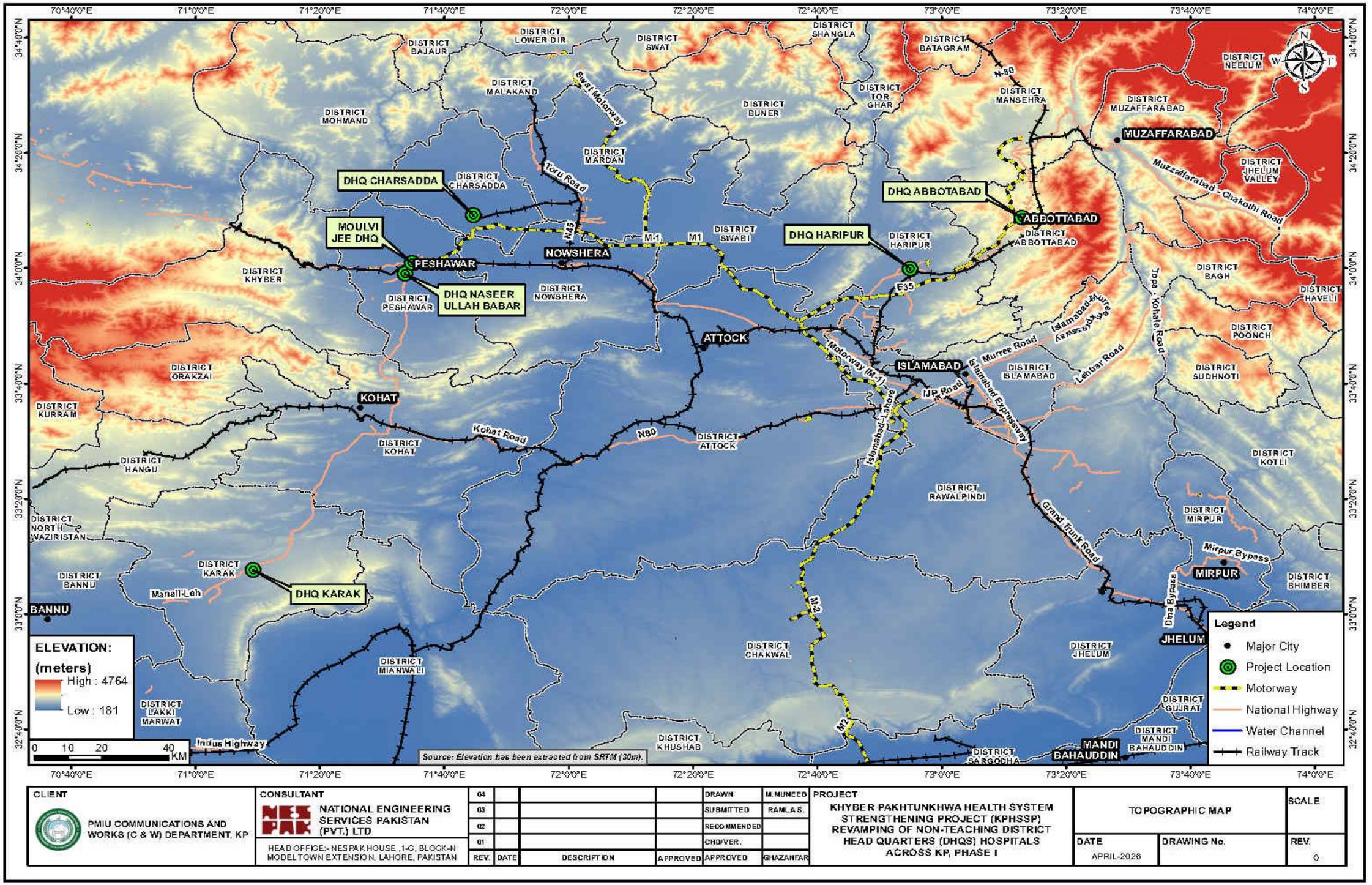


Figure 4.1: Topography Map of Proposed Project Area

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125. Most of the district consists of a plain with elevation ranging from 457 m to 915 m, and comprises of lush green plains surrounded by mountains with a number of water resources. Its topography can be divided into 3 plain areas and a mountainous region:[6]

Abbottabad

126. District Abbottabad located on the Eastern Border of the Khyber Pakhtunkhwa between 33°-50' to 34°-23' North latitudes and 72°-35' to 73°-31' East longitudes. It is bounded by Mansehra to the North, District Haripur to the West and South-West, Kashmir on the East, District Rawalpindi on the South and Islamabad on the South-East. River Jhelum is on the Eastern side and River Kunhar is on the North-East of District Abbottabad.

127. Spread over an area of 1,969 sq. km (178,401 ha), District Abbottabad is in predominantly mountainous terrain. These mountains form part of the lesser Himalayas and dominate the landscape. The average elevation of peaks in the district ranges from 2,500 m to 2,700 m.

4.3.2 Geology

Peshawar

128. District Peshawar is a fertile plain and is known to produce a high agricultural yield. The central part of the district consists of fine alluvial deposits. The cultivated tracks consist of a rich, light and porous soil, composed of an even mixture of clay and sand. This is highly suitable for cultivation of wheat, sugarcane and tobacco. Geology of Project Area is presented in **Figure 4.2.**

Charsadda

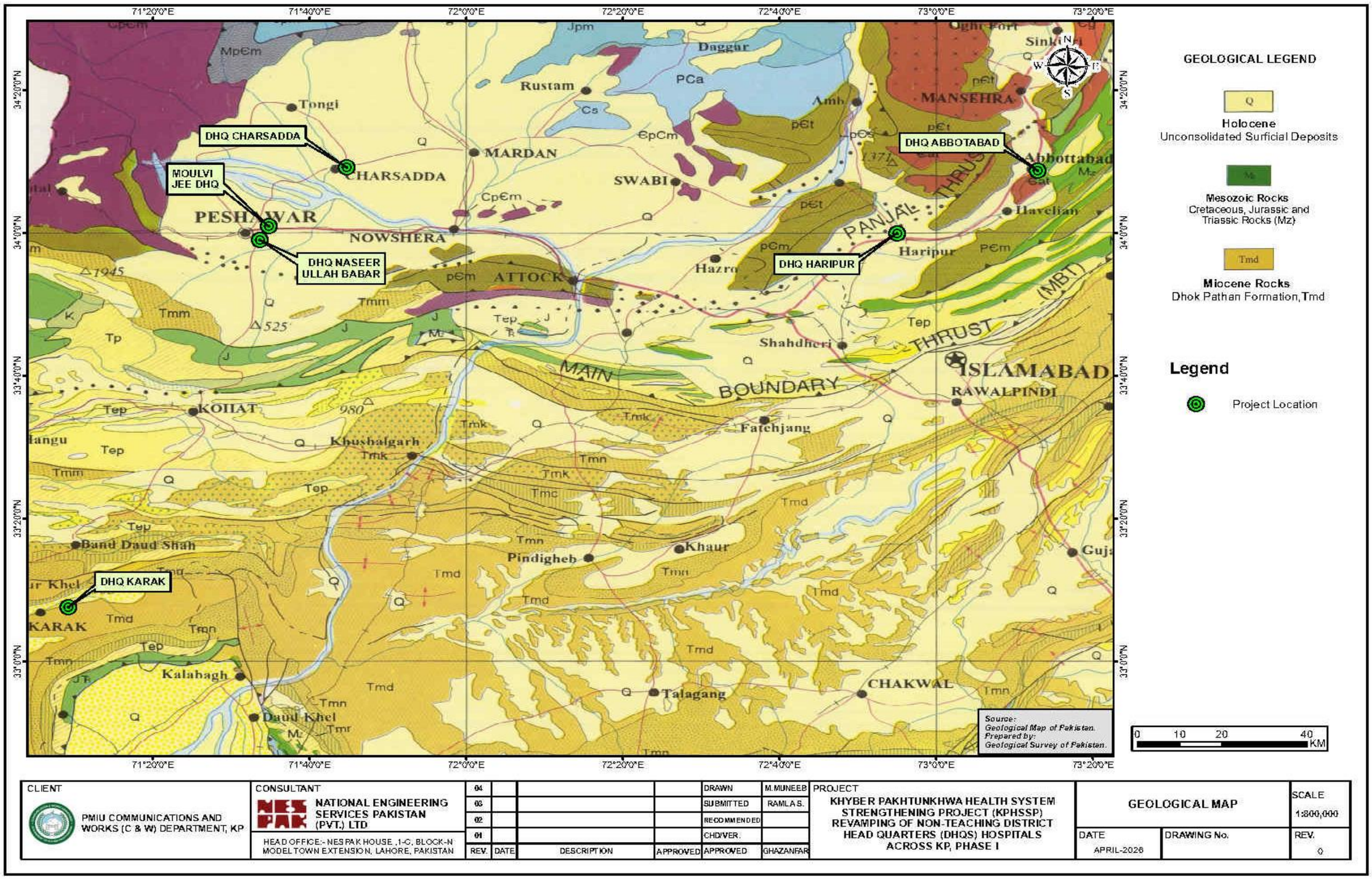
129. The area of Charsadda is mainly covered with alluvial deposits from the Pleistocene epoch, which have been deposited in recent rivers, streams, floodplains, and lakes. Apart from this, various other rocks can be found in the Charsadda region. These rock types are generally exposed in outcrops that form a belt surrounding the Charsadda area.

Karak

130. District Karak's central region, especially around Karak city, has alluvial deposits ideal for agriculture, construction, and groundwater use. Southern and central areas (Takht-e-Nasrati) feature Miocene rocks suitable for farming. The North (Banda Daud Shah) has rugged Oligocene and Eocene formations, less favorable for agriculture but promising for mineral exploration. Pleistocene and Pliocene rocks in the Southwest and Southeast offer moderate development potential.[7]

[6] https://pakistanalmanac.com/kp-haripur
[7]Provincial Land Use Plan of Khyber Pakhtunkhwa. (2025). Revised draft district land use plan report: District Karak

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		03				SUBMITTED	RAMLA S.			
		02				RECOMMENDED				
		01				CHD/VER.			DATE: APRIL-2026	DRAWING No.
		REV.	DATE	DESCRIPTION	APPROVED	APPROVED	GHAZANFAR			REV. 0

Figure 4.2: Geological Map of the Study Area

Hariupur

131. The Haripur Basin is bounded by Nathia Gali and Hissartang in the north, the Margalla Hills in the east, the Gandghar Ranges in the west, and the Haripur alluvial/fluvial plains in the south.

132. The Gandghar Ranges consist of Proterozoic, Paleozoic, and Mesozoic rock formations. The Gandaf Formation represents the oldest exposed rock unit in the area, particularly near Tarbela Dam, and is overlain by the Manki Formation. The Gandaf Formation is predominantly composed of calcareous phyllitic schist.[8]

133. The overlying Manki Formation comprises phyllite, argillaceous marble, and metasiltstone. The Shahkot Formation conformably overlies the Manki Formation and is mainly composed of limestone.

134. Another significant geological unit in the area is the Tanawal Formation, which is dominated by feldspathic sandstone, siltstone, and shale. In addition, the Sirban Dolomite of the Abbottabad Group is also present within the regional stratigraphic sequence.

Abbottabad

135. District Abbottabad has a complex and diverse geological structure ranging from Cambrian to recent Quaternary deposits. The area comprises several major geological groups including the Hazara Group, Abbottabad Group, Thandiani Group, Hothla Group, Galis Group, Rawalpindi Group, and recent Havelian Group. These formations consist mainly of limestone, sandstone, shale, dolomite, marl, quartzite, and alluvial deposits. The older formations, such as the Hazara and Abbottabad groups, include slates, quartzites, and dolomites, while younger formations like the Murree and Kuldana formations consist of sandstones, shales, and marls. The most recent deposits belong to the Havelian Group and consist of gravels, clay, loess, and alluvium. These geological formations reflect a long history of sedimentation, tectonic activity, and mountain building associated with the Himalayan region.

4.3.3 Soil

Peshawar

136. Peshawar basin is situated at southern foothills of the lesser Himalayas in the Khyber Pakhtunkhwa (KP) Province of Pakistan. It is mainly composed of the Quaternary fluvial and lacustrine sediments. The soil of the basin has been classified into Peshawar piedmont soil, Peshawar floodplain soil and Peshawar lacustrine soil.

[8] Integrated geoelectrical and geological investigation of a quaternary paleo-depositional environment in the Haripur Basin, Northern Pakistan: Implications for groundwater system. (2023, March 6) Wiley Online Library

Charsadda

137. The fertile plain of Charsadda consists of alluvial deposits. Most of the plains are composed of light, porous sandy soil underneath which lies the sandy mixture of clay, often combined with beds of nodular limestone by gravel and sand.[9]

Karak

138. The soil in the Karak district of Khyber Pakhtunkhwa, Pakistan, is primarily categorized as medium-textured, ranging from sandy loam to silt loam, with significant presence of clayey and stony soils. The area is generally characterized as having highly alkaline and calcareous soils with low organic matter.[10]

Hariupur

139. The soil of the district is dissected loess plain or dissected piedmont plains having silty loam, and silty clay loam texture.[11]

Abbottabad

140. The soil in the project area is mostly of alluvial character and consists of agglomerate of stone fragments, gravel, sand and silty loams. The soil at project area is predominantly of silt.

4.3.4 Surface Water Resources

Peshawar

141. The Project Area is situated in a region enriched by several rivers that significantly contribute to the local ecosystem. Below is a description of some of the key rivers in district Peshawar.

Kabul River

142. The Kabul River is a crucial waterbody in South Asia, originating in the Hindu Kush mountains of Afghanistan and traversing eastern Afghanistan and northwestern Pakistan. Spanning approximately 700 kilometers, it serves as a major tributary of the Indus River. The river's watershed, covering around 50,000 square kilometers, supports diverse ecosystems and supplies water for agriculture, industry, and domestic use along its route. The Kabul River is characterized by its high flow variability, experiencing significant fluctuations between the wet and dry seasons.

[9] www.tdap.gov.pk/charsadda-district/
[10] Determination of Physico-Chemical Properties and Fertility Status of District Karak Soil. (2022, December). ResearchGate
[11] www.pakistanalmanac.com/kp-haripur/

143. The major tributaries of the Kabul River in Pakistan region are: Naguman, Shah Alam, Khiali and Jindi Rivers. Shah Alam and Naghuman Rivers having lengths of about 28 and 27 kilometers, respectively, emerge from Kabul River near Bela Momandan and again fall into it.

Bara River

144. The Bara River is a significant waterbody flowing through the Khyber Agency and Khyber Pakhtunkhwa regions of Pakistan. It originates in the Tirah Valley of Bara Tehsil in the Khyber Agency. Known for its meandering course, the Bara River plays a crucial role in the region's hydrology. Starting from the Tirah Valley, it winds through the Khyber Agency, intersecting with the Kabul River Canal, which originates from the Warsak Dam. At the convergence point, the river reenters Peshawar and takes a northeasterly path into the Nowshera District, eventually joining the Kabul River near Camp Koruna, Akbarpura.

145. The hydrological dynamics of the Bara River are influenced by its higher elevation, resulting in a limited catchment area. Beyond its geographical path, the Bara River is vital to the local ecosystem and the livelihoods of people in the Khyber Pakhtunkhwa region. Its journey from the Tirah Valley to its confluence with the Kabul River highlights the intricate interplay between geography and hydrology, shaping the landscapes and lives of those along its banks. There are several dams in the area which includes:

Warsak Dam

146. Warsak Dam is located on the Kabul River in the Peshawar District of Khyber Pakhtunkhwa, Pakistan. Warsak Dam has catchment area of 68819.45 sq.km and encounters warm and dry conditions during the summer, with high temperatures leading to elevated evaporation rates, potentially impacting reservoir water level. It was completed in 1960 and is a multipurpose dam which serves as a lifeline for the region, offering a multitude of benefits to the local populace and the country as a whole.

147. One of the primary purposes of Warsak Dam is irrigation. Warsak Reservoir has a catchment area of 68819.45 sq.km and live storage capacity of about 0.35 billion cubic meters. This vast reservoir plays a crucial role in irrigating agricultural lands in the Peshawar valley, supporting the livelihoods of countless farmers and ensuring a steady food supply for the region.

148. In addition to irrigation, Warsak Dam also serves as a flood control measure. The dam helps regulate the flow of the Kabul River, reducing the risk of flooding downstream. This is particularly important during the monsoon season when heavy rains can lead to swollen rivers and devastating floods. Warsak Dam's ability to control the flow of water helps protect lives and property in the surrounding areas.

149. Another significant benefit of Warsak Dam is its hydroelectric power generation capacity. The dam has a hydroelectric power station with an installed capacity of 243 megawatts. This power station harnesses the energy of flowing water to generate electricity, providing a reliable source of power to the region. The electricity generated by Warsak

Dam helps meet the energy needs of the local community and contributes to the national grid, reducing the country's reliance on fossil fuels.

Azakhel Dam

150. Azakhel dam is Situated near Mattani, approximately 35 kilometres southeast of Peshawar and has catchment area approximately 115.29 sq.km. The dam at Azakhel Khawar was Initiated in June 2003, dam was completed in 2004 With a water storage capacity of 3,500 acre-feet, the dam was designed to discharge 14,000 acre-feet annually. It was constructed primarily for the purpose of irrigation and flood control.

151. The dam has a storage capacity of about 55,000 acre-feet and is used to irrigate agricultural lands in the surrounding areas. The water stored in the dam is released as needed to ensure a steady supply of water for crops, particularly during the dry season when water availability is limited.

152. In addition to irrigation, Azakhel Dam also serves as a flood control measure. The dam helps regulate the flow of the Azakhel Khwar / Nullah, reducing the risk of flooding during periods of heavy rainfall. This is particularly important for the surrounding areas, which are prone to flooding due to their proximity to the Kabul River.

Khwars / Nullah

153. Nullahs are small, seasonal streams or channels that are common in the mountainous regions of Pakistan. These nullahs play a crucial role in the local hydrology, especially during the monsoon season when they can experience significant flows. While nullahs are important for local ecosystems and agriculture, they can also pose challenges in terms of flood risk and erosion.

Charsadda

154. Charsadda has a very unique feature of water resources comprising Canals, Nullah and three main rivers flowing through its terrain Kabul and Swat River pass through the District. River Kabul forms the boundaries between Peshawar. The second major River is Khiali, which is a branch of river Swat which enters near Munda, later bifurcates into Khialai and Jindi Rivers. The two main Canals of River Swat Namely Lower Swat Canal constructed in 1895 and Upper Swat Canal System constructed in 1914 that includes recognizable Benton tunnel to irrigate lands of Malakand Agency and four Districts of KP including Charsadda, Mardan, Swabi and Nowshera.[12]

155. Charsadda can truly be called the land of rivers. River Swat, River Kabul along with the upper & Lower Swat canal, Michini Dalazak Canal and Doaba feeder Canal are the main sources of irrigation. The three rivers flowing in Charsadda: The River Jindi (also known as Nullah Jindi), the Kabul River, and the Swat River; these are the main source of irrigation for Charsadda. There are a number of Nullahs and small tributaries in the

[12] Urban Policy and Planning Unit, P&D Department, KP (2019) – Provincial Land Use Plan (PLUP)- District Charsadda

District Charsadda including Jindi and Shobla nullah. The three rivers then merge and join the Indus River. The area surrounded by River Swat and River Kabul is called Doaba and has a great importance in the district.

Karak

156. District Karak relies on small dams, khwars, nullahs, and limited canal infrastructure for surface water. With no major rivers, rainwater collected in dams is distributed through natural channels. However, inadequate infrastructure and irregular rainfall pose challenges for effective water distribution, affecting agricultural productivity. Expanding water storage and distribution systems is essential for improving water availability[7]

Canals

157. Canal irrigation in District Karak is minimal, with only 257 hectares irrigated through government canals consistently from 2017–18 to 2021–22. No irrigation is reported via private canals during this period, highlighting the district's limited reliance on canal infrastructure.

River

158. District Karak does not have major rivers like those found in other regions of Pakistan.

Khwar and Nullahs

159. In District Karak, rainwater from dams is distributed through narrow khwars and nullahs, which cannot often meet irrigation needs. Combined with irregular rainfall, this limits the reach of water and leaves much cultivable land barren. Strengthening these natural channels, along with projects like the Makh Banda and Chashma Akhora Khel Dam, is essential to improve water distribution for agriculture.

Dams

160. Due to the absence of rivers or canal systems, District Karak relies on rain-fed small dams for irrigation and water supply. Key completed dams include Zeibi, Ghole Banda, Sharqi, Sarki Lawaghar, Mardan Khel, Changhoz, Karak, Chambai, and Latambar. Among these, Changhoz Dam has the largest capacity (11,550 acre-feet), while Sharqi and Ghole Banda support extensive cultivable command areas. These dams irrigate various regions across the district and also supply drinking water in some cases.

Hariupur

161. The Haripur district covers an area of 1902 km^2, which is 2.56% of the total area of the KP province and is located in the hilly plains at an average altitude of 520 m above sea level. It occupies an important geographical position as it is known as the gateway to the Hazara and the Khyber-Pakhtunkhwa regions and is adjacent to the capital city Islamabad. The region is rich in natural resources and has special significance due to the presence of two important reservoirs, namely the Tarbera Dam and the Khanpur

Dam. The major rivers passing through this region are the Dor, the Haro and the mighty Indus. There are also many rivers flowing from the surrounding hills. The Tarbera Dam is an earth fill dam on the Indus River in the KP province. It is the largest earth fill dam in the world in terms of its structural volume. It forms the Tarbera Reservoir, with a surface area of about 250 square kilometers.[13]

162. The Khanpur Dam is a dam on the Haro River near the Potohar Plateau and the Khanpur village in the Khyber Pakhtunkhwa. The reservoir, Khanpur Lake, supplies drinking water to Islamabad and Rawalpindi and irrigation water to many agricultural and industrial areas around the city. In Haripur, both surface water and groundwater are important for natural environment, drinking water and irrigation. The groundwater and surface water in this region are abundant in terms of water quantity. Although the main source of water in Haripur is a mixture of groundwater and surface water, the local people use dug wells, shallow wells and springs for drinking and other purposes.

Abbottabad

163. The water resources of District Abbottabad consist of rivers, small streams, small dams and khattas/khwars. The main natural sources for irrigation in District Abbottabad are khattas/Khwars, mountain springs, tube wells, dug wells. The main source of water in the rivers is rainfall and melting of snow which vary from season to season. District Abbottabad has a great potential for harvesting rain water run off through modern harvesting techniques.

Rivers

164. The main rivers of District Abbottabad are Haro, Dor, Siran and Kunhar. These rivers sprout countless tributaries, some of which are permanent (known as a katha) while others experience seasonal flows (known as kassi). The details of each river are as under:

Haro River

165. Haro River originates at the southern end of the Dongagali range and flows through the district. The total catchment area of Haro River Basin is 853 Square Kilometers. The major natural drains that contribute to the flow of River Haro are Samandur Katha, Nadi Haro, Ruppar Katha, Lelianda Kacha and Nillan Nalla.

Dor River

166. Dor River which originates at the northern end of the Nathiagali range. The catchment area of Dor River Basin is 160 Sq.Km. The watershed primarily comprises of vegetative land cover and steep slopes. The Dor River is a combination of five natural drains, which combines at two different locations and contributes in the flow. Dor River Joins River Indus at downstream side of District Haripur, which further flows towards Tarbela Dam.

[13] Master Plan of Water. Supply and Sanitation for District Haripur (2018), Public Health Engineering Department KP

Siran River

167. It originates from District Mansehra and passes through District Abbottabad and crossing through north western part of district Haripur drains directly into Tarbela Reservoir. Uppermost reaches of the Siran watershed receive snow from December to February, which melts down completely by the mid of March. The elevation of the Siran watershed ranges are between 834m to 4199m and terrain comprise of two valleys namely Pakhli and Chattar, which are surrounded by moderate to steeply sloping mountains, the catchment area of Siran river is 2797 sq. Km.

Kunhar River

168. River Kunhar originates from the Lulusar Lake in the Kaghan valley. It passes through Jalkhand, Bata Kundi, Naran, Kaghan, Kawai, Balakot, and Gari Habibullah and finally joins the Jhelum River at Rara. Kunhar River is 166 kilometers long; the catchment area of Kunhar River is 163 Sq.km. It has a drainage area of 2535 km^2, with elevation ranging from 600 to 5000 m. The water of the Kunhar River is mostly used for irrigation, municipal use, power generation, and recreation. Since no industries are in the basin, most of the water of the Kunhar Basin (about 98 percent) is used for agriculture and the rest for domestic use. Surface Water Hydrology near Study Area is presented in **Figure 4.3**

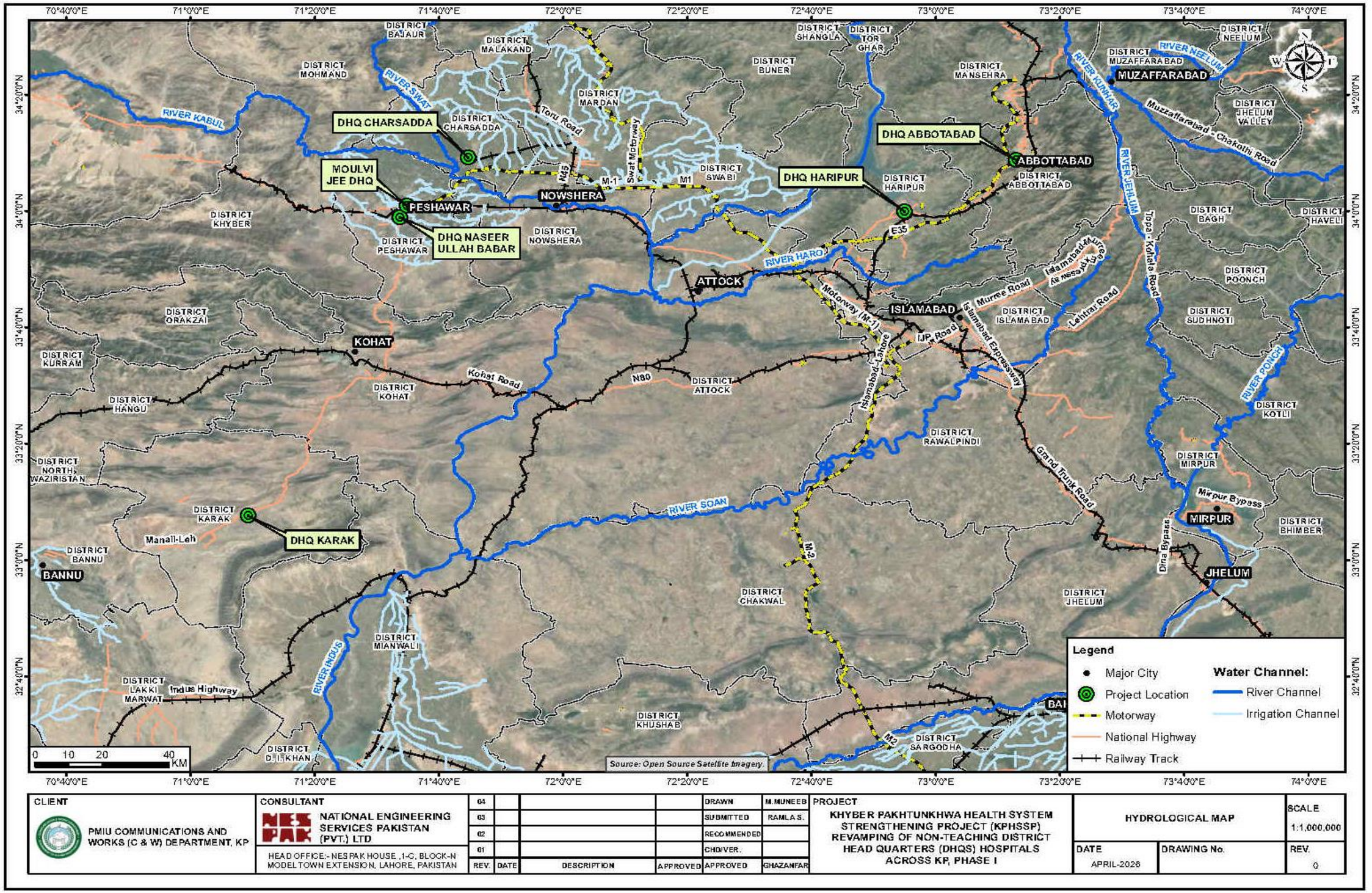


Figure 4.3: Surface Water Hydrology Near Study Area

4.3.5 Seismology

Peshawar

169. The project area falls in seismically active zone due to its proximity to the collosional zone between the two tectonic plates. The Project area is located near the western boundary of the Peshawar basin which is bounded by Panjal-Khairabad Fault in the south and Main Mantle Thrust in the north.

170. This region has been subjected to severe shaking in the past due to earthquakes, especially the deep earthquakes of the Hindukush Seismic Zone which are felt frequently in the project area. Peshawar basin itself shows low level of seismicity. However, other active crustal tectonic features of the project region are Main Boundary Thrust (MBT) which passes at a closest distance of about 45 km south of the project area, Khairabad fault passes at a closest distance of less than 15 km south of the project area and Main Mantle Thrust (MMT) zone passes at a closest distance of about 45 km north from the project area. All these features are considered active and are capable of producing damaging earthquakes.

Charsadda

171. The project area falls in tectonically active zone due to its location near the collosional zone between the two tectonic plates. It is located in the central part of the Peshawar basin which is bounded by Main Mantle Thrust in the north and Khairabad/Hissartang and Main Boundary Thrust faults in the south.

172. This region has been subjected to severe shaking in the past due to earthquakes, especially the deep earthquakes of the Hindukush Seismic Zone which are felt frequently in the project area. Peshawar basin itself shows low level of seismicity. However, active tectonic features of the project region are Main Boundary Thrust (MBT) which passes at a distance of about 50 km south, Khairabad fault passes at a distance of about 40 km south and Main Mantle Thrust (MMT) zone passes at a distance of about 30 km north of the project area. All these features are considered active and are capable of producing damaging earthquakes.

Karak

173. The project area is located in the northeastern part of the Bannu basin which is bounded by east-west running Karak fault in the north, north-south running Kalabagh/Surghar range faults in the east and Kurram Thrust in the west.

174. The Kurram Thrust is a north-northeast – west-southwest (NNE–WSW) trending westward dipping active tectonic feature running parallel to the western boundary of Indian plate. The Kurram Thrust along with other sub-parallel thrust faults extending in Baluchistan such as the northern and southern Khorasan faults and the left-lateral, strike-slip Quetta fault, are considered seismically active. The north dipping Karak fault is located on the boundary between the Bannu Basin and the Kohat Plateau. It is oriented from almost east to west. Kalabagh fault is a prominent right-lateral strike slip

fault; located on the east of Kalabagh, and extending between Kalabagh and Mianwali. The overall trend of the fault is northwest-southeast. It truncates the western margin of Salt Range which takes a sharp bend along Mianwali re-entrant and extends along the Surghar Range as part of Trans-Indus Ranges. The recorded seismicity of this region can be associated with all of these features; therefore, these are considered capable of producing damaging earthquakes.

175. This region has been subjected to severe shaking in the past due to earthquakes including the deep earthquakes of the Hindukush Seismic Zone which are felt frequently in the project area. Although infrequent, Bannu basin along with Kohat plateau show low to moderate level of seismicity.

Haripur

176. The project area falls in Haripur basin which is bounded by Abbotabad hills in the north, by Margalla Hills in the east, by Gandghar ranges in the west, and by Haripur alluvial/fluvial plain area in the south. The area is part of the northwestern Himalayan fold-thrust belt, characterized by complex geological structures formed by this ongoing collision. The geology of the Haripur valley (or Haripur Basin) is characterized by a complex, collisional tectonic environment where the Indian and Eurasian plates meet, resulting in a combination of metamorphic bedrock, folded sedimentary sequences, and thick Quaternary fluvial deposits. The area is part of the Hazara region and features a diverse array of geological structures, including thrust faults and folds.

177. The project area falls in seismically active zone due to its proximity to the collosional zone between the two tectonic plates. This region has been subjected to severe shaking in the past due to crustal earthquakes and also by deep earthquakes of the Hindukush Seismic Zone which are felt frequently in the project area. The main active crustal tectonic feature of the project area is Panjal-Khairabad fault. The inferred location of this fault dipping towards northwest and on geological maps concealed under alluvial deposits, passes at a closest distance of less than 2 km of the project area. Other important faults bounding the north-western side of Margalla Hills is the Nathiagali fault, a thrust fault dipping towards northwest and passing at a closest distance of about 15 km southeast of the project area. The Main Boundary Thrust (MBT) bounding the south-eastern side of Margalla Hills passes at a closest distance of about 30 km southeast of the project area. All these features are considered active and are capable of producing damaging earthquakes.

Abbotabad

178. The project area falls in northwestern Himalayan fold-thrust belt which is characterized by complex geological structures formed by this ongoing collision. The geology of Abbottabad area is influenced by a complex, collisional tectonic environment where the Indian and Eurasian plates meet, resulting in a combination of metamorphic bedrock, folded sedimentary sequences and Quaternary fluvial deposits in the valleys. The area is part of the Hazara region and features a diverse array of geological structures, including thrust faults and folds.

179. The project area falls in seismically active zone due to its proximity to the collosional zone between the two tectonic plates. This region has been subjected to severe shaking in the past due to crustal earthquakes, notably Kashmir Magnitude 7.6 earthquake of 2005 and also by deep earthquakes of the Hindukush Seismic Zone which are felt frequently in the project area. The main active crustal tectonic feature near the project area is Panjal-Khairabad fault. This fault dipping towards northwest passes at a closest distance of about 10 km southwest of the project area. Other important faults bounding the north-western side of Margalla Hills is the Nathiagali fault, a thrust fault dipping towards northwest and passing at a closest distance of about 15 km southeast of the project area. The Main Boundary Thrust (MBT) bounding the south-eastern side of Margalla Hills passes at a closest distance of about 28 km southeast of the project area. All these features are considered active and are capable of producing damaging earthquakes.

180. Probabilistic Seismic hazard assessment of Pakistan carried as part of updating of Building Code of Pakistan in 2021 (BCP-2021) shows that project area falls in districts, Peshawar, Charsadda, Karak, Haripur, Abbottabad for which following spectral horizontal acceleration values are recommended:

Table 4.1: Spectral Horizontal Acceleration Values

Sr. No.	Spectral Horizontal Acceleration Values	Peshawar	Charsadda	Karak	Haripur	Abbotabad
1.	Short Period Spectral Acceleration (Ss)	0.8399 g	0.7283 g	0.7469 g	1.2187g	1.5596 g
2.	Long Period Spectral Acceleration (S1)	0.2943 g,	0.3102 g	0.1923 g	0.3650 g	0.4996 g
3.	PGA (RP 2475 Years)	0.3969 g	0.3529 g	0.3582 g	0.5500 g	0.6907 g
4.	RP 475 Years	0.2153 g	0.2116 g	0.1978 g	0.3026 g	0.3319 g

181. It is recommended that project structures should be designed using these seismic parameters in accordance with BCP-2021 after giving due consideration to the foundation soil material in the project area.

4.3.6 Water Supply System

Peshawar

182. The water supply system in Peshawar is primarily managed by the Water and Sanitation Services Peshawar, which provides bulk water to the residents of Peshawar through a network of tube wells extracting groundwater. Groundwater serves as the principal source of public water supply across the district. The entire urban area, including municipal limits, cantonment, and adjoining settlements, is located within the main hydrological basin of the Peshawar Valley. Water for domestic and municipal use is drawn from the extensive aquifer system underlying this basin. Most areas of the district

are served by piped water supply systems, which predominantly consist of underground distribution networks ensuring water conveyance to households and other users. [14][15]

Charsadda

183. The main source of potable water in Charsadda is groundwater extracted through tube wells and hand pumps. Groundwater serves as the backbone of the water supply system, with many tube wells drilled to depths between approximately 280 ft and 400 ft. These deeper tube wells generally yield safer water as they are less prone to surface contamination, and water quality tests have shown that around 89 % of operational tube wells provided bacteriologically safe water at the source. However, at the consumer end, about 50 % of tap-delivered water samples were found contaminated, likely due to distribution line leakages or unprotected storage conditions.

184. A significant portion of the installed tube wells in Charsadda are non-operational or intermittently functional. In one survey, of 143 tube wells under the control of the Public Health Engineering Department (PHED), only 64 were operational while 78 were not, indicating challenges in maintenance and continuous supply coverage.[16]

Karak

185. The groundwater resources of District Karak are primarily utilized for drinking water through tube well based small schemes. These schemes are predominantly managed by the Public Health Engineering Department (PHED), with installations completed in multiple phases across rural areas. The discharge capacity of tube wells varies with the local groundwater potential, which remains poor in settlements such as Sur Dag, Narre Khawar, and Takht-e-Nasrati. Notably, over 112 water supply schemes have dried up 16 ongoing and 298 operational schemes raising serious concerns for future drinking water availability. The depletion of groundwater is driven by limited recharge sources, declining rainfall, and increasing temperatures.[7]

Haripur

186. At present, groundwater is being used as water supply source in Haripur. The water is pumped directly from tube wells into supply pipes. Depth of water table in Haripur city is 160 to 210 feet below ground level. The average depletion rate of aquifer is 7 feet per year and specifically in urban area, depletion rate is 11 feet per year.

Abbottabad

187. Currently, there are two main sources of water supply in Abbottabad. The major source is ground water source based on tube wells while the second source is the existing surface water-based water treatment plant Japan International Cooperation Agency

[14] www.wsspeshawar.org.pk

[15] Provincial Land Use Plan (PLUP) Urban Policy and Planning Unit (2019) – Planning and Development Department Government of Khyber Pakhtunkhwa

16 Imran S., L. N. Bukhari. and Gul S. (2018). Water Quality Assessment Report: District Charsadda Khyber Pakhtunkhwa 2018. Pakistan Council of Research in Water Resources (PCRWR), pp. 49

(JICA). The approximate discharge of the existing and operational 14 tube wells is 1,120,000 gallons per day and average water supply from existing JICA water treatment plant is approx. 1,460,766 gallons per day, which gives a total supply of 2,580,766 gallons per day. At present, there is net shortfall of 2,669,234 gallons per day in Abbottabad.

188. There are 19 number of existing tube wells under jurisdiction of WSSC Abbottabad. At present, 14 out of 19 tube wells are operational while the remaining 5 tube wells are non-operational.

4.3.7 Sewerage System

Peshawar

189. Water and Sanitation Services Peshawar (WSSP) is the designated authority for sanitation and drainage facilities. In Peshawar city there are many disposal sites i.e. Budni Nala, Narai Khwar,Chaura Khwar, Gandao Khwar, Kabul River Canal, Hazar Khwani Canal, Joe Sheikh Canal and Bara River.

190. Drainage channels collect surface runoff through hundreds of small/large side channels and lined nullahs (drains) that serve as important components of the drainage network. These are generally dry built channels and streambeds that flow into the main rivers described above.

191. The existing coverage of the sewerage system is not 100% for the Peshawar. The existing sewerage system has a number of problems. These include low sewage flows, resulting from the inadequate provisions of sewer trunk mains and the malfunctioning of pumping facilities, deterioration of water quality in rivers and canals, and clogging of waterways caused by damping of massive rubbish.

Charsadda

192. A drainage system allows the safe disposal of wastewater from house or even an entire area. Thus, it is important to have a sufficient and satisfactory drainage system, from single dwelling to urban level. A proper drainage system is lacking in most areas of Charsadda city. There is no sewerage treatment plant available in charsadda and the wastewater is eventually discharged into Jindi River without any treatment.[17]

Karak

193. Karak District is characterized by limited and largely underdeveloped sewerage and drainage infrastructure. The majority of the population relies on on-site sanitation systems such as septic tanks and soak pits, while greywater and stormwater are commonly discharged into open, unlined drains or natural depressions. There is no functional centralized sewerage network or wastewater treatment facility in most urban

[17] Charsadda City Master Plan 2024-42-Volume I

and peri-urban areas, resulting in the direct discharge of untreated wastewater into the surrounding environment

194. The general natural drainage of the district north of the Khattak Range is from west to east, while in the south of the Khattak Range, it is from northeast to southwest.

195. Drainage systems, where present, are often poorly designed, discontinuous, and inadequately maintained, leading to frequent blockages, stagnant water accumulation, and localized flooding, particularly during rainfall events. The absence of an integrated stormwater management system further exacerbates these issues, as surface runoff mixes with domestic wastewater, increasing the risk of environmental contamination and public exposure

Hariupur

196. Partially Combined wastewater collection system exists in Haripur city which is served through mainly combination of open drains and covered drains. In this system a single/combined collection network (i.e., conduits) is used to convey both the wastewater and stormwater generated in a developed area. There is no functional wastewater treatment plant in the city. All of the wastewater generated is discharged untreated into the receiving water bodies without giving any consideration to the environment.

197. Sewage treatment is a type of wastewater treatment which aims to remove contaminants from sewage to produce an effluent that is suitable to discharge to the surrounding environment or an intended reuse application, thereby preventing water pollution from raw sewage discharges.

Abbottabad

198. The district is drained by perennial streams, dry streams and nullahs. There is almost no manmade drainage system in Abbottabad. The central region, a major surface area, is drained by the Dor River. The Water and Sanitation Company Abbottabad has identified a few natural drains in the main urban area of Tehsil Abbottabad.

4.3.8 Climate of Peshawar

199. The climate of Peshawar is generally classified as semi-arid to sub-tropical, characterized by hot summers, mild winters, and moderate seasonal rainfall influenced by the monsoon system, with pronounced seasonal temperature variations. Summers extend from May to September, with peak temperatures in June and July often exceeding 40 °C, while winters from December to February are relatively cool, particularly during nighttime. Mean monthly maximum temperatures range from about 15 °C to 43 °C, and minimum temperatures from approximately 3 °C to 32 °C, reflecting the continental nature of the Peshawar Valley, where April to October remains warm to hot and December to February constitutes the coldest period.

200. Rainfall exhibits significant seasonal variability, with monthly totals ranging from negligible levels to over 250 mm during intense monsoon events, with peak precipitation occurring in July and August, supplemented by moderate rainfall in March and April due

to western disturbances, while October, November, and sometimes May remain relatively dry. Relative humidity is generally higher during the monsoon months of July and August and lower during winter and pre-summer months, particularly from November to January.

201. Wind patterns indicate average speeds ranging between approximately 2.5 km/h and 9 km/h, with relatively higher wind activity observed during late spring and summer (May to August) and calmer conditions prevailing in winter months. Overall, these climatic parameters highlight a distinct seasonal regime with hot, dry summers, monsoon-driven rainfall, and cool winters.

4.3.9 Climate of Charsadda

202. The climate of Charsadda District is classified as subtropical to semi-humid, exhibiting pronounced seasonal variations in temperature, precipitation, humidity, and wind patterns based on meteorological data for the period 2010–2025. Summers extend from May to September, with mean monthly maximum temperatures ranging from about 12°C to 44°C and frequently exceeding 40°C during May and June, while minimum temperatures vary between approximately 4°C and 31°C, indicating warm nights in peak summer and cooler conditions in winter months (December–February).

203. The area experiences moderate to heavy rainfall influenced by the monsoon system, with monthly precipitation ranging from negligible values to over 500 mm during extreme events (e.g., July 2010 and August 2024–2025), with peak rainfall occurring in July and August and supplementary rainfall during March–April due to western disturbances, while late autumn and early winter months remain relatively dry. Relative humidity generally ranges from about 20% to 65%, with higher levels during monsoon months (July–September) and lower levels during winter (December–February).

204. Wind speeds remain moderate throughout the year, typically ranging between 4 km/h and 10 km/h, with relatively higher speeds observed during summer months (May–July) and lower speeds during winter. Overall, the climatic regime reflects a continental pattern with hot summers, mild winters, monsoon-driven rainfall, and conditions favorable for agriculture, while also having implications for construction activities, particularly in terms of heat stress, rainfall management, and material performance.

4.3.10 Climate of Karak

205. The climate of Karak District is predominantly arid to semi-arid, exhibiting strong continental characteristics with marked seasonal variations in temperature, precipitation, humidity, and wind patterns based on data for the period 2010–2025. Summers extend from May to September, with mean monthly maximum temperatures ranging from approximately 13 °C to 41 °C and frequently exceeding 40 °C during May to July, while minimum temperatures vary between about 4 °C and 30 °C, indicating very hot days and warm nights in summer and comparatively cool conditions in winter (December–February).

206. Rainfall is low to moderate and highly variable, ranging from negligible amounts to over 600 mm during extreme monsoon events (e.g., July 2010), with the majority of precipitation occurring during July and August, supplemented by moderate rainfall from February to April due to western disturbances, while October to December remain relatively dry. Relative humidity generally ranges between approximately 16% and 61%, with higher levels during the monsoon months (July–September) and lower levels during pre-summer and winter periods, reflecting overall dry atmospheric conditions.

207. Wind speeds remain low to moderate, typically ranging from about 3 to 10 km/h (or equivalent), with relatively higher speeds during late spring and summer (April–July) and calmer conditions during winter months. Overall, the climate is characterized by high temperatures, low and erratic rainfall, and high evaporation rates, resulting in limited water availability and significant implications for agriculture, water resources, and construction activities.

4.3.11 Climate of Haripur

208. The climate of Haripur District is classified as subtropical humid with a strong monsoon influence, exhibiting clear seasonal variations in temperature, rainfall, humidity, and wind patterns based on meteorological data for the period 2010–2025. Mean monthly maximum temperatures range from approximately 13°C to 42°C, with peak values commonly recorded during May and June, while minimum temperatures vary between about 3°C and 27°C, indicating hot conditions from April to September and cooler conditions during December to February.

209. Rainfall shows pronounced seasonal variability, ranging from negligible amounts to over 560 mm during peak monsoon events (e.g., August 2025), with the highest precipitation occurring in July and August, supplemented by notable rainfall in March and April due to western disturbances, while late autumn and early winter months remain relatively dry. Relative humidity generally increases during the monsoon period, ranging from about 17% to 72%, with higher values observed in July and August and comparatively lower levels during May–June and winter months.

210. Wind speeds remain moderate throughout the year, typically ranging between approximately 6 km/h and 11.5 km/h, with higher values observed during late spring and early summer (April–June) and relatively lower speeds during winter. Overall, the climatic regime reflects a humid subtropical environment with strong monsoonal effects, influencing water availability, agricultural productivity, and construction planning considerations such as drainage, material performance, and scheduling of works.

4.3.12 Climate of Abbottabad

211. The climate of Abbottabad District is classified as humid to sub-humid, with a temperate climatic regime influenced by its elevated topography in the Hazara region and strong monsoonal effects, based on meteorological data for 2010–2025. The district experiences moderate summers (May–September) with mean monthly maximum temperatures generally ranging from about 13°C to 36°C, while winter months (December–February) are cold, with minimum temperatures frequently falling to

between –1°C and 5°C and occasionally dropping below freezing, indicating frost conditions.

212. Rainfall is comparatively high, ranging from moderate values to over 540 mm during peak monsoon events (e.g., August 2024), with July and August contributing the highest share of annual precipitation, supplemented by significant winter and spring rainfall due to western disturbances, making Abbottabad one of the wetter districts in the region. Relative humidity remains generally high, particularly during the monsoon season (July–August), where it ranges from about 70% to over 80%, while lower values are observed during winter and pre-monsoon months.

213. Wind speeds remain moderate throughout the year, typically between 6 and 11 km/h, with slightly higher values during April to June and lower speeds during winter months. Overall, the climate reflects a cool, moist, and well-precipitated environment with strong seasonal variation, supporting agriculture and forestry while also requiring careful consideration for construction activities due to rainfall intensity, humidity, and occasional frost conditions.

4.3.13 Floods

214. Flooding is a recurring natural hazard in several districts of Khyber Pakhtunkhwa, including Abbottabad, Charsadda, Haripur, Karak, and Peshawar, mainly associated with intense monsoon rainfall, river overflow, and flash floods in natural drainage channels. Historical records indicate that major flood events occurred during 2010, 2014, 2015, 2021, 2022, and 2023, causing varying degrees of damage to infrastructure, residential areas, agricultural land, and public utilities. In Charsadda and Peshawar, flood risks are relatively higher due to their proximity to the Kabul River and its tributaries, where riverine flooding and overflow of drainage channels such as Budni Nala frequently affect low-lying settlements and agricultural land. Similarly, Abbottabad and Haripur experience flash floods and urban flooding triggered by heavy rainfall, steep terrain, and limited stormwater drainage capacity, which occasionally inundate roads, houses, and commercial areas.

215. The 2022 monsoon floods in Khyber Pakhtunkhwa further highlighted the vulnerability of these districts, resulting in damage to houses, roads, agricultural land, and other infrastructure. Reported impacts included damage to approximately 230 houses and 273 livestock in Charsadda, about 175 houses in Karak, and infrastructure damages in Peshawar, Abbottabad, and Haripur, with economic losses ranging from PKR 90 million to PKR 1,900 million across these districts.

216. Rapid urbanization, encroachments along natural drainage channels, and inadequate stormwater management systems have further increased the risk of urban flooding, particularly in densely populated areas such as Peshawar city. Overall, historical flood events indicate that the project districts are moderately to highly vulnerable to flash floods, riverine flooding, and urban flooding during the monsoon season, which is an important environmental baseline consideration for planning and implementation of development projects.

4.3.14 Climate Change

217. The project districts are located in Khyber Pakhtunkhwa, which exhibits diverse climatic conditions ranging from the hot, semi-arid climate of Karak to the cooler mountainous climate of Abbottabad. Peshawar experiences high summer temperatures, occasional urban flooding during intense rainfall, and deteriorating air quality, while Charsadda, located within the Kabul River basin, is prone to riverine and flash flooding. Karak is characterised by prolonged dry periods, high temperatures, water scarcity, and dust storms. Haripur receives relatively higher rainfall and is susceptible to localized flooding and occasional windstorms, whereas Abbottabad is exposed to heavy rainfall, landslides in surrounding areas, and seismic hazards. According to the ADB–World Bank Climate Risk Country Profile: Pakistan, the country is projected to experience warming at rates above the global average, with rising temperatures, more frequent heatwaves, increasing rainfall variability, and a higher frequency and intensity of extreme weather events, which are expected to exacerbate existing climate-related hazards across Khyber Pakhtunkhwa.[18]

4.3.15 Solid Waste System

Peshawar

218. Approximately 1331 [19] tons of wastes are generated in Peshawar with a waste generation rate of around 0.38 kg per person per day. The two dumping sites (Hayatabad and Shamshato) still exist but they are situated within the unsuitable areas while the 3rd dumping site (Hazarkhwani) is already closed by the district administration (Rafiq et al., 2017). Other than dumping sites, scattered heaps of waste can be found on streets. WSSP is the relevant authority that collect and dispose the solid waste.

Charsadda

219. In Charsadda, the practice of at-source waste storage is non-existent, as the majority of residents dispose of their waste outside their premises, including on streets, in drains, open spaces, water bodies, and other inappropriate locations. Unfortunately, it is common practice of residents to discard waste into the running water bodies, including streams and canals, leading to the city's waterways becoming designated dumping sites. However, the TMA has taken proactive measures to address this challenge, including deploying containers and litter bins along main roads and streets. Additionally, after sweeping the streets, sanitary workers collect waste in handcarts and transport it to designated waste storage points in the area, typically containers. Currently, most waste collected by collection vehicles is taken to the dumping site directly. Smaller vehicles dump their waste at open collection points and this waste is lifted in bigger dump trucks etc.

[18] Asian Development Bank (ADB) and World Bank. 2021. Climate Risk Country Profile: Pakistan. Manila and Washington, D.C. Climate Risk Country Profile: Pakistan

[19] Optimizing municipal solid waste management in urban Peshawar: A linear mathematical modeling and GIS approach for efficiency and sustainability**.** *(2024, June).* Case Studies in Chemical and Environmental Engineering, 9*, 100704.* ***ScienceDirect***

220. The field survey revealed that hospital waste from the DHQ Hospital Charsadda was being openly disposed of. While some color-coded bins were present, a proper designated storage facility for hazardous and medical waste was not available.

Karak

221. The Solid Waste Management (SWM) system in Karak District faces critical challenges due to inadequate infrastructure, financial constraints, and a lack of human resources. Urban areas have limited waste collection, often leading to uncontrolled dumping, while rural regions lack any structured disposal system, exacerbating environmental and health risks. The absence of designated landfill sites and inefficient machinery further hinders effective waste management. Waste generation is projected to increase significantly.[7]

222. The field survey revealed that hospital waste from the DHQ Hospital Karak was being openly disposed of. While some color-coded bins were present, a proper designated storage facility for hazardous and medical waste was not available.

Haripur

223. Haripur city did not own a permanent dumping/ sanitary landfill site. Municipal solid waste of city is being dumped at temporary dumping site at Doyan Khuski. At present another site is proposed by TMA for landfill near Kot Najeeb ullah, which is outside the city area. Total land requirement for sanitary landfill site is about 40 acres.[20]

224. The field survey revealed that hospital waste from the DHQ Hospital Haripur was being openly disposed of. While some color-coded bins were present, a proper designated storage facility for hazardous and medical waste was not available.

Abbottabad

225. The current system of solid waste disposal is highly unsatisfactory. Abbottabad town's solid waste is deposited at a municipal dump site at Salhad, some 3 km from the city in a ravine close to the Karakoram highway. Some of this waste is burned while the remainder is left to rot. There are no landfills in the area, nor have attempts been made to redistribute waste.

226. Waste management in Abbottabad city is the responsibility of the TMA, which employs a staff of 129, equipped with two multi-loading trucks, 12 skips, three tractor-trolleys and 70 wheelbarrows, to handle solid waste disposal. The Abbottabad cantonment board performs similar functions for areas under its jurisdiction. Nevertheless, waste water and solid waste management is far from satisfactory. The open garbage dump on the highway outside.[21]

[20] Master Plan of Haripur City 2024-2042 Vol. I of III

[21] Urban Policy and Planning Unit, Planning and Development Department, Government of Khyber Pakhtunkhwa. (n.d.). Final land use plan of District Abbottabad (Provincial Land Use Plan – PLUP).

227. During the baseline assessment, it was observed that hospital waste at the Women and Children Hospital Abbottabad was being openly dumped. Partial color-coded bins were available; however, no dedicated storage area for hazardous or medical waste existed on-site.

228. The baseline assessment indicated that hospital waste at Naseerullah Khan Babar Hospital and Molvi Jee Hospital, Peshawar, was openly dumped. Partial color-coded bins were available. Naseerullah Khan Babar Hospital had a partial hazardous waste storage area, while Molvi Jee Hospital lacked any dedicated storage facility for hazardous or medical waste.

4.3.16 Environmental Monitoring

229. Environmental monitoring, sampling, and testing of the proposed project were carried out in March 2026 by a third-party laboratory, M/s PakGreen Laboratories, certified by EPA-KP. The sampling for the proposed environmental monitoring of ambient air, noise and water for proposed project is shown in **Plate 4.1**. Results of Air, Noise and Water are provided in **Table 4.2 to 4.25.** Detailed environmental monitoring, sampling and testing results have been provided as **Annex-III** of this report.

Ambient Air

230. Ambient air quality data for CO, SO_2, NO, NO_2, CO_2, O_3, PM_{10} and $PM_{2.5}$ was monitored at one (01) point at each project location. The results were compared with the NEQS 2010. The concentrations of PM_{10} exceeded at Naseerullah Babar Hospital and $PM_{2.5}$ exceeded at Naseerullah Babar Hospital, Molvi Jee Hospital, DHQ Haripur and DHQ Abbottabad. Most of the project sites are located in developed urban areas with considerable surrounding traffic, contributing to elevated ambient air pollution levels. Although traffic congestion is relatively lower in Karak, the area's dry climatic conditions and dust-prone environment may contribute to comparatively higher $PM_{2.5}$ concentrations.

Noise Level

231. Noise level monitoring was conducted at each hospital facility, and the recorded values were compared with the National Environmental Quality Standards (NEQS) for Silence Zone (D), i.e., 50 dB(A) during daytime and 45 dB(A) during nighttime. Elevated noise levels exceeding applicable standards were recorded at all project hospitals, mainly due to their location within busy urban areas with continuous traffic flow, commercial activity, and public movement.

Wastewater

232. The wastewater quality was measured at one (01) location from each of the specified hospitals mentioned in the project area. The water sample were analyzed for the parameters specified in NEQS, 2010. Higher BOD and COD was observed at Haripur and Abbottabad.

Groundwater / Drinking Water

233. To assess the existing groundwater quality within the AOI, one (01) groundwater sample was collected from each of the specified hospitals. The sample was properly labeled, preserved, and transported to the laboratory for comprehensive analysis. It was tested against all relevant physico-chemical and biological parameters. Biological contamination was observed at locations like, Maulvi Jee Hospital, DHQ Karak and DHQ Abbottabad. Other parameters were within the NEQS limits.

Plate 4.1: Environmental Monitoring of Ambient Air, Noise and Water for proposed project Phase-I



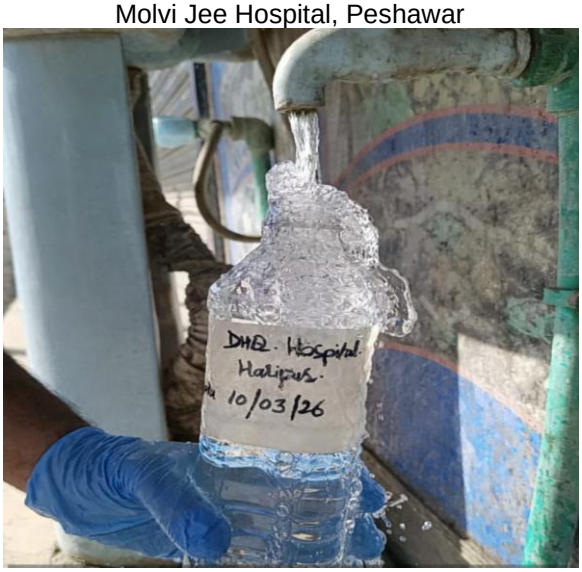
DHQ Hospital, Karak



Molvi Jee Hospital, Peshawar



DHQ Hospital, Charsadda



DHQ Hospital, Haripur

Table 4.2: Ambient Air Monitoring Results

Sr. No.	Parameters	Monitoring Duration	Limits as Per NEQS, 2010	Average Concentration Naseerullah Khan Babar Hospital	Average Concentration Molvi Jee Hospital	Average Concentration Cardsadda	Average Concentration Karak	Average Concentration Haripur	Average Concentration Abbottabad
1.	Nitrogen Dioxide (NO_2)	24 Hours	80 µg/m^3	32.79	35.08	23.66	36.52	35.13	35.12
2.	Nitrogen Oxide (NO)	24 Hours	40 µg/m^3	13.55	12.44	8.67	13.45	14.50	11.65
3.	Sulphur Dioxide (SO_2)	24 Hours	120 µg/m^3	42.68	43.86	34.15	43.85	41.86	41.82
4.	Carbon Monoxide (CO)	8 Hours	5.0 mg/m^3	1.81	1.98	1.22	1.89	1.97	1.88
5.	Ozone (O_3)	1 Hour	130 µg/m^3	47.6	45.9	41.2	62.1	49.3	56.9
6.	Particulate Matter (PM_{10})	24 Hours	150 µg/m^3	**164.2***	147.5	105.7	146.6	146.7	146.7
7.	Particulate Matter ($PM_{2.5}$)	24 Hours	35 µg/m^3	**42.5***	**59.3***	23.8	31.8	**43.8***	**38.5***
8.	Lead	24 Hours	1.5 µg/m^3	0.02	0.02	0.02	0.02	0.02	0.01
9.	SPM	24 Hours	500 µg/m^3	472.3	469.7	403.5	437.2	452.1	423.6

µg/m^3: micrograms per cubic meter **NEQS:** National Environmental Quality Standards

Table 4.3: Noise Level Monitoring Results

Sr. No	Name of the Hospital	Coordinates		Duration	Average Noise Level in dB(A)		NEQS (Silence Zone (D)
		Latitude	Longitude				
1	Naseerullah Khan Hospital	33.983643°N	71.56096°E	24 Hours	Day Time	60.3	50
					Night Time	51.2	45
2	Molvi Jee Hospital	34.01563°N	71.57937°E	24 Hours	Day Time	65.2	50
					Night Time	53.5	45
3	Charsadda	34.15258°N	71.74499°E	24 Hours	Day Time	58.1	50
					Night Time	50.7	45
4	Karak	33.128094°N	71.15231°E	24 Hours	Day Time	59.6	50
					Night Time	51.0	45
5	Haripur	34.000015°N	72.9141517°E	24 Hours	Day Time	62.0	50
					Night Time	49.8	45
6	Abbottabad	31.823214°N	31.823214°N	24 Hours	Day Time	61.1	50
					Night Time	52.3	45

Day Time hour: 06:00am to 10:00pm **Night Time hour:** 10:00pm to 06:00am

Table 4.4: Surface Water/Wastewater Sampling Results

Sr. No.	Parameter	Units	NEQS 2010	Naseerulla Khan Hospital	Maulvi Jee Hospital	Charsadda	Karak	Haripur	Abbottabad
Field Analysis									
1	Temperature	°C	40	23.8	24.2	23.8	23.4	23.4	24.2
Laboratory Analysis									
2	pH**		6 - 9	7.560 at 23.8°C	7.864 at 24.2°C	8.209 at 23.9ºC	7.602 at 23.4°C	7.890 at 23.4°C	7.700 at 24.2°C
3	Biochemical Oxygen Demand (BOD_5) *	mg/L	80	68	28	68	38	**118***	**158***
4	Chemical Oxygen Demand (COD)**	mg/L	150	112	40	104	56	**184***	**256***
5	Total Suspended Solids (TSS)**	mg/L	200	20	10	50	20	100	90
6	Total Dissolved Solids (TDS)**	mg/L	3500	2380	520	830	720	690	1080

Sr. No.	Parameter	Units	NEQS 2010	Naseerulla Khan Hospital	Maulvi Jee Hospital	Charsadda	Karak	Haripur	Abbottabad
7	Phenolic Compounds (as Phenols) *	mg/L	0.1	BDL	BDL	BDL	BDL	BDL	BDL
8	Grease and Oil**	mg/L	10	BDL	BDL	BDL	BDL	BDL	BDL
9	Chloride (Cl^-)**	mg/L	1000	820	30	75	195	90	130
10	Fluoride (F^-)**	mg/L	10	2.0	0.5	0.8	0.7	0.7	1.0
11	Cyanide (CN-)*	mg/L	1.0	BDL	BDL	BDL	BDL	BDL	BDL
12	An-ionic Detergents (as MBAs) *	mg/L	20.0	0.134	0.048	0.085	0.048	0.246	0.105
13	Sulfate ($SO_4^{-2)}$ **	mg/L	600	200	55	90	85	80	105
14	Sulfide (S^{-2}) *	mg/L	1.0	BDL	BDL	BDL	BDL	BDL	BDL
15	Ammonia (NH_3) *	mg/L	40	7.4	1.8	7.3	4.6	28.9	38.4
16	Cadmium (Cd)	mg/L	0.1	BDL	BDL	BDL	BDL	BDL	BDL
17	Chromium (Cr)	mg/L	1.0	0.0404	0.0482	0.2035	BDL	0.2097	0.0321
18	Copper (Cu)	mg/L	1.0	BDL	BDL	0.0277	BDL	BDL	0.0488
19	Lead (Pb)	mg/L	0.5	BDL	BDL	BDL	BDL	BDL	BDL
20	Mercury (Hg)	mg/L	0.01	BDL	BDL	BDL	BDL	BDL	BDL
21	Selenium (Se)	mg/L	0.5	BDL	BDL	BDL	BDL	BDL	BDL
22	Nickel (Ni)	mg/L	1.0	BDL	BDL	BDL	BDL	BDL	BDL
23	Silver (Ag)	mg/L	1.0	0.0346	0.1198	BDL	BDL	0.0299	0.0394
24	Total Toxic Metals	mg/L	2.0	BDL	0.1680	0.2312	BDL	0.2396	0.1203
25	Zinc (Zn)	mg/L	5.0	0.0750	0.00024	0.0458	BDL	0.1030	0.1826
26	Arsenic (As)	mg/L	1.0	BDL	BDL	BDL	BDL	BDL	BDL
27	Barium (Ba)	mg/L	1.5	BDL	BDL	BDL	BDL	BDL	BDL
29	Iron (Fe)	mg/L	8.0	BDL	0.4012	2.0292	BDL	2.2492	2.7616
30	Manganese (Mn)	mg/L	1.5	0.3574	0.0342	0.1530	1.7047	0.1598	0.2445
31	Boron (B)	mg/L	6.0	BDL	BDL	BDL	BDL	BDL	BDL
32	Residual Chlorine (Cl_2)	mg/L	1.0	BDL	BDL	BDL	BDL	BDL	BDL

NEQS = National Environmental Quality Standards **BDL=** Below detective Level

Table 4.5: Groundwater / Drinking Water Sampling Results

Sr. No.	Parameter	Units	NEQS Limits	Haripur	Naseer Ullah Khan Babar	Maulvi Jee	Charsadda	Karak	Abbottabad
Field Analysis									
1	Temperature	°C	---	22.4-23.9°C	22.5-24.2°C	22.4-23.9°C	23.0-24.5°C	22.8-23.9°C	22.4-23.9°C
Laboratory Analysis									
2	Color*	TCU	≤ 15	0.000	0.000	0.000	0.000	0.000	0.000
3	Taste*	---	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable
4	Odor*	---	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable
5	Turbidity*	NTU	< 5	0.20	0.24	0.40	0.20	0.35	0.28
6	Total Hardness (as CaCO3) **	mg/L	< 500	220	440	390	90	410	410
7	Total Dissolved Solids (TDS)**	mg/L	< 1000	320	620	570	225	610	630
8	pH**	---	6.5- 8.5	8.016 at 23.4ºC	7.936 at 23.4ºC	7.808 at 23.4ºC	8.209 at 23.9ºC	7.283 at 24.0ºC	7.735 at 24.2ºC
9	Aluminum (Al)	mg/L	≤ 0.2	BDL	BDL	BDL	BDL	BDL	BDL
10	Antimony (Sb)	mg/L	≤ 0.005	BDL	BDL	BDL	BDL	BDL	BDL
11	Arsenic (As)	mg/L	≤ 0.05	BDL	BDL	BDL	BDL	BDL	BDL
12	Barium (Ba)	mg/L	0.7	BDL	BDL	BDL	BDL	BDL	BDL
13	Boron (B)	mg/L	0.3	BDL	BDL	BDL	BDL	BDL	BDL
14	Cadmium (Cd)	mg/L	0.01	BDL	BDL	BDL	BDL	BDL	BDL
15	Chloride (Cl^-) **	mg/L	< 250	25	35	25	05	55	55
16	Chromium (Cr)	mg/L	≤ 0.05	BDL	BDL	BDL	BDL	BDL	BDL
17	Copper (Cu)	mg/L	2.0	BDL	0.0261	BDL	BDL	BDL	BDL
18	Cyanide (CN^-)*	mg/L	≤ 0.05	BDL	BDL	BDL	BDL	BDL	BDL
19	Fluoride (F^-)**	mg/L	≤ 1.5	0.3	0.6	0.6	0.2	0.6	0.6
20	Lead (Pb)	mg/L	≤ 0.05	BDL	BDL	BDL	BDL	BDL	BDL
21	Manganese (Mn)	mg/L	≤ 0.5	BDL	0.0106	BDL	BDL	BDL	BDL
22	Mercury (Hg)	mg/L	≤ 0.001	BDL	BDL	BDL	BDL	BDL	BDL
23	Nickel (Ni)	mg/L	≤0.02	BDL	BDL	BDL	BDL	BDL	BDL
24	Nitrate (NO^{-3}) **	mg/L	≤ 50	BDL	BDL	BDL	BDL	BDL	BDL
25	Nitrite (NO^{-2}) *	mg/L	≤ 3.0	BDL	0.085	BDL	BDL	0.108	BDL

Sr. No.	Parameter	Units	NEQS Limits	Haripur	Naseer Ullah Khan Babar	Maulvi Jee	Charsadda	Karak	Abbottabad
26	Selenium (Se)	mg/L	0.01 mg/L	BDL	BDL	BDL	BDL	BDL	BDL
27	Residual Chlorine (Cl^2) *	mg/L	0.2 to 0.5 at Consumer & 0.5-1.5 at Source	BDL	BDL	BDL	BDL	BDL	BDL
28	Phenolic Compounds (as Phenols)	mg/L	NGVS	BDL	BDL	BDL	BDL	BDL	BDL
29	Zinc (Zn)	mg/L	5.0	BDL	BDL	BDL	BDL	0.0031	0.0104
30	Iron (Fe)	mg/L	-	0.0262	BDL	BDL	0.0315	0.0259	BDL
Microbiological Analysis									
31	E. Coli	Number/100 mL	Must not be detectable in any 100 ml sample	NIL	NIL	40.4	NIL	35.9	40.4
32	Total Coliforms	Number/100 mL	Must not be detectable in any 100 ml sample	NIL	NIL	286.2	NIL	114.4	114.4
33	Fecal Coliforms	Number/100 mL	Must not be detectable in any 100 ml sample	NIL	NIL	95.0	NIL	95.0	113.4

NEQS = National Environmental Quality Standards **BDL=** Below detective Level

4.3.17 Land Use Pattern

234. The proposed project is confined to the existing hospital premises, where the land is already designated for institutional (healthcare) use. No land acquisition or change in land use is required. The surrounding areas comprise predominantly residential, commercial, and mixed-use developments, which have been considered in the assessment of potential indirect impacts, including noise, dust emissions, and temporary traffic disturbances during project implementation. **Table 4.6** provide statistical data regarding land use characteristics within hospital premises and immediate surroundings (10 m).

Table 4.6: Landuse land use characteristics within hospital premises

Landuse Type	Naseerullah Babar	Maulvi Jee	Charsadda	Karak	Haripur	Abbottabad
	Area (acres)					
Barren / Open Area	0.140	0.072	0.764	12.228	25.483	0.041
Builtup Area	3.681	5.207	11.771	8.192	15.188	7.084
Park/green space	0.259	0.791	1.685	1.983	8.126	-
Road / Track	1.734	1.707	4.578	8.996	5.507	2.880
Water Tank	0.005	-	0.016	0.024	-	0.005
Parking	-	0.800	0.135	-	-	-
Trees/bushes	-	-	0.105	1.954	9.269	0.472
Structure	-	-	-	0.076	2.442	-
Graveyard	-	-	0.745	-	-	-
Cultivated land	-	-	-	-	2.397	-

4.3.18 Environmental Sensitive Receptors

235. Sensitive receptors for the hospital project include internal and nearby facilities that may be affected by construction and operational activities. Although the AOI is defined as the project boundary, adjacent surroundings have also been considered for a precautionary assessment. Within the hospital premises, key sensitive receptors include patient care units (wards, OPDs, emergency, and operation theatres) as well as on-site prayer areas/mosques.

236. In the surrounding area, staff residential colonies and nearby mosques are also identified as receptors; however, these are not expected to be directly impacted due to their distance from core construction activities.

237. Land use and Sensitive receptors map is attached as **Annex-IV.**

4.3.19 Environmental Compliance Status

238. Environmental Compliance Status of Hospital facilities in Phase I given in following **Table 4.7** whereas pictorial representation is given in **Plate 4.2.** The identified environmental management deficiencies constitute existing environmental liabilities. To address these issues, a Corrective Action Plan (CAP) has been developed and is presented in Section 9.13. The CAP outlines corrective measures, implementation responsibilities, monitoring requirements, and timelines to achieve compliance with national regulations, WHO EHS Guidelines, and ADB SPS (2009).

Table 4.7: Environmental Compliance Status of Hospital facilities in Phase I

Environmental Aspect	Naseerullah Khan Babar Hospital	Maulvi Jee Hospital	DHQ Charsadda	DHQ Karak	DHQ Haripur	DHQ Abbottabad (Women & Children Block)
Permit Requirements	Existing hospital;					
	No environmental approval required for rehabilitation works.					
Healthcare Waste Management	For generation rates refer section 3.17					
	• Inadequate segregation; • No on-site treatment; • Poor record keeping; • Partial compliance.	• Segregation practiced; • On-site incineration; • Limited colour-coded bins; • Incomplete waste records.	• Limited segregation; • Incinerator temporarily non-operational; • Incomplete records.	• Limited segregation; • No on-site treatment; • Incomplete records.	• Segregation practiced; • On-site incineration; • Limited colour-coded bins; • Incomplete records.	• Segregation practiced; • waste incinerated at main DHQ; • Limited colour-coded bins; • Incomplete records.
Wastewater Management	For generation rates refer section 3.16					
	• No on-site treatment. • Direct discharge to municipal sewer	• No on-site treatment. • Direct discharge to municipal sewer	• No on-site treatment. • Direct discharge to municipal sewer	• No on-site treatment. • Direct discharge to municipal sewer	• No on-site treatment. • Wastewater pretreated through septic tanks with periodic desludging	• No on-site treatment. • Direct discharge to municipal sewer
Air Quality	Refer Table 4.2					
Noise	Refer Table 4.3					
Wastewater Quality	Refer Table 4.4					
Drinking Water Quality	Refer Table 4.5					
Occupational Health and Safety	Partial compliance with OHS requirements. Gaps were observed in: • Availability and proper use of PPE; • Electrical safety, including exposed wiring and inadequate protection of electrical installations; • Housekeeping practices, resulting in slip, trip, and fall hazards • Safe storage and handling of hazardous materials and chemicals • Safety Signage and hazard communication					

Environmental Aspect	Naseerullah Khan Babar Hospital	Maulvi Jee Hospital	DHQ Charsadda	DHQ Karak	DHQ Haripur	DHQ Abbottabad (Women & Children Block)
	• Biological exposure, Sharps handling and infection prevention and control					
Emergency Preparedness	• Limited fire extinguishers; units overdue for inspection, servicing, and recharging. • No fire detection and alarm system or fixed firefighting system. • Emergency escape routes, assembly points, and fire safety signage not adequately designated. • No documented emergency response procedures, staff training, or mock drills.	• Fire extinguishers not available. • No fire detection and alarm system or fixed firefighting system. • Emergency escape routes, assembly points, and fire safety signage not adequately designated • No documented emergency response procedures, staff training, or mock drills.	• Limited fire extinguishers; units overdue for inspection, servicing, and recharging. • No fire detection and alarm system or fixed firefighting system. • Emergency escape routes, assembly points, and fire safety signage not adequately designated. • No documented emergency response procedures, staff training, or mock drills.	• Fire extinguishers not available. • No fire detection and alarm system or fixed firefighting system. • Emergency escape routes, assembly points, and fire safety signage not adequately designated. • No documented emergency response procedures, staff training, or mock drills.	• Fire extinguishers not available. • No fire detection and alarm system or fixed firefighting system. • Emergency escape routes, assembly points, and fire safety signage not adequately designated. • No documented emergency response procedures, staff training, or mock drills.	• Limited fire extinguishers; several units overdue for inspection, servicing, and recharging. • Fire hose system available; however, only a few hose reels were operational and coverage was inadequate. • No fire detection and alarm system. • Emergency escape routes, assembly points, and fire safety signage not adequately designated. • No documented emergency response procedures, staff training, or mock drills.
Environmental Monitoring	No structured environmental monitoring programme.					
Institutional Arrangements	No dedicated environmental staff or EMS; limited training, budget, and monitoring resources.					

Plate 4.2: Environmental Compliance Status of Hospital facilities in Phase



NASEERULLAH KHAN BABAR HOSPITAL, PESHAWAR



MAULVI JEE HOSPITAL, PESHAWAR







DHQ HOSPITAL, CHARSADDA




WOMEN AND CHILDREN HOSPITAL, ABBOTTABAD

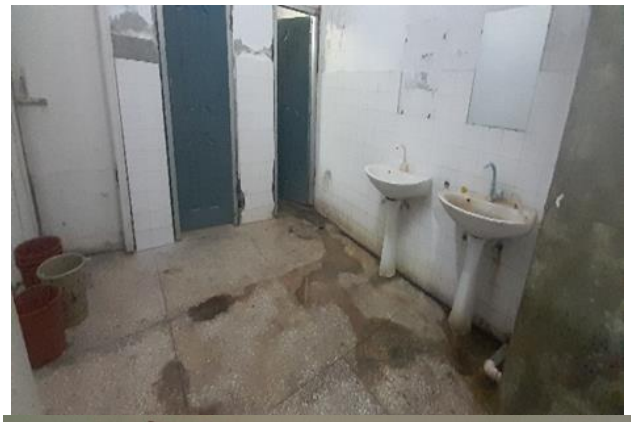







DHQ HOSPITAL, HARIPUR









DHQ HOSPITAL, KARAK

4.3.20 Existing Environmental Liabilities and Associated Risks

239. The assessment of environmental compliance identified a number of pre-existing environmental management deficiencies including waste management, occupational health and safety, and emergency preparedness at the hospitals in Phase I. These conditions indicate existing environmental liabilities and are not attributable to the proposed rehabilitation activities. These liabilities may result in continued environmental degradation, occupational and public health risks, and non-compliance with applicable environmental, healthcare waste management, occupational health and fire and safety requirements. The principal existing liabilities and associated risks are summarized in **Table 4.8.**

240. The **Table 4.8** presents pre-existing environmental liabilities, which are distinct from project-induced impacts associated with the proposed rehabilitation activities. Project-induced impacts will be managed through the Environmental Management Plan (EMP), while existing liabilities will be addressed through hospital-specific Corrective Action Plans (CAPs). Corrective actions within the project scope will be incorporated into project design and implementation arrangements, while those outside the project scope will be referred to the respective hospital/Health Department for appropriate action.

Table 4.8: Environmental Liabilities and Associated Risks

Hospital	Existing Environmental Liability	Associated Environmental, Health and Safety Risks / Impacts
Naseerullah Khan Babar Hospital	• Inadequate healthcare waste segregation; no on-site treatment; poor record keeping. • No on-site wastewater treatment; direct discharge to municipal sewer. • Gaps in PPE provision and use, electrical safety, housekeeping, hazardous materials, signage, sharps and biological exposure controls. • Limited/overdue fire extinguishers; no fire detection/alarm or fixed firefighting system; inadequate escape routes/signage; no documented emergency procedures, training or drills. • No structured environmental monitoring programme and limited institutional capacity.	• Increased risk of infectious/sharps exposure and healthcare-associated infections due to inadequate waste management. • Potential pollution and pathogen exposure from untreated wastewater discharge. • Increased occupational injury and exposure risks from inadequate OHS controls. • High fire and life-safety risk due to inadequate detection, suppression and evacuation arrangements. • Weak monitoring may allow identified deficiencies to persist.
Maulvi Jee Hospital	• Healthcare waste segregation practiced and on-site incineration available; limited colour-coded bins and incomplete records • No on-site wastewater treatment; direct discharge to municipal sewer. • Drinking Water quality is not reliable • Gaps in PPE, electrical safety, housekeeping, hazardous materials, signage, sharps and biological exposure controls. • Fire extinguishers unavailable; no fire detection/alarm or fixed firefighting system; inadequate escape routes/signage; no documented emergency procedures, training or drills. • No structured environmental monitoring programme and limited institutional capacity.	• Residual risk of infectious/sharps exposure and inadequate waste traceability despite on-site incineration. • Potential pollution and pathogen exposure from untreated wastewater discharge. • Increased risk of waterborne diseases among patients, healthcare workers, and visitors. • Increased occupational injury and exposure risks from inadequate OHS controls. • Significant fire and evacuation risks due to absence of basic detection and firefighting systems. • Weak institutional controls may delay corrective action.
DHQ Charsadda	• Limited healthcare waste segregation; incinerator temporarily non-operational; incomplete records. • No on-site wastewater treatment; direct discharge to municipal sewer. • Gaps in PPE, electrical safety, housekeeping, hazardous materials, signage, sharps and biological exposure controls. • Limited/overdue fire extinguishers; no fire detection/alarm or fixed firefighting system; inadequate escape routes/signage; no documented emergency procedures, training or drills. • No structured environmental monitoring programme and limited institutional capacity.	• Increased risk of accumulation or inappropriate disposal of untreated infectious waste while the incinerator is non-operational • Increased infection, sharps and occupational exposure risks. • Potential pollution and pathogen exposure from untreated wastewater. • Increased fire and life-safety risks with potential disruption of hospital services. • Weak monitoring may delay corrective action.

Hospital	Existing Environmental Liability	Associated Environmental, Health and Safety Risks / Impacts
DHQ Karak	• Limited healthcare waste segregation; no on-site treatment; incomplete records. • No on-site wastewater treatment; direct discharge to municipal sewer. • Drinking Water quality is not reliable • Gaps in PPE, electrical safety, housekeeping, hazardous materials, signage, sharps and biological exposure controls. • Fire extinguishers unavailable; no fire detection/alarm or fixed firefighting system; inadequate escape routes/signage; no documented emergency procedures, training or drills. • No structured environmental monitoring programme and limited institutional capacity.	• Increased risk of improper handling and disposal of infectious and sharps waste. • Potential pollution and pathogen exposure from untreated wastewater discharge. • Increased risk of waterborne diseases among patients, healthcare workers, and visitors. • Increased occupational injury and exposure risks from inadequate OHS controls. • High fire and life-safety risk due to absence of basic detection and firefighting arrangements. • Weak monitoring increases the likelihood of persistent non-compliance.
DHQ Haripur	• Healthcare waste segregation and on-site incineration practiced; limited colour-coded bins and incomplete records. • Septic-tank-available • Gaps in PPE, electrical safety, housekeeping, hazardous materials, signage, sharps and biological exposure controls • Fire extinguishers unavailable; no fire detection/alarm or fixed firefighting system; inadequate escape routes/signage; no documented emergency procedures, training or drills • No structured environmental monitoring programme and limited institutional capacity.	• Residual risk of waste mixing, infectious exposure and inadequate waste traceability. • Risk of soil/groundwater contamination from septic tank leakage or overflow and exposure risks from sludge handling. • Increased occupational injury and exposure risks from inadequate OHS controls. • Significant fire and emergency-response risks due to inadequate detection and suppression. • Weak monitoring may limit timely corrective action.
DHQ Abbottabad (Women & Children Block)	• Healthcare waste segregation practiced; waste transported to the main block for incineration; limited colour-coded bins and incomplete records • No on-site wastewater treatment; direct discharge to municipal sewer. • Drinking Water quality is not reliable • Gaps in PPE, electrical safety, housekeeping, hazardous materials, signage, sharps and biological exposure controls. • Limited/overdue fire extinguishers; fire hose system available but with limited operational coverage; no fire detection/alarm; inadequate escape routes/signage; no documented emergency procedures, training or drills. • No structured environmental monitoring programme and limited institutional capacity.	• Increased waste handling, transportation and traceability risks associated with off-site treatment. • Potential pollution and pathogen exposure from untreated wastewater discharge. • Increased risk of waterborne diseases among patients, healthcare workers, and visitors. • Increased occupational injury and exposure risks from inadequate OHS controls. • Increased life-safety and evacuation risks due to limited firefighting coverage and absence of fire detection/alarm, particularly for women, children and persons with limited mobility. • Potential disruption of essential maternal and child healthcare services.

4.4 ECOLOGICAL ENVIRONMENT

4.4.1 Flora of Peshawar District

241. The flora of project Corridor in Peshawar District (Khyber Pakhtunkhwa, Pakistan) reflects its semi-arid climate, irrigated plains, and subtropical conditions. Vegetation includes natural wild plants, agricultural crops, trees, shrubs, and grasses commonly found in the Peshawar Valley.

242. The flora of Peshawar District mainly consists of thorn forest trees, shrubs, grasses, cultivated crops, and fruit plants adapted to semi-arid conditions.

243. Common tree species observed in the project area include *Dalbergia sissoo* (Shisham), *Acacia nilotica* (Kikar/Babul), *Eucalyptus camaldulensis* (Safeda), *Morus alba* (Shahtoot), *Ficus religiosa* (Peepal), *Ficus benghalensis* (Banyan), *Populus deltoides* (Poplar), *Melia azedarach* (Dharek), and *Ziziphus mauritiana* (Ber).

244. Frequently occurring shrub species include *Calotropis procera* (Aak), *Dodonaea viscosa* (Sanatha), *Ricinus communis* (Castor plant), and *Nerium oleander* (Kaner). The herbaceous layer and wild vegetation mainly consist of *Chenopodium album* (Bathu), *Amaranthus viridis* (Green amaranth), *Cynodon dactylon* (Doob grass), *Tribulus terrestris* (Puncture vine), *Solanum nigrum* (Black nightshade), and *Portulaca oleracea* (Purslane).

245. Agricultural land surrounding the urban and peri-urban areas is predominantly cultivated with wheat, maize, sugarcane, rice, tobacco, vegetables, and fodder crops, indicating the agrarian nature of the region. Fruit plants commonly grown in the area include citrus species (Malta and orange), guava, pomegranate, apricot, peach, and mulberry.

4.4.2 Vegetation Characteristics of Project Area of Peshawar

- Mostly subtropical thorn forest type vegetation.
- Natural vegetation is limited due to urbanization and agriculture.
- Plants adapted to hot summers and low rainfall.
- Irrigation from Kabul River and canals supports agriculture.

4.4.3 Flora of Charsadda District

246. The flora of Project Corridor in Charsadda District (KP, Pakistan) reflects the region's semi-arid climate, fertile alluvial plains, and riverine ecosystems influenced mainly by the Kabul and Swat rivers. Vegetation includes, planted trees, agricultural crops, fruit trees, wild shrubs, grasses, and riverbank plants.

247. The flora of Charsadda consists of a combination of common tree species, shrubs, riverine vegetation, agricultural crops, and fruit plants, reflecting the fertile alluvial plains and irrigated agricultural landscape of the district.

248. Dominant tree species observed in the area include *Dalbergia sissoo* (Shisham), *Acacia nilotica* (Kikar/Babul), *Populus* species (Poplar), *Eucalyptus camaldulensis* (Eucalyptus), *Morus alba* (Mulberry), *Azadirachta indica* (Neem), *Ficus religiosa* (Peepal), and *Ziziphus mauritiana* (Beri).

249. Common shrub and bush species include *Calotropis procera* (Calotropis), *Lantana camara* (Lantana), *Dodonaea viscosa* (Sanatha), *Phragmites* species (Reeds), *Typha* species (Cattails), and *Saccharum spontaneum* (Kans grass/wild sugarcane). Riverine and wetland vegetation is mainly associated with seasonal streams, canals, and low-lying moist areas, where species such as *Tamarix* (Farash), reeds, cattails, and wild grasses are commonly found.

250. The agricultural landscape is dominated by major crops including wheat, maize, sugarcane, tobacco, and rice, *along* with seasonal vegetables such as onion, tomato, spinach, and okra. Fruit-bearing plants commonly cultivated in the district include citrus species (orange and kinnow), guava, pomegranate, fig, mulberry, and loquat.

4.4.4 Importance of Flora in Charsadda

- Supports agriculture and local economy
- Provides fodder for livestock
- Helps prevent soil erosion along rivers
- Supplies timber, fuelwood, and medicinal plants

4.4.5 The Ecological Environment of Karak District

251. The flora of Project Corridor in Karak District in Khyber Pakhtunkhwa, Pakistan is mainly dry subtropical and semi-arid vegetation because the region has low rainfall, rocky hills, and hot summers. Most plants are drought-resistant shrubs, grasses, and scattered trees. The vegetation of Karak district is classified as Tropical Thorn Forest, Subtropical Scrub Vegetation. These plants are adapted to high temperature, drought, and poor soils typical of the Kohat–Karak region.

252. The flora of Karak is characterized by drought-resistant vegetation and sparse natural cover, which are typical of the semi-arid climatic conditions of the district. The area supports a variety of common tree species including *Dalbergia sissoo* (Shisham), *Acacia nilotica* (Kikar/Babul), *Acacia modesta* (Phulai), *Eucalyptus camaldulensis* (Eucalyptus), *Morus alba* (Mulberry), *Prosopis juliflora* (Vilayati Kikar/Mesquite), *Tamarix aphylla* (Farash), *Ziziphus mauritiana* (Beri), and *Ziziphus nummularia*.

253. Common shrub species found in the area include *Calotropis procera* (Aak), *Capparis decidua* (Kareer), *Dodonaea viscosa* (Sanatha), *Rhazya stricta*, *Carissa opaca*, and *Withania somnifera* (Ashwagandha). The grass cover mainly consists of drought-tolerant species such as *Cenchrus ciliaris*, *Cenchrus setigerus*, *Cymbopogon jwarancusa*, *Dichanthium annulatum*, and *Saccharum spontaneum* along seasonal streams and moist patches.

254. Agricultural activities in the district are primarily based on rain-fed farming, with wheat, maize, groundnut, gram (*chickpea*), mustard, vegetables, and fruit plants being the major cultivated crops. Common herbs and wild plants observed in the area include *Tribulus terrestris*, *Chenopodium album*, *Amaranthus viridis*, *Fagonia indica*, and *Solanum surattense*.

4.4.6 Flora of Haripur District

255. The flora of Project Corridor in Haripur District (Khyber Pakhtunkhwa, Pakistan) is influenced by its sub-tropical climate, hills of the Lesser Himalayas, and agricultural plains. Vegetation ranges from natural forests and shrubs to cultivated plants.

256. The flora of Haripur comprises a diverse mixture of forest vegetation, shrubs, grasses, cultivated crops, fruit plants, and medicinal species due to the district's relatively moderate climate and varied topography.

257. Common forest tree species found in the area include *Pinus roxburghii* (Chir Pine), *Pinus wallichiana* (Kail/Blue Pine), *Acacia modesta* (Phulai), *Acacia nilotica* (Kikar/Babul), *Quercus incana* (Oak), *Eucalyptus* species, *Dalbergia sissoo* (Shisham), and *Populus* species (Poplar).

258. Frequently occurring shrub species include *Dodonaea viscosa* (Sanatha), *Justicia adhatoda* (Baker), *Ziziphus nummularia* (Ber/Jujube), *Carissa opaca* (Garanda), and *Calotropis procera* (Aak). The ground vegetation mainly consists of grasses and herbs such as *Cynodon dactylon* (Bermuda grass), *Saccharum munja*, vetiver grass, *Parthenium hysterophorus* (an invasive weed), and *Amaranthus* species.

259. Agricultural and horticultural activities are common in the district, with cultivated plants including wheat, *maize*, sugarcane, vegetables (tomato, onion, spinach, etc.), and fruit plants such as citrus (kinnow and orange), guava, peach, and apricot. Several medicinal plant species are also present in the area, including *Adhatoda vasica* (used for cough treatment), *Mentha* (Mint), *Withania somnifera* (Ashwagandha), *Fumaria indica* (Shahtara), and *Solanum nigrum* (Makoh).

260. Overall, Haripur's vegetation is a mix of subtropical pine forests, scrub vegetation, agricultural crops, and planted trees, influenced by rainfall from monsoon and the hilly terrain near the Hazara region.

4.4.7 Flora of Abbottabad District

261. The flora of Project Corridor in Abbottabad District (Khyber Pakhtunkhwa, Pakistan) is very diverse because the area ranges from lower hills to higher Himalayan foothills with varying climates. Forests, shrubs, grasses, and cultivated plants are all present.

4.4.8 Major Forest Types

262. The coniferous forest cover in the district is mainly composed of *Pinus roxburghii* (Chir Pine), *Pinus wallichiana* (Kail/Blue Pine), *Cedrus deodara* (Deodar cedar), *Abies*

pindrow (Silver fir), and *Picea smithiana* (Spruce), which dominate the higher elevations and mountainous slopes.

263. Common broad-leaved forest species include *Quercus incana* (Oak), *Aesculus indica* (Horse chestnut), *Juglans regia* (Walnut), *Morus alba* and *Morus nigra* (Mulberry), *Platanus orientalis* (Chinar/Oriental plane), and *Acacia modesta* (Phulai). The herbaceous layer and grass cover mainly consist of *Artemisia* species, *Mentha longifolia* (Wild mint), *Plantago lanceolata* (Plantain), *Trifolium* species (Clover), and *Cynodon dactylon* (Bermuda grass).

264. Common shrubs and understory vegetation observed in the area include *Berberis lycium* (Barberry), *Dodonaea viscosa* (Sanatha), *Rubus fruticosus* (Wild blackberry), *Indigofera heterantha*, and *Rosa moschata* (Wild rose).

265. The district also supports a variety of medicinally important plant species such as *Ajuga bracteosa*, Berberis *lycium***,** *Withania somnifera* (Ashwagandha), *Valeriana jatamansi*, and *Zanthoxylum armatum*, which are traditionally used for herbal remedies and local healthcare practices.

4.4.9 Ecological Importance

- Prevents soil erosion in Himalayan slopes
- Supports wildlife habitats
- Provides timber, fuelwood, fodder, and medicinal resources

266. Overall, Abbottabad's flora represents Himalayan moist temperate vegetation mixed with subtropical plants at lower elevations.

4.4.10 Conservation Status

267. All the trees, common shrubs and herbs have status of Least Concern as per IUCN list across all the districts

4.4.11 Fauna

268. Environments for flourishing of faunal species are not encouraging across all the districts. Fauna is impoverished and degraded, resulting from non-availability of habitat. This process has irreversibly reduced the biodiversity of the indigenous as well as introduced vegetation and hence it offers very little chance for the survival/growth of fauna in the macro environment of project area. There are even otherwise, no threatened species in the project area. There are some of characteristic bird species that have adapted to this environment and in nearby areas. These include Indian roller, common mynah, pigeon, common crow and house sparrow.

4.4.11.1 Mammals

269. Based on secondary data review and consultation with the Wildlife Department, the presence of large and small mammals has not been reported within the project area or

its surroundings, in all the districts which are predominantly urban in nature. Only common Mongoose is reported occasionally.

4.4.11.2 Birds

270. In the project site and its adjoining areas across all the districts, no endangered bird species exist. The proposed project is also not falling in migratory bird flyway (migration corridor). Some flying birds including common birds like sparrows, crows, bulbuls, mynas and egrets are observed and reported by the Wildlife

271. Department and in secondary data source. Birds, in and around the project sites across all districts are presented in the **Table 4.8**. IUCN status is also mentioned in the table for each species.

Table 4.9:-Fauna across all districts in Phase 1

Sr. No.	Common Name	Scientific Name	IUCN Conservation Status
	Mammals		
1.	Common Mongoose	*Herpestesed wardsii*	Least Concern
	Birds		
1.	Sanderling	*Calidris alba*	Least Concern
2.	Pariah kite	*Milvusmigrans*	Least Concern
3	Mynah	*Acridotheros tristis*	Least Concern
4.	Bulbul	*Pycnontidae*	Least Concern
5.	House Sparrow	*Passer domesticus*	Least Concern
6.	House Crow	*Corvus splendens*	Least Concern
7.	Heron	*Ardeolagrayii*	Least Concern
8.	Egret	*Egrettagarzetta*	Least Concern
9.	Plover	*Charadriinae*	Least Concern
10.	Black headed Gull	*Chroicocephalus ridibundus*	Least Concern
11.	Little Tern	*Sterna albifrons*	Least Concern
12.	Pariah kite	*Milvusmigrans*	Least Concern

4.4.12 Horticulture

272. Across the project districts, no significant horticultural practices were observed during the site surveys. However, a few scattered guava, papaya, and lemon trees were present within or around the project areas. Sporadic plantation of Date Palm, Citrus, Fig, and Jaman trees was also observed in some locations.

4.4.13 Habitat

273. The project areas in all districts are categorized as modified habitats, characterized by urban settings comprising buildings, roads, and human habitation. No natural or critical habitats were identified within the project footprints.

4.4.14 Protected and Sensitive Area

274. No protected areas, environmentally sensitive areas, or ecologically significant habitats were identified within or in the immediate vicinity of the project areas across the surveyed districts.

4.5 SOCIOECONOMIC ENVIRONMENT

275. The socioeconomic baseline encompasses the demographic profile, administrative and political context, religious and cultural characteristics, economic conditions, infrastructure and service facilities, and gender dimensions of the sub-projects areas. To document these conditions comprehensively, social surveys were conducted among a representative sample of respondents. The study population was carefully defined to include not only the residents of the project area but also patients visiting the respective health units and the employees working within these facilities, ensuring a holistic understanding of community dynamics and service delivery aspects.

276. A key initial step involved delineating the AOI and identifying respondents through a random sampling methodology during the baseline survey conducted in February 2026. The basic objectives of the social survey was to:

- Observe and document the existing socio-cultural and socioeconomic conditions of the study area, including community structure, livelihoods, and access to services;
- Identify and assess the potential social and economic impacts associated with the implementation of the proposed project;
- Collect and analyze community feedback regarding existing social and economic issues, perceived risks, and potential project-related concerns through inclusive and participatory engagement; and,
- Evaluate feasible mitigation measures and opportunities to address identified issues within the study and subsequent reporting framework.

4.6 METHODOLOGY

277. Primary and secondary data were collected and reviewed to develop the socioeconomic baseline of the study area. Primary data was obtained through field surveys and stakeholder consultations, while secondary data were sourced from provincial departments and relevant documents, including census reports, district profiles, and project-related information. All data were cross-verified to ensure reliability and consistency.

278. A mixed-method approach was adopted, combining quantitative and qualitative techniques. Quantitative data were collected through structured questionnaires administered at selected DHQ hospitals under Phase 1 to capture key demographic and socioeconomic indicators. Qualitative insights were gathered through interactions with community members and stakeholders to better understand social dynamics and perceptions.

279. The survey covered areas directly and indirectly affected by the project. A total of 121 respondents, including hospital staff, patients, attendants, and nearby commuters, were selected through random sampling. Data were collected through face-to-face interviews and subsequently digitized and analyzed to establish the baseline conditions.

280. In addition to the questionnaire-based survey, the study incorporated qualitative inquiry through public consultations. These included focus group discussions, key informant interviews, participatory observation, and the use of structured consultation proformas. This mixed-method approach facilitated triangulation of findings, enriched the analysis with contextual insights, and ensured a more comprehensive understanding of the social and institutional landscape of the project area.

4.6.1 Task Specific Approach

281. In conducting the social survey, full concentration was given to identify area of impacts and collection of necessary data/information on the existing social environment (economic, social, cultural etc.). This was done by holding discussions / meetings followed by in-depth survey and administering structured / semi-structured questionnaires.

4.6.2 Discussion with Officials

282. The Consultant had frequent discussions with the client and the concerned project officers to get a clear understanding about the project. This facilitated sharing of ideas, conceptual clarity and minimized constraints in carrying out the task.

4.6.3 Data Collection and Field Survey

283. The field survey was undertaken to generate primary data and validate the findings of the desk review, with a focus on key socioeconomic and socio-cultural aspects of the project area. The exercise emphasized direct engagement with communities and relevant stakeholders to capture ground level realities, service access conditions, and community perspectives.

284. The survey also facilitated the identification of potential social and economic impacts under both project and no-project scenarios. Feedback obtained during field interactions was used to understand community concerns, expectations, and priorities, which will inform the development of appropriate mitigation and enhancement measures in subsequent stages of the assessment. Social Survey tools are attached as **Annex-V**

4.6.4 Community/Stakeholders' Participation

285. Community consultations were conducted with key stakeholders, beneficiaries, and surrounding communities within the project area to ensure inclusive participation in the planning of the proposed project. These consultations provided a platform for participants to express their concerns, expectations, and suggestions, which were duly considered in the project planning and design process. The engagement process helped in building broader stakeholder ownership by involving local communities, public representatives, government officials, and relevant professional groups in informed decision-making.

4.7 POLITICAL AND ADMINISTRATIVE SETUP

4.7.1 Peshawar

286. Peshawar District falls under the administrative jurisdiction of Khyber Pakhtunkhwa, Pakistan. At the federal level, the district is represented by four (04) seats in the National Assembly of Pakistan, while at the provincial level it holds eleven (11) seats in the Provincial Assembly of Khyber Pakhtunkhwa. Administratively, Peshawar is divided into several tehsils, including: Peshawar City and Peshawar Saddar (Recent administrative reforms have further refined subdivisions, but these remain the core traditional tehsils.)

287. Under the Local Government system, the district comprises a District Council along with multiple Tehsil Councils and Neighborhood/Village Councils, which correspond to urban and rural areas. These bodies are responsible for municipal services, infrastructure development, and local governance across the district.

4.7.2 Charsadda

288. Charsadda District falls under the administrative jurisdiction of Khyber Pakhtunkhwa, Pakistan. At the federal level, the district is represented by two (02) seats in the National Assembly of Pakistan, while at the provincial level it holds five (05) seats in the Provincial Assembly of KP. Administratively, Charsadda is divided into three tehsils: Charsadda, Tangi and Shabqadar

289. Under the Local Government system, the district comprises a Distict Council along with multiple Tehsil Councils and Village/Neighborhood Councils corresponding to its urban and rural areas. These institutions are responsible for municipal services, local development, and governance within the district.

4.7.3 Karak

290. Karak District falls under the administrative jurisdiction of Khyber Pakhtunkhwa, Pakistan. At the federal level, the district is represented by one seat in the National Assembly of Pakistan, while at the provincial level it holds three (03) seats in the Provincial Assembly of Khyber Pakhtunkhwa. Administratively, Karak is divided into three tehsils: Karak, Banda Daud Shah and Takht-e-Nasrati

291. Under the Local Government system, the district comprises a District Council along with Tehsil Councils and Village/Neighborhood Councils corresponding to its urban and rural areas. These bodies are responsible for municipal services, infrastructure development, and local governance across the district.

4.7.4 Haripur

292. Haripur District falls under the administrative jurisdiction of Khyber Pakhtunkhwa, Pakistan. At the federal level, the district is represented by two (02) seats in the National Assembly of Pakistan, while at the provincial level it holds three (03) seats in the

Provincial Assembly of Khyber Pakhtunkhwa. Administratively, Haripur is divided into three tehsils: Haripur, Ghazi and Khanpur.

293. Under the Local Government system, the district comprises a District Council along with multiple Tehsil Councils and Village/Neighborhood Councils corresponding to its urban and rural areas. These institutions oversee municipal services, development projects, and local governance within the district.

4.7.5 Abbottabad

294. Abbottabad District falls under the administrative jurisdiction of Khyber Pakhtunkhwa, Pakistan. At the federal level, the district is represented by two (02) seats in the National Assembly of Pakistan, while at the provincial level it holds four (04) seats in the Provincial Assembly of Khyber Pakhtunkhwa. Administratively, Abbottabad is divided into two tehsils: Abbottabad and Havelian.

295. Under the Local Government system, the district comprises a District Council along with Tehsil Councils and Village/Neighborhood Councils corresponding to its urban and rural areas. These bodies are responsible for municipal services, infrastructure development, and local governance across the district.

4.8 DEMOGRAPHIC CHARACTERISTICS OF PROJECT DISTRICTS

4.8.1 Peshawar

296. As per the 2017 Census of Pakistan, Peshawar District had a population of approximately 4,267,198. By 2023, the population has increased to around 4,758,762, reflecting an average annual growth rate of about 1.6%. The total area of Peshawar District is 1,518 square kilometers, resulting in a population density of roughly 3,135 persons per square kilometer, indicating moderate population growth with a mix of urban and rural settlements.

    In 2023, the population comprised 2,425,808 males, 2,332,767 females, and a small number of transgender individuals, giving a sex ratio of approximately 104 males per 100 females. Peshawar has a relatively youthful population, with a significant proportion under 20 years of age, creating growing demand for educational and health services. Average life expectancy in the district aligns with regional norms for KP.

297. The gender ratio is an important demographic indicator, showing a nearly equal distribution between males and females. The district's youthful demographic emphasizes the need for expanded social infrastructure, including schools, healthcare, and recreational facilities.

4.8.2 Charsadda

298. As per the 2017 Census of Pakistan, Charsadda District had a population of approximately 1,610,960. By 2023, the population has increased to around 1,835,504, reflecting an average annual growth rate of about 2.2%. The total area of Peshawar

District is 996 square kilometers, resulting in a population density of roughly 1,843 persons per square kilometer, indicating moderate population growth with a mix of urban and rural settlements.

299. In 2023, the population comprised 950,872 males, 884,613 females, and a small number of transgender individuals, giving a sex ratio of approximately 107.5 males per 100 females. Charsadda has a relatively youthful population, with a significant proportion under 20 years of age, creating growing demand for educational and health services. Average life expectancy in the district aligns with regional norms for KP.

4.8.3 Karak

300. As per the 2017 Census of Pakistan, Karak District had a population of approximately 705,362. By 2023, the population has increased to around 815,878, reflecting an average annual growth rate of about 2.5%. The total area of Karak District is 3,371 square kilometers, resulting in a population density of roughly 242 persons per square kilometer, indicating moderate population growth with a mix of urban and rural settlements.

301. In 2023, the population comprised 421,292 males, 394,575 females, and a small number of transgender individuals, giving a sex ratio of approximately 106.8 males per 100 females. Karak has a relatively youthful population, with a significant proportion under 20 years of age, creating growing demand for educational and health services. Average life expectancy in the district aligns with regional norms for KP.

4.8.4 Haripur

302. As per the 2017 Census of Pakistan, Haripur District had a population of approximately 1,001,515. By 2023, the population has increased to around 1,173,783, reflecting an average annual growth rate of about 2.7%. The total area of Haripur District is 1,725 square kilometers, resulting in a population density of roughly 681 persons per square kilometer, indicating moderate population growth with a mix of urban and rural settlements.

303. In 2023, the population comprised 591,540 males, 583,198 females, and a small number of transgender individuals, giving a sex ratio of approximately 101.4 males per 100 females. Haripur has a relatively youthful population, with a significant proportion under 20 years of age, creating growing demand for educational and health services. Average life expectancy in the district aligns with regional norms for KP.

4.8.5 Abbottabad

304. As per the 2017 Census of Pakistan, Abbottabad District had a population of approximately 1,333,089. By 2023, the population has increased to around 1,419,072, reflecting an average annual growth rate of about 1.1%. The total area of Abbottabad District is 1,976 square kilometers, resulting in a population density of roughly 721.4 persons per square kilometer, indicating moderate population growth with a mix of urban and rural settlements.

305. In 2023, the population comprised 712,218 males, 706,750 females, and a small number of transgender individuals, giving a sex ratio of approximately 100.8 males per 100 females. Abbottabad has a relatively youthful population, with a significant proportion under 20 years of age, creating growing demand for educational and health services. Average life expectancy in the district aligns with regional norms for KP.

4.9 SOCIOECONOMIC PROFILE OF STUDIED HOUSEHOLDS

306. A socio-economic survey of 121 households was carried out, which revealed that the total population of the surveyed households comprised 1,278 individuals.

4.9.1 Gender Distribution of the Respondents

307. The gender distribution of respondents across the surveyed hospitals indicates an overall predominance of male participants, with 75 males (62%) compared to 46 females (38%). This imbalance does not necessarily reflect actual service utilization patterns but is largely attributable to socio-cultural constraints, including mobility limitations and hesitancy among women to engage with enumerators or participate in public surveys. As a result, a higher proportion of male respondents were approached and interviewed. At the facility level, Naseerullah Khan Babar Hospital shows a balanced representation (50% male and 50% female), while DHQ Hospital (Women and Children Block) records a female majority (55%), likely due to its focus on women and children and a more enabling environment for female participation. In contrast, Molvi Jee Hospital and DHQ Hospital exhibit moderate male dominance (60–65%), whereas DHQ Hospital and DHQ Hospital show a more pronounced imbalance, with male participation exceeding 75%. **Table 4.9** presents the subproject-wise distribution of respondents by gender.

Table 4.10 Gender Distribution of Respondents

Sr. No.	Hospital	Male		Female	
		Number	(%)	Number	(%)
1.	Naseerullah Khan Babar Hospital, Peshawar	10	50	10	50
2.	Molvi Jee Hospital, Peshawar	12	60	8	40
3.	DHQ Hospital, Charsadda	15	75	5	25
4.	DHQ Hospital (Women & Children Block), Abbottabad	9	45	11	55
5.	DHQ Hospital, Haripur	16	76	5	24
6.	DHQ Hospital, Karak	13	65	7	35
Total		**75**	**62**	**46**	**38**

4.9.2 Population and Family Size

308. Females constituted a slightly higher proportion (52%) compared to males (48%), indicating a relatively balanced gender composition. The findings further show that the average household size is approximately 10-11 persons per household, reflecting the prevalence of extended family systems in the project area. **Table 4.10** presents the subproject-wise distribution of population and family size.

Table 4.11 Population and Family Size

Sr. No.	Hospital	Total Respondents	Male Population		Female Population		Total Population
			No.	%	No.	%	No.
1.	Naseerullah Khan Babar Hospital	20	129	49	135	51	264
2.	Molvi Jee Hospital	20	106	52	97	48	203
3.	DHQ Hospital	20	103	49.8	104	50.2	207
4.	DHQ Hospital (Women and Children Block)	20	90	48	98	52	188
5.	DHQ Hospital	21	78	48	85	52	163
6.	DHQ Hospital	20	121	48	132	52	253
Total		**121**	**627**	**48**	**651**	**52**	**1278**

4.9.3 Age Composition of the Respondents

309. The age composition of respondents presented in **Table 4.11** indicates that the sample is largely dominated by the young and economically active population. Overall, the highest proportion of respondents falls within the 19–25 age group (29%), followed by 26–35 years (27%) and 36–45 years (23%), while respondents aged 45 and above constitute 16%, and only 5% are below 18 years.

Table 4.12: Age Composition of the Respondents

Sr. No.	Hospital	Up to 18		19–25		26–35		36–45		45+	
		No.	%	No.	%	No.	%	No.	%	No.	%
1.	Naseerullah Khan Babar Hospital, Peshawar	2	10	7	35	5	25	2	10	4	20
2.	Molvi Jee Hospital, Peshawar	2	10	1	5	7	35	7	35	3	15
3.	DHQ Hospital, Charsadda	0	0	8	40	6	30	4	20	2	10
4.	DHQ Hospital (Women & Children Block), Abbottabad	0	0	3	15	5	25	6	30	6	30
5.	DHQ Hospital, Haripur	2	10	5	24	6	29	4	19	4	19
6.	DHQ Hospital, Karak	0	0	11	55	4	20	3	15	2	10
Total		**6**	**5**	**35**	**29**	**33**	**27**	**28**	**23**	**19**	16

4.9.4 Literacy

310. The educational profile of respondents presented in **Table 4.12** indicates a relatively high literacy level among the surveyed population. Overall, only 9% (11 respondents) are illiterate, while the remaining 91% are literate, reflecting a generally educated population among sampled respondents. Among literate respondents, the largest proportion holds a graduation degree (27%), followed by matric (19%), intermediate (18%), and post-graduation (18%), while smaller shares fall under primary (2%) and middle (6%) education levels. This distribution suggests that the majority of respondents belong to at least secondary or higher education categories, indicating a comparatively strong educational base in the surveyed communities.

Table 4.13: Educational Level of the Respondents

Sr. No.	Hospital	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1	Naseerullah Khan Babar Hospital, Peshawar	3	15	0	0	0	0	1	5	8	40	3	15	5	25
2	Molvi Jee Hospital, Peshawar	2	10	1	5	2	10	5	25	3	15	4	20	3	15
3	DHQ Hospital, Charsadda	5	25	1	5	0	0	0	0	3	15	7	35	4	20
4	DHQ Hospital (Women & Children Block), Abbottabad	0	0	0	0	1	5	1	5	4	20	11	55	3	15
5	DHQ Hospital, Haripur	0	0	0	0	2	10	12	57	0	0	3	14	4	19
6	DHQ Hospital, Karak	1	5	1	5	2	10	4	20	4	20	5	25	3	15
Total		**11**	**9**	**3**	**2**	**7**	**6**	**23**	**19**	**22**	**18**	**33**	**27**	**22**	**18**

4.10 ECONOMIC ASPECTS

4.10.1 Occupations

311. The occupational profile of respondents indicates that the studied population is predominantly engaged in formal employment sectors, particularly government and private jobs, alongside a smaller share involved in informal and non-employed categories. Overall, government employment constitutes the largest share of occupations, especially in facilities such as DHQ Hospital (Women and Children Block), where it reaches as high as 75%, and Molvi Jee Hospital and DHQ Hospital, where it accounts for around 60% of respondents. Overall, the findings suggest that the surveyed population is largely economically active and engaged in stable employment, particularly in the public sector, with a smaller share dependent on informal or unstable livelihoods. **Table 4.13** depicts the occupational status of the respondents.

Table 4.14: Occupation of the Respondents

Sr. No.	Hospital	Govt. Job		Private Job		Business		Labour		Unemployed		Others	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1.	Naseerullah Khan Babar Hospital, Peshawar	7	35	7	35	1	5	2	10	1	5	2	10
2.	Molvi Jee Hospital, Peshawar	12	60	2	10	3	15	1	5	1	5	1	5

Sr. No.	Hospital	Govt. Job		Private Job		Business		Labour		Unemployed		Others	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
3.	DHQ Hospital, Charsadda	7	35	3	15	2	10	4	20	2	10	2	10
4.	DHQ Hospital (Women & Children Block), Abbottabad	15	75	1	5	2	10	—	—	2	10	—	—
5.	DHQ Hospital, Haripur	6	29	6	29	4	19	1	5	2	10	2	10
6.	DHQ Hospital, Karak	12	60	2	10	1	5	1	5	4	20	—	—
Total		**59**	**47.6**	**21**	**16.9**	**13**	**10.5**	**9**	**7.3**	**12**	**9.7**	**9**	**7.3**

4.10.2 Monthly Household Income

312. The monthly household income distribution of respondents shows a diverse socio-economic profile with a clear concentration in the higher income bracket. Overall, the largest proportion of households falls in the above 100,000 PKR category (approximately 36%), indicating that a significant share of respondents belongs to relatively better-off households with stronger financial stability. The second most common category is the 40,001–60,000 PKR range (around 22%), followed by the 60,001–80,000 PKR bracket (about 16%), reflecting a substantial middle-income segment within the sample.

313. Lower-income households are also present but in comparatively smaller proportions, with up to 40,000 PKR accounting for roughly 14%, while the 80,001–100,000 PKR group represents about 13% of respondents. **Table 4.14** shows the average monthly income of the respondents.

Table 4.15: Average Monthly Income of the Respondents

Sr. No.	Hospital	≤40,000		40,001–60,000		60,001–80,000		80,001–100,000		>100,000	
		No.	%	No.	%	No.	%	No.	%	No.	%
1.	Naseerullah Khan Babar Hospital, Peshawar	2	10	4	20	5	25	0	0	9	45
2.	Molvi Jee Hospital, Peshawar	2	10	6	30	5	25	3	15	4	20
3.	DHQ Hospital, Charsadda	3	15	6	30	3	15	5	25	3	15
4.	DHQ Hospital (Women & Children Block), Abbottabad	0	0	5	25	1	5	0	0	14	70
5.	DHQ Hospital, Haripur	6	29	4	19	3	14	4	19	4	19
6.	DHQ Hospital, Karak	3	15	3	15	2	10	2	10	10	50
Grand Total		**16**	**13.2**	**28**	**23.1**	**19**	**15.7**	**14**	**11.6**	**44**	**36.4**

4.10.3 Monthly Household Expenditures

314. The monthly household expenditure pattern of respondents reflects a broad distribution across income levels, indicating varying living standards and spending capacities. The largest proportion of households falls within the above 100,000 PKR expenditure category (approximately 30%), suggesting that a considerable segment incurs relatively high monthly expenses, likely associated with larger household sizes and higher costs of living. This is followed by the 40,001–60,000 PKR range (around 25%), representing a substantial share of lower-middle expenditure households. The 60,001–80,000 PKR bracket accounts for about 17%, while the 80,001–100,000 PKR category comprises approximately 14% of respondents, indicating a moderate presence of middle- to upper-middle expenditure groups. Meanwhile, households spending up to 40,000 PKR constitute roughly 15%, reflecting a smaller yet notable proportion with relatively limited expenditure capacity. Overall, the findings suggest that while expenditures vary across households, the distribution is somewhat concentrated in the middle- and higher-expenditure brackets, pointing to differing levels of economic capacity and household consumption patterns within the surveyed population. **Table 4.15** shows the average monthly expenditures of the respondents.

Table 4.16: Monthly Expenditures of the Respondents

Sr. No.	Hospital	≤40,000		40,001–60,000		60,001–80,000		80,001–100,000		>100,000	
		No.	%	No.	%	No.	%	No.	%	No.	%
1.	Naseerullah Khan Babar Hospital, Peshawar	2	10	5	25	4	20	—	—	9	45
2.	Molvi Jee Hospital, Peshawar	2	10	6	30	5	25	4	20	3	15
3.	DHQ Hospital, Charsadda	3	15	7	35	4	20	4	20	2	10
4.	DHQ Hospital (Women & Children Block), Abbottabad	—	—	5	25	1	5	—	—	14	70
5.	DHQ Hospital, Haripur	6	29	4	19	4	19	4	19	3	14
6.	DHQ Hospital, Karak	3	15	3	15	2	10	2	10	10	50
Total		**16**	**13.1**	**30**	**24.6**	**20**	**16.4**	**14**	**11.5**	**41**	**33.6**

4.10.4 Family System

315. The family system of respondents indicates a predominance of joint family structures, although nuclear families also represent a significant share. Overall, joint families constitute the majority, ranging from 48% to 75% across the sample, with the highest representation observed at 75%, followed by 70% and 65%, reflecting the continued prevalence of extended family living arrangements. Nuclear families, on the other hand, account for 25% to 52% of respondents, with the highest proportion at 52%, indicating that in some cases nuclear households slightly outnumber joint families. A balanced distribution is also observed in certain instances, where joint and nuclear families each

account for 50% of respondents. These findings suggest that while joint family systems remain dominant, there is a gradual shift toward nuclear family structures, highlighting evolving social dynamics and household compositions within the surveyed population. **Table 4.16** shows the family system statistics of the respondents.

Table 4.17: Family System of the Respondents

Sr. No.	Hospital	Joint		Nuclear	
		(No.)	(%)	(No.)	(%)
1.	Naseerullah Khan Babar Hospital, Peshawar	15	75	5	25
2.	Molvi Jee Hospital, Peshawar	10	50	10	50
3.	DHQ Hospital, Charsadda	13	65	7	35
4.	DHQ Hospital (Women & Children Block), Abbottabad	14	70	6	30
5.	DHQ Hospital, Haripur	10	48	11	52
6.	DHQ Hospital, Karak	15	75	5	25
Total		**77**	**62.1**	**44**	**35.5**

4.10.5 Basic Amenities

316. Social infrastructure and amenities are crucial to creating sustainable communities. This assessment is done for nature of access to water, and mode of transport to the hospitals.

4.10.6 Sources of Drinking Water and Quality

317. Drinking water, also known as potable water, improved drinking water is water safe enough for drinking and food preparation. Access to safe drinking water is not only a basic need and a precondition for healthy life, but is also a basic human right. The quality of water is directly linked to the quality of health.

318. The analysis of available drinking water sources indicates a diverse reliance on multiple water supply systems, with no single source uniformly dominant across all respondents. Overall, public water supply emerges as the most commonly used source, accounting for a substantial share ranging from 15% to 55%, highlighting its importance as a primary water source for many households. At the same time, a significant proportion of respondents depend on bore water/other sources, which range between 15% and 55%, indicating reliance on alternative or self-provided water options, particularly where public supply is limited or unreliable.

319. The use of filtration plants varies considerably, contributing between 5% and 40%, which suggests that a segment of the population seeks safer or treated drinking water where such facilities are accessible. Additionally, hand pumps account for 5% to 28.5% of water sources, reflecting their role as a supplementary or fallback option, particularly in areas with limited infrastructure. Overall, the findings highlight that households often rely on a combination of water sources, pointing to inconsistencies in the availability and reliability of safe drinking water. **Table 4.17** reflects the various sources of the drinking water in the project area.

Table 4.18: Source of water of the respondents

Sr. No.	Hospital	Public Water Supply		Filtration Plant		Hand Pump		Other/Bore	
		No.	%	No.	%	No.	%	No.	%
1.	Naseerullah Khan Babar Hospital, Peshawar	11	55	1	5	—	—	8	40
2.	Molvi Jee Hospital, Peshawar	11	55	3	15	—	—	6	30
3.	DHQ Hospital, Charsadda	4	20	2	10	3	15	11	55
4.	DHQ Hospital (Women & Children Block), Abbottabad	8	40	8	40	1	5	3	15
5.	DHQ Hospital, Haripur	9	43	—	—	6	28.5	6	28.5
6.	DHQ Hospital, Karak	3	15	7	35	5	25	5	25
	Total	**46**	**38.0**	**21**	**17.4**	**15**	**12.4**	**39**	**32.2**

4.10.6.1 Mode of Transportation

320. The analysis of the principal mode of transport used by respondents indicates a mixed reliance on both public and private transport, with a slight overall inclination toward public transport. Public transport accounts for a significant share, ranging from 38% to 60%, and emerges as the most commonly used mode in several cases, reflecting its accessibility and affordability for a large portion of respondents. Private transport is also widely used, varying between 35% and 62%, and in some instances exceeds public transport usage, suggesting better economic capacity and availability of personal vehicles among certain households. Additionally, a smaller proportion of respondents (5% to 20%) reported using both public and private modes, indicating flexibility in travel behavior depending on need and convenience. Overall, the findings highlight that while public transport remains a primary means of mobility, private transport also plays a substantial role, pointing to diverse mobility patterns and varying levels of access to transportation among the surveyed population. **Table 4.18** depicts the principal mode of transport being used by the respondents.

Table 4.19: Principal Mode of Transport

Sr. No.	Hospital	Public		Private		Both	
		No.	%	No.	%	No.	%
1.	Naseerullah Khan Babar Hospital, Peshawar	11	55	9	45	—	—
2.	Molvi Jee Hospital, Peshawar	8	40	11	55	1	5
3.	DHQ Hospital, Charsadda	12	60	5	25	3	15
4.	DHQ Hospital (Women & Children Block), Abbottabad	11	55	8	40	1	5
5.	DHQ Hospital, Haripur	8	38	13	62	—	—
6.	DHQ Hospital, Karak	9	45	7	35	4	20
	Total	**59**	**48.8**	**53**	**43.8**	**9**	**7.4**

4.10.7 Availability of Different Facilities in the Hospitals

321. The respondents were asked about the available facilities in the hospitals that they were aware of, such as OPD, emergency, maternity, etc.

Naseerullah Khan Babar Hospital, Peshawar

322. 100% of the respondents stated that facilities such as OPD, Emergency, Maternity, Child Health, Diagnostic Services and Pharmacy are present in the hospital. However, there are no ambulance present in or operated by the hospital.

Molvi Jee Hospital, Peshawar

323. 100% of the respondents stated that facilities such as OPD, Emergency, Maternity, Child Health and Pharmacy are present in the hospital. However, there are no ambulance present in or operated by the hospital, similarly there are no diagnostic services in the hospital.

DHQ Hospital, Charsadda

324. 100% of the respondents stated that facilities such as OPD, Emergency, Child Health, Diagnostic Services and Pharmacy are present in the hospital. However, there are no ambulance present in or operated by the hospital. Similarly, there are no maternity facilities in the hospital.

DHQ Hospital, Karak

325. 100% of the respondents stated that facilities such as OPD, Emergency, Maternity, Child Health, Diagnostic Services and Pharmacy are present in the hospital. However, there are no ambulance present in or operated by the hospital.

DHQ Hospital, Haripur

326. 100% of the respondents stated that facilities such as OPD, Emergency, Maternity, Child Health, Diagnostic Services, Pharmacy and ambulance are present in the hospital.

DHQ Hospital (Women and Children Block), Abbottabad

327. 100% of the respondents stated that facilities such as OPD, Emergency, Maternity, Child Health, Diagnostic Services and Pharmacy are present in the hospital. However, there are no ambulance present in or operated by the hospital.

4.10.7.1 Availability of Medical Staff

Naseerullah Khan Babar Hospital, Peshawar

328. As per the 75% of the respondents, the medical staff was available at all the time in the hospital, however 25% of the respondents said that hospital staff was unavailable due to insufficient numbers.

Molvi Jee Hospital, Peshawar

329. As per the 75% of the respondents, the medical staff was available at all the time in the hospital, however 25% of the respondents said that hospital staff was unavailable due to insufficient numbers.

DHQ Hospital, Charsadda

330. As per the respondents, 100% agreed that the medical staff was available at all the time in the hospital.

DHQ Hospital, Haripur

331. As per the respondents, 100% agreed that the medical staff was available at all the time in the hospital.

DHQ Hospital, Karak

332. As per the 90% of the respondents, the medical staff was available at all the time in the hospital, however 10% of the respondents said that hospital staff was unavailable due to insufficient numbers.

DHQ Hospital (Women and Children Block), Abbottabad

333. As per the respondents, 100% agreed that the medical staff was available at all the time in the hospital.

4.10.7.2 Availability of Drinking Water Facilities in Hospitals

Naseerullah Khan Babar Hospital, Peshawar

334. 80% of the respondents said that the drinking water was available for patients and attendants while 100% of the respondents said that the drinking water is available for the staff.

Molvi Jee Hospital, Peshawar

335. 70% of the respondents said that the drinking water was available for patients and attendants while 85% of the respondents said that the drinking water is available for the staff.

DHQ Hospital, Charsadda

336. 65% of the respondents said that the drinking water was available for patients and attendants while 70% of the respondents said that the drinking water is available for the staff.

DHQ Hospital, Karak

337. 55% of the respondents said that the drinking water was available for patients and attendants while 60% of the respondents said that the drinking water is available for the staff.

DHQ Hospital, Haripur

338. 48% of the respondents said that the drinking water was available for patients and attendants while 52% of the respondents said that the drinking water is available for the staff.

DHQ Hospital (Women and Children Block), Abbottabad

339. 55% of the respondents said that the drinking water was available for patients and attendants while 45% of the respondents said that the drinking water is available for the staff.

4.10.7.3 Sufficiency and Cleanliness of the Toilets

Naseerullah Khan Babar Hospital, Peshawar

340. 45% of the respondents said that the toilets were sufficient, however majority (55%) said that the toilet facilities in the hospital are insufficient. 15% of the respondents stated that the cleanliness of the toilets is satisfactory, however majority (85%) were not satisfied with the cleanliness of the toilets.

Molvi Jee Hospital, Peshawar

341. 75% of the respondents said that the toilets were sufficient, however 25% said that the toilet facilities in the hospital are insufficient. 70% of the respondents stated that the cleanliness of the toilets is satisfactory, however 30% were not satisfied with the cleanliness of the toilets.

DHQ Hospital, Charsadda

342. 80% of the respondents said that the toilets were sufficient, however 20% `said that the toilet facilities in the hospital are insufficient. 75% of the respondents stated that the cleanliness of the toilets is satisfactory, however 25% were not satisfied with the cleanliness of the toilets.

DHQ Hospital, Karak

343. 45% of the respondents said that the toilets were sufficient, however majority (55%) said that the toilet facilities in the hospital are insufficient. 35% of the respondents stated that the cleanliness of the toilets is satisfactory, however majority (65%) were not satisfied with the cleanliness of the toilets.

DHQ Hospital, Haripur

344. 24% of the respondents said that the toilets were sufficient, however majority (76%) said that the toilet facilities in the hospital are insufficient. 33% of the respondents stated that the cleanliness of the toilets is satisfactory, however majority (67%) were not satisfied with the cleanliness of the toilets.

DHQ Hospital (Women and Children Block), Abbottabad

345. 25% of the respondents said that the toilets were sufficient, however majority (75%) said that the toilet facilities in the hospital are insufficient. 10% of the respondents stated that the cleanliness of the toilets is satisfactory, however majority (90%) were not satisfied with the cleanliness of the toilets.

4.10.7.4 Availability of Toilets for Persons with Disabilities

Naseerullah Khan Babar Hospital, Peshawar

346. There were no toilets available for persons with disabilities as stated by the respondents.

Molvi Jee Hospital, Peshawar

347. 10% of the respondents stated that the toilets are available for persons with disabilities.

DHQ Hospital, Charsadda

348. There were no toilets available for persons with disabilities as stated by the respondents.

DHQ Hospital, Karak

349. There were no toilets available for persons with disabilities as stated by the respondents.

DHQ Hospital, Haripur

350. There were no toilets available for persons with disabilities as stated by the respondents.

DHQ Hospital (Women and Children Block), Abbottabad

351. There were no toilets available for persons with disabilities as stated by the respondents.

4.10.7.5 Household Members with disabilities

Naseerullah Khan Babar Hospital, Peshawar

352. 15% of the respondents said that they have a household member with disability. All of them had physical disability.

Molvi Jee Hospital, Peshawar

353. 5% of the respondents said that they have a household member with disability. The disability type stated is physical.

DHQ Hospital, Charsadda

354. 10% of the respondents said that they have a household member with disability. The disability type stated is physical.

DHQ Hospital, Karak

355. 35% of the respondents said that they have a household member with disability. The disability type stated is physical, chronic illness, hearing and visual impairment.

DHQ Hospital, Haripur

356. 10% of the respondents said that they have a household member with disability. The disability type stated is physical.

DHQ Hospital (Women and Children Block), Abbottabad

357. 10% of the respondents said that they have a household member with disability. The disability type stated is physical.

4.10.7.6 Accessibility Features in the Hospital

358. Accessibility features refer to those features such as handrails, visual Impairment marking, etc., which help the disabled person to access the hospital facilities.

Naseerullah Khan Babar Hospital, Peshawar

359. 80% of the respondents stated that wheel chair access is available in the hospital. There are no elevators in the hospital, while 80% agreed that the wheel chair is available at the front gates as well, moreover 55% and 50% of the respondents stated the availability of accessible toilets and handrails respectively. Overall, 50% of the respondents agreed on the ease of access for the persons with disabilities.

Molvi Jee Hospital, Peshawar

360. 90% of the respondents stated that wheel chair access is available in the hospital. There are no elevators in the hospital, while 100% agreed that the wheel chair is available at the front gates as well, moreover 50% and 55% of the respondents stated the availability of accessible toilets and handrails respectively. Overall, 30% of the respondents agreed on the ease of access for the persons with disabilities.

DHQ Hospital, Charsadda

361. 100% of the respondents stated that wheel chair access is available in the hospital. There are no elevators in the hospital, while 100% agreed that the wheel chair is available at the front gates as well, moreover 20% of the respondents stated the availability of accessible toilets and handrails. Overall, 30% of the respondents agreed on the ease of access for the persons with disabilities.

DHQ Hospital, Karak

362. 90% of the respondents stated that wheel chair access is available in the hospital. There are no elevators in the hospital, while 100% agreed that the wheel chair is available at the front gates as well, moreover 10% of the respondents stated the availability of accessible toilets and handrails. Overall, only 5% of the respondents agreed on the ease of access for the persons with disabilities.

DHQ Hospital, Haripur

363. 67% of the respondents stated that wheel chair access is available in the hospital. There are no elevators in the hospital, while 43% agreed that the wheel chair is available at the front gates as well, moreover 5% of the respondents stated the availability of accessible toilets and handrails. Overall, 100% of the respondents agreed that the hospoital is not accessible to the persons with disabilities.

DHQ Hospital (Women and Children Block), Abbottabad

364. 55% of the respondents stated that wheel chair access is available in the hospital. There are no elevators in the hospital no wheel chair is available at the front gates, no accessible toilets and handrails. Overall, 100% of the respondents agreed that the hospital is not accessible to the persons with disabilities. **Table 4.19** reflects the accessibilities features of the hospitals.

Table 4.20: Accessibility features of the hospitals

Sr. No.	Hospital	Wheelchair Ramp		Elevators		Wheelchair at Entry		Accessible Toilets		Handrails	
		No.	%	No.	%	No.	%	No.	%	No.	%
1.	Naseerullah Khan Babar Hospital, Peshawar	16	80	0	0	16	80	11	55	10	50
2.	Molvi Jee Hospital, Peshawar	18	90	0	0	20	100	10	50	11	55
3.	DHQ Hospital, Charsadda	20	100	0	0	20	100	4	20	4	20
4.	DHQ Hospital (Women & Children Block), Abbottabad	11	55	0	0	0	0	0	0	0	0
5.	DHQ Hospital, Haripur	14	67	0	0	9	43	1	5	1	5
6.	DHQ Hospital, Karak	18	90	0	0	20	100	2	10	2	10

4.11 AWARENESS & IMPLEMENTATION OF PROPOSED PROJECT

4.11.1 Awareness about the Project

365. The analysis of respondents' knowledge about the proposed project reveals a very low level of awareness across the surveyed population. Overall, only a small proportion of respondents reported having knowledge of the project, ranging between 0% and 15%, while an overwhelming majority 85% to 100% indicated that they were unaware of it. In several cases, awareness is completely absent, with 0% of respondents reporting any knowledge, highlighting a significant information gap. Even in locations where awareness exists, it remains minimal at 5% to 15%, suggesting that project-related information has not been effectively disseminated among the community. **Table 4.20** indicates the knowledge of the respondents about the proposed project.

Table 4.21: Knowledge about the project

Sr. No.	Hospital	Yes		No	
		No.	%	No.	%
1.	Naseerullah Khan Babar Hospital, Peshawar	2	10	18	90
2.	Molvi Jee Hospital, Peshawar	3	15	17	85
3.	DHQ Hospital, Charsadda	2	10	18	90
4.	DHQ Hospital (Women & Children Block), Abbottabad	0	0	20	100
5.	DHQ Hospital, Haripur	0	0	21	100
6.	DHQ Hospital, Karak	1	5	19	95
	Total	**8**	**6.6**	**113**	**93.4**

4.11.2 Perceived Positive Impacts

366. The analysis of perceived project impacts indicates that respondents hold a highly positive outlook regarding the effectiveness and benefits of the proposed project. The most prominent perceived benefit is improved healthcare services, with an overwhelming majority of respondents (80% to 100%) identifying this as a key outcome, highlighting strong expectations for enhanced service quality and access. This is followed by improvements in drinking water and sanitation, reported by 40% to 90% of respondents, reflecting the importance of basic service infrastructure in shaping community well-being.

367. Other anticipated benefits include reduced travel time, noted by 10% to 86%, suggesting that improved accessibility and proximity to services are significant concerns for many households. Additionally, employment opportunities are recognized by 25% to 38% of respondents, indicating expectations for some level of economic benefit, although this is less prominent compared to service-related improvements. Improved accessibility for persons with disabilities is identified by 20% to 65%, reflecting moderate awareness of inclusive infrastructure needs.

368. Overall, the findings demonstrate that respondents perceive the project as highly beneficial, particularly in terms of improving healthcare delivery and essential services, while also acknowledging its potential to enhance accessibility, reduce travel burdens, and create livelihood opportunities. This positive perception underscores the project's

relevance and its anticipated contribution to improving the quality of life for the local population. The responses of the respondents are obtained and summarized in the **Table 4.21.**

Table 4.22: Perceived Positive Impacts of the Project

Hospital	Improved Healthcare		Improved Water & Sanitation		Accessibility for People with disabilities		Employment Opportunities		Reduced Travel	
	No.	%	No.	%	No.	%	No.	%	No.	%
Naseerullah Khan Babar Hospital, Peshawar	20	100	12	60	7	35	6	30	8	40
Molvi Jee Hospital, Peshawar	18	90	8	40	4	20	5	25	6	30
DHQ Hospital, Charsadda	17	85	15	75	5	25	7	35	2	10
DHQ Hospital (Women & Children Block), Abbottabad	19	95	12	60	13	65	6	30	7	35
DHQ Hospital, Haripur	18	86	19	90	7	33	8	38	18	86
DHQ Hospital, Karak	16	80	13	65	5	25	7	35	7	35

4.12 GENDER SURVEY

369. Under the KP Health Systems Strengthening Program, a gender survey was also conducted across six health facilities: Naseerullah Babar Hospital, Peshawar, Molvi Jee Hospital (Peshawar), DHQ Charsadda, DHQ (Women and Children Block) Abbottabad, DHQ Haripur, and DHQ Karak. At each site, women (patients, attendants, or staff) were interviewed, yielding a total of 30 respondents. This analysis synthesizes their responses to identify systemic gaps, disparities, and priorities for gender-responsive health system strengthening.

4.12.1 Decision-Making Autonomy and Household Dynamics

- Women's ability to make independent health-related decisions is a key determinant of timely care access. The survey reveals predominant male control over major household and health decisions, with notable local variations.
- In four of six hospitals (Molvi Jee Hospital, DHQ Charsadda, DHQ Abbottabad, DHQ Karak), all respondents reported that males decide. Only in Naseerullah Babar Hospital and Haripur DHQ was decision-making described as "mutual" for Children's education
- Universally, male authority dominates. Respondents at every hospital except Abbottabad recorded that males decide whether women can work outside. However, at Abbottabad hospital, most of the respondents were of the view that this decision is taken mutually by the male and females house members.
- A split pattern emerges for choice of health facility in Molvi Jee Hospital, DHQ Charsadda, DHQ Abbottabad and DHQ Karak, all women said males choose the facility. However, in Naseerullah Babar Hospital, 3/5 said males choose, and in

Haripur, 3/5 said they choose for themselves. This suggests that Haripur and Naseerullah Babar Hospital have relatively higher female agency in seeking health care.

- Regarding major household purchases, the response was overwhelmingly male dominated rated 4/5 or 5/5 across all hospitals. All respondents consistently reported that decisions regarding major household purchases are made by male members of the household, reflecting a deeply entrenched norm in which men are seen as the primary financial decision-makers. Women's involvement in such decisions is minimal and often limited to informal consultation rather than active participation or final authority. This pattern indicates that, even where women have physical access to services or resources, their ability to act independently is frequently mediated by male approval or preferences.

4.12.2 Healthcare Access and Physical Barriers

- With the exception of Naseerullah Babar Hospital (4/5) and DHQ Abbottabad (4/5), all other hospitals reported 5/5 that services are easily accessible. However, "accessibility" in the survey primarily refers to distance/transport, not permission.
- Permission to visit hospital was required or "sometimes required" for a majority in Molvi Jee Hospital (3/5), DHQ Charsadda (3/5), DHQ Haripur (3/5), and DHQ Karak (3/5). Only in Naseerullah Babar Hospital and DHQ Abbottabad did 4/5 say no permission is needed.
- In Naseerullah Babar Hospital, the one-woman reporting difficulty cited "roads far from home," indicating transport infrastructure gaps.

4.12.3 Facility Infrastructure: Water, Sanitation, Lighting, and Safety

4.12.3.1 Toilets and Cleanliness

370. Availability of separate female toilets remains inconsistent across the assessed facilities, highlighting a significant gap in gender-sensitive infrastructure. In Molvi Jee, a majority of respondents (3/5) reported the absence of separate toilets for women, indicating particularly limited provision. Similarly, in Charsadda and Haripur, 2 out of 5 respondents in each location noted that such facilities were not available, suggesting that access is still unreliable. While comparatively better conditions were reported in Naseerullah Babar Hospital, Abbottabad, and Karak where 4 out of 5 respondents confirmed the presence of separate female toilets.

371. Overall, the findings suggest that although some progress has been made in certain locations, the lack of consistently available, safe, and private sanitation facilities for women remains a concern. This gap can directly affect women's comfort, dignity, and willingness to access healthcare services, underscoring the need for more systematic and inclusive facility planning.

372. Cleanliness of sanitation facilities emerges as a critical and widespread shortfall across all assessed hospitals. In Naseerullah Babar Hospital, Molvi Jee Hospital, and DHQ Charsadda, a strong majority of respondents (ranging from 3/5 to 4/5) reported that toilets are "never clean," pointing to persistent neglect in maintenance and hygiene

standards. Even in relatively better-performing locations such as Karak, 2 out of 5 respondents still indicated that toilets are never clean, suggesting that no facility consistently meets acceptable cleanliness levels.

373. Importantly, not a single hospital had a majority of respondents reporting that toilets are clean, underscoring the systemic nature of the issue rather than isolated lapses. Poor sanitation conditions can discourage patients especially women from using facilities, reduce overall satisfaction with services, and pose direct health risks. These findings highlight the urgent need for improved cleaning protocols, regular monitoring, and accountability mechanisms to ensure safe, hygienic, and user-friendly environments in healthcare settings.

4.12.3.2 Lighting

374. **Lighting conditions:** Inadequate lighting emerges as a significant concern in several facilities, particularly in Naseerullah Babar Hospital, Molvi Jee, and Charsadda. A large proportion of respondents in these locations 4 out of 5 in Naseerullah Babar Hospital, 3 out of 5 in Molvi Jee, and 4 out of 5 in Charsadda reported the absence of proper lighting, indicating poorly maintained or insufficient illumination in critical areas. Such conditions can compromise safety, reduce usability of services (especially during early morning or evening hours), and disproportionately affect women, who may feel more vulnerable in poorly lit environments.

375. In contrast, facilities in Abbottabad, Haripur, and Karak present a markedly different picture, with all respondents (5/5 in each location) confirming the availability of proper lighting. It suggests that while some hospitals have benefited from better management or resource allocation, others continue to lag behind, underscoring the need for more equitable distribution of resources and consistent enforcement of facility standards across all locations.

4.12.3.3 Drinking water

376. All assessed hospitals rely on formal water supply systems such as public supply, WSSP, or tube wells indicating that basic infrastructure for water provision is in place across facilities. However, the quality and reliability of this water vary considerably. In Naseerullah Babar Hospital, respondents reported that water is “sometimes muddy” and has a bad taste, while in Molvi Jee Hospital it was described as both “muddy” and having an unpleasant smell, raising concerns about safety and potability. In contrast, respondents from other locations generally reported that the water is clean, suggesting more effective maintenance or treatment systems in those facilities.

377. Notably, no women reported collecting water themselves, which reflects a complete dependence on facility-provided water within these healthcare settings. While this is expected in institutional environments, it also means that any failure in water quality or supply directly affects users without alternative options. The issues observed in Naseerullah Babar Hospital and Molvi Jee hospitals therefore represent critical service gaps, underscoring the need for improved water treatment, regular quality monitoring,

and stronger accountability mechanisms to ensure safe and reliable water for all patients.

4.12.3.4 Safety in hospital premises

378. Overall, respondents reported a high sense of safety within hospital premises. In Naseerullah Babar Hospital, Molvi Jee Hospital, DHQ Charsadda, DHQ Haripur, and DHQ Karak, all respondents (5/5 in each location) indicated that they feel safe, suggesting a generally positive perception of the hospital environment. However, Abbottabad stands out as a notable exception: 3 out of 5 respondents reported that they "sometimes feel insecure." While not an outright lack of safety, this inconsistency signals underlying concerns that warrant closer examination, particularly around security arrangements, staff presence, crowd management, or specific areas within the facility that may feel less secure.

379. Importantly, perceived safety is closely tied to the availability and quality of basic infrastructure such as WASH facilities and lighting. As highlighted in earlier findings, clean toilets and adequate lighting are not consistently ensured across all hospitals. Poor sanitation and inadequate lighting can undermine women's sense of dignity and security, especially in spaces like toilets, corridors, and waiting areas. Even where clinical services are available, such environmental shortcomings may discourage women from fully utilizing healthcare facilities.

380. These findings suggest that safety should not be viewed solely in terms of physical security measures, but also as a function of overall facility conditions. Strengthening cleanliness, ensuring reliable lighting, and addressing gaps in infrastructure are essential to creating a hospital environment where women feel both safe and respected, thereby supporting greater and more consistent service utilization.

4.12.4 Clinical Service Quality and Staffing

381. Privacy during medical examinations emerges as a strong and consistent positive across all assessed facilities. All 30 respondents, spanning every hospital included in the assessment, confirmed that appropriate privacy measures are in place and being practiced. This suggests that essential protocols such as the use of curtains, separate examination spaces, and respectful staff behavior are being effectively implemented.

382. This universal satisfaction indicates that, despite gaps in other areas like WASH facilities or infrastructure, hospitals have successfully prioritized patient confidentiality and dignity during clinical interactions. As a foundational element of quality care, maintaining privacy is critical for building trust, particularly for women seeking sensitive or reproductive health services. This strength should be sustained and reinforced, while similar levels of attention and consistency are extended to other aspects of the healthcare environment.

383. All respondents reported that they received proper care during both pre-natal (antenatal) and post-natal stages, indicating a consistently positive experience with maternal health services across the assessed hospitals. This suggests that healthcare providers are

effectively delivering the required clinical care, including routine check-ups, monitoring, guidance, and follow-up support for mothers.

384. The availability of healthcare staff presents a mixed picture across the assessed hospitals. In Molvi Jee, 3 out of 5 respondents reported that nurses and doctors are occasionally unavailable, while in Abbottabad this concern was even more pronounced, with 2 out of 5 indicating similar issues. These responses suggest intermittent staffing gaps that may affect timely access to care and increase waiting times for patients.

385. In contrast, all other hospitals demonstrated more consistent staff presence, with 4 out of 5 or 5 out of 5 respondents confirming that nurses and doctors are generally available when needed. This indicates that, in most locations, staffing levels and scheduling are functioning adequately to meet patient demand.

386. The disparities observed point to the need for targeted interventions in Molvi Jee and Abbottabad. Addressing these gaps may require a combination of measures, such as recruiting additional staff, improving shift planning, or strengthening attendance monitoring systems. Ensuring consistent availability of healthcare providers is essential for maintaining service quality, building patient trust, and preventing delays in critical care.

387. All respondents reported that there are “no major health issues” affecting women in their area. While this could suggest a relatively low perceived burden of illness, it is more likely to reflect under-recognition or limited awareness of women’s health conditions particularly non-communicable diseases (such as hypertension or diabetes), as well as reproductive and mental health concerns that are often overlooked or normalized. Social and cultural factors may also influence how women perceive and report health problems, leading to underreporting. This highlights the need for more detailed clinical assessments and community-level health data to accurately understand the true burden of women’s health issues in these areas.

4.12.5 Gender Equity and Facilities for Female Staff

388. The findings reveal clear and persistent gaps in gender equity and workplace support systems for female health workers, particularly in terms of opportunity structures, safe working conditions, and basic facilities that support dignity and wellbeing.

389. Responses on perceived equal opportunities show significant variation across hospitals. Abbottabad stands out positively, with all respondents (5/5) agreeing that equal opportunities exist. In contrast, at Molvi Jee reflects the most concerning situation, where 4 out of 5 respondents disagreed that women have equal opportunities, indicating strong perceptions of inequality in career progression, training access, or job assignments. Other hospitals show mixed responses, with only partial agreement (around 3/5), suggesting that equity is inconsistent and not institutionally guaranteed. Overall, the pattern points to perceived structural inequities in professional development and workplace treatment of female staff.

390. While basic toilet facilities for female staff are reported as generally available across hospitals (with 3–5/5 positive responses), more essential supportive infrastructure is

largely missing. Rest areas for female staff are severely inadequate, with very low availability reported in Naseerullah Babar Hospital (2/5), Molvi Jee Hospital (1/5), DHQ Charsadda (1/5), DHQ Abbottabad (3/5), DHQ Karak (2/5), and only slightly better in DHQ Haripur (4/5). This indicates that female staff often lack spaces for rest during long shifts, which can directly affect fatigue, productivity, and wellbeing. Most critically, no hospital provides a designated breastfeeding or lactation area for female staff. This represents a major systemic gap, forcing working mothers to manage childcare needs without institutional support and effectively placing them in difficult and inequitable working conditions.

391. Perceptions of safety during night shifts are generally moderately positive in most hospitals (4/5 or 3/5 agreement), suggesting that basic security arrangements exist. However, DHQ Karak shows a notable weakness, with only 2/5 respondents feeling safe during night duty. These variations likely reflect differences in lighting, security staffing, transport availability, and surrounding environment, all of which influence how secure female staff feel during late-hour shifts.

392. This is identified as the most critical gap across all dimensions. Awareness and availability of formal reporting systems for harassment are extremely weak. In Naseerullah Babar Hospital only 1 out of 5 respondents knew of a mechanism, while 3/5 were unaware entirely. In Molvi Jee, 3/5 reported that no mechanism exists. In Charsadda, 3/5 again reported lack of awareness. Abbottabad shows a particularly concerning situation, where all respondents (5/5) either stated the mechanism is unavailable or were unaware of it. Karak shows complete lack of awareness (5/5). Haripur is the only partial positive outlier, with 3/5 reporting availability. Overall, this reflects a serious safeguarding failure, where reporting systems are either not established, not communicated, or not trusted by staff.

393. Following suggestions were proposed to overcome reduce the gap.

- Hospitals should consider introducing gender-responsive workplace reforms to better support female health workers.
- It would be beneficial to provide dedicated rest rooms for female staff in all healthcare facilities to improve comfort, wellbeing, and work efficiency.
- Hospitals are encouraged to clearly establish and visibly communicate confidential harassment reporting mechanisms, along with regular staff training on how to use them effectively.
- Regular reviews or audits of night-duty safety could be conducted, focusing on lighting conditions, security presence, and safe transport arrangements for female staff.
- Strengthening human resource practices may help ensure fair and equal access for female staff to training opportunities, career progression, and professional development.
- These suggested measures would help ensure that female healthcare workers are not only part of the system but are also adequately supported, protected, and treated equitably within their workplaces.

4.12.6 Economic Empowerment and Income-Related Patterns among Women

394. Women's participation in income-generating activities shows clear variation across locations, ranging from very low involvement in Molvi Jee (1/5) to high participation in DHQ Abbottabad (4/5), with relatively strong participation also observed in DHQ Haripur and DHQ Karak (4/5 each). Importantly, all women engaged in income generation are employed in formal sectors (government or private jobs), with no evidence of participation in informal or home-based economic activities. This indicates that women's economic engagement is limited to structured employment opportunities, and informal livelihood options remain either absent or unreported.

395. Family approval appears to be a key determinant of women's ability to work. The pattern closely mirrors income generation trends, with very low support in Molvi Jee Hospital (1/5) and full support in DHQ Abbottabad (5/5). This strong alignment suggests that women's participation in employment is not solely based on personal aspiration or opportunity, but is significantly influenced by household acceptance and social permission. In practice, family endorsement functions as a gatekeeping factor for women's entry into paid work.

396. The ability of women to save income independently is relatively strong in most areas However, this capacity is weaker in Molvi Jee Hospital (2/5) and DHQ Charsadda (3/5), indicating uneven financial autonomy. Even where women earn, their ability to retain and manage savings varies depending on household dynamics and local norms.

397. Across all locations, women's earnings are consistently directed toward household needs. This universal pattern indicates that women's income is primarily integrated into family subsistence and day-to-day expenditures rather than being used for personal consumption, investment, or discretionary spending. While this reflects women's strong contribution to household welfare, it also suggests limited individual financial control over earned income.

398. Respondents suggested several potential pathways for improving women's earnings, including vocational teaching roles, savings from private clinic work, expansion of government job quotas, skills such as tailoring and tuition services, and taking up multiple jobs. However, a notable finding is the absence of any formal support programs such as microfinance schemes, structured skills training, or targeted livelihood initiatives in all communities assessed. This highlights a significant gap between identified needs and available institutional support.

399. Overall, the findings indicate that women's economic empowerment is uneven and highly dependent on family approval and formal employment structures. The lack of informal sector inclusion and the absence of structured support programs such as microfinance, entrepreneurship training, and skill development initiatives represent a major missed opportunity. Strengthening these systems could significantly enhance women's financial independence and create stronger linkages between economic empowerment and broader social and health outcomes.

4.12.7 Violence Against Women

400. The findings indicate that witnessing violence against women is a relatively common experience across the surveyed areas, though its intensity varies by location. The highest prevalence is reported in Naseerullah Babar Hospital, where 4 out of 5 respondents have witnessed physical or psychological violence. This is followed by Molvi Jee Hospital, where 3 out of 5 respondents reported exposure mainly to physical and economic violence. Lower but still notable levels are reported in rest of the area (2/5 each). The types of violence identified include physical harm, psychological abuse, and economic control or deprivation, suggesting that violence is not limited to a single form but is multidimensional and often interlinked.

401. A critical and consistent gap across all facilities is the complete absence of a functional referral pathway or structured on-site support system for survivors of violence. None of the hospitals reported having formal mechanisms to identify, support, or refer survivors to appropriate psychosocial, legal, or protection services. This is particularly concerning because healthcare facilities are often the first or only point of contact for women experiencing violence. The lack of a response system means that opportunities for early identification, intervention, and protection are being missed, leaving survivors without guidance or support within the health system.

402. It is suggested that hospital staff be trained in gender-based violence (GBV) first line response, including basic psychosocial support, confidentiality practices, and safe identification of survivors. In addition, formal referral linkages should be established between hospitals and relevant psychosocial, legal, and protection services to ensure that survivors receive comprehensive and timely support beyond initial healthcare contact.

403. Summary of key findings is presented in **Table 4.22 and 4.23** whereas key needs and priority improvements identified by women are given in **Table 4.23**

Table 4.23: Summary of Key Findings of the Gender Analysis

Domain	Key Finding	Pattern Across Facilities
Decision-making autonomy	Strong male dominance in household decisions	Women rarely decide on education, mobility, or major purchases.
Health access barriers	Permission required in most districts	Only Naseerullah Babar Hospital and Abbottabad show higher autonomy.
Facility infrastructure	Poor sanitation and inconsistent female facilities	No hospital meets full standards for toilets and cleanliness.
Lighting and safety	Uneven lighting affecting safety perception	A mixed pattern was observed including poor and good in hospital which require attention.
Water quality	Mixed water quality with contamination issues	Naseerullah Babar Hospital and Molvi Jee show poor water quality.
Clinical services	Strong maternal care and privacy	Universal satisfaction in privacy and ANC/PNC care.
Staffing	Moderate gaps in two hospitals	Molvi Jee and Abbottabad show intermittent shortages.

Domain	Key Finding	Pattern Across Facilities
Women's health awareness	Low awareness of disease burden	Likely underreporting of NCDs and mental health issues.
Female staff equity	Weak institutional support systems	Lack of breastfeeding rooms and rest areas across all sites.
Harassment systems	Extremely weak safeguarding structures	Most hospitals lack awareness or systems.
Economic empowerment	Limited to formal employment only	No informal sector participation or support programs.
Violence against women	Moderate exposure across districts	Highest in Naseerullah Babar Hospital, followed by Molvi Jee
Health system response	No GBV referral mechanisms	All hospitals lack structured response systems.

Table 4.24: Findings and Proposed actions for Gender Analysis

Area	Top Needs Identified	Suggested Actions / Measures
Decision-making autonomy	Greater women's involvement in household and health decisions	Conduct community awareness sessions targeting both men and women; engage male household heads and community leaders to promote shared decision-making; integrate gender sensitization into outreach programs.
Healthcare access	Reduced dependency on permission for seeking care	Strengthen community mobilization and health education campaigns emphasizing women's right to access care; involve local influencers to shift norms; expand female outreach workers to support women's independent access.
Female-friendly infrastructure	Separate toilets, clean sanitation, proper lighting	Construct and maintain gender-segregated toilets; establish routine cleaning schedules with monitoring systems; install and maintain adequate lighting in all facility areas.
Water quality	Safe, clean, and reliable drinking water	Introduce regular water quality testing; install filtration or treatment systems where needed; assign responsibility for routine monitoring and maintenance.
Safety in hospitals	Improved environmental safety and security	Improve lighting in all areas; deploy trained security staff; establish complaint mechanisms for safety concerns; conduct periodic safety audits.
Staffing availability	Reliable presence of doctors and nurses	Recruit additional staff in understaffed facilities; optimize shift schedules; introduce attendance monitoring systems; consider incentive mechanisms for staff retention in underserved areas.
Female staff welfare	Rest rooms	Allocate dedicated rest areas for female staff; establish lactation rooms; include these facilities as mandatory standards in hospital infrastructure planning.
Harassment protection	Functional reporting and response systems	Develop confidential and accessible reporting mechanisms; display reporting procedures clearly; train staff on harassment policies and response protocols; ensure accountability and follow-up systems.

Area	Top Needs Identified	Suggested Actions / Measures
Economic empowerment	Access to skills training and livelihood programs	Link women with vocational training programs; collaborate with government and NGOs to introduce microfinance and income-generating initiatives; promote skill-building opportunities within communities.
Violence response	Health system support for survivors	Train healthcare providers in GBV first-line response; establish referral linkages with legal, psychosocial, and protection services; integrate GBV screening and support into routine healthcare services.

Table 4.25: Strategic Recommendations for KP Health Systems Strengthening Program

Strategic Area	Recommended Action	Implementation Focus
Gender-responsive governance	Integrate gender equity into hospital governance frameworks	Policy-level inclusion of gender indicators in performance monitoring.
Women's autonomy in health access	Reduce permission barriers for healthcare access	Community engagement with male household decision-makers.
WASH infrastructure	Upgrade sanitation facilities and ensure female-friendly toilets	Separate toilets, cleanliness audits, maintenance contracts.
Lighting and safety	Improve infrastructure safety standards	Install reliable lighting in wards, corridors, and outdoor areas.
Water safety systems	Introduce routine water quality testing and treatment	Monitoring protocols and accountability systems.
Staffing improvements	Address staff shortages in underperforming facilities	Targeted recruitment and shift optimization in all health centers.
Female staff welfare	Establish lactation and rest facilities	Mandatory infrastructure standards for all hospitals.
Harassment prevention	Create confidential reporting and response systems	Awareness campaigns, training, and visible complaint mechanisms
GBV response integration	Establish hospital-based GBV referral pathways	Link hospitals with legal, psychosocial, and protection services.
Economic empowerment linkage	Introduce health-linked livelihood programs	Skills training, microfinance, and vocational pathways for women.
Data and monitoring systems	Strengthen gender-disaggregated data collection	Routine gender audits across all facilities.

5 ANTICIPATED IMPACTS AND MITIGATION MEASURES

404. This section presents the anticipated positive and adverse environmental and social impacts of the KPHSSP. As the proposed interventions involve only rehabilitation and upgrading works within existing DHQ premises, the assessment of impacts is limited to the facility boundaries and their immediate surroundings (refer to **Section 4** for the Area of Influence).

405. The impacts have been evaluated for the design/pre-construction, construction, and operational phases of the project. The assessment covers physical, ecological, and socio-economic aspects within the AOI. For each identified impact, a qualitative description is provided along with corresponding mitigation and remedial measures.

406. An impact evaluation matrix has been established to evaluate the significance of identified environmental and social impacts, providing a basis for the identification of appropriate mitigation measures.

5.1 NOTION OF SIGNIFICANCE

407. The term “environmental impact” refers to both adverse and beneficial impacts of the project on the physical, biological, and socio-economic environment. Impact prediction has been undertaken based on available baseline data, project information, and reasonable professional assumptions. The evaluation of impact significance relies on established criteria and expert judgment. The identified impacts are categorized using following criteria:

Direction	-	Positive or Negative
Duration	-	Long or Short Term
Effect	-	Direct or Indirect
Extent	-	Localized or Widespread

408. Impact significance is determined by considering both the nature and magnitude of the impact and the sensitivity of the affected receptor. Receptors with higher sensitivity are likely to experience impacts of greater significance from the same activity.

409. For this IEE, the characteristics of project activities and the type of impacts are assessed in combination with receptor sensitivity to determine overall significance. Impact significance is categorized as negligible, low, moderate, or high.

410. Impacts assessed as moderate or high are addressed through appropriate mitigation and management measures in the Environmental Management Plan (EMP).

411. Following the assessment of impact magnitude, the sensitivity of the receiving environment and affected receptors was evaluated to determine the overall significance of each potential impact, using the impact significance matrix presented below. While most identified impacts can be effectively mitigated through appropriate management

measures, certain residual impacts may remain after mitigation. The classification of impact significance based on the combined evaluation of impact magnitude and receptor sensitivity is presented below using assigned scores and corresponding color codes.

Magnitude of Impact	Sensitivity of Receptors			
	High (4)	**Medium (3)**	**Low (2)**	**Negligible (1)**
Major (4)	16	12	8	4
Moderate (3)	12	9	6	3
Minor (2)	8	6	4	2
Negligible (1)	4	3	2	1

Score	**Impact Significance**
1	Negligible
2 – 4	Low
5 – 8	Medium
9 – 12	High
> 12	Very High

5.2 METHODOLOGY FOR IMPACT EVALUATION

412. The methodology adopted for the evaluation of the impacts included the following assessment tools, (i) project impact evaluation matrix and (ii) overlays. These tools were used to identify the significance and magnitude of the impact as well as the nature, duration, extent etc.

a) Project Impact Evaluation Matrix

413. The Impact Evaluation Matrix presents a structured analysis by mapping project activities against relevant environmental and social parameters. It categorizes potential interactions across various project phases design, construction, and operation allowing systematic identification and assessment of likely impacts on the physical, ecological, and socio-economic environment. The project Impact Evaluation Matrix is given in **Annex-VI.**

b) Overlays

414. In order to identify spatial based impacts, overlays were used. An overlay is based on a set of transparent maps, each of which represents the spatial distribution of an environmental characteristic (for example; topography). Information for an array of variables such as land use, infrastructure, vegetation etc. was collected for the standard geographical units within the project's AOI, recorded on a series of maps, typically one for each variable. These maps were overlaid to produce a composite map. The resulting composite maps characterize the project area's land use, physical, social, ecological and other relevant parameters related to proposed intervention. The overlays maps used in this IEE study are given in **Section 4.**

415. The impact assessment has been conducted within the delineated AOI, as defined in **Section 4** in accordance with the project's scope and environmental baseline studies.

5.3 POTENTIAL POSITIVE IMPACTS

416. The proposed hospital revamp project is anticipated to result in significant positive environmental, social, and operational outcomes. As the interventions are confined within existing hospital premises, the project will enhance healthcare service delivery without requiring land acquisition or change in land use. The design incorporates functional layout optimization, segregation of clean and contaminated zones, and integration of infection prevention and control measures, which will improve patient safety, reduce hospital-acquired infection risks, and enhance overall quality of care. Improvements in building systems and materials will contribute to better indoor air quality, thermal comfort, and long-term durability of the facilities.

417. Upgradation of critical infrastructure, including fire-fighting, medical gas, electrical, ICT, and ELV systems, will strengthen operational reliability, emergency preparedness, and resilience of healthcare services. Environmental sustainability will be promoted through energy-efficient systems, solar energy integration, and reduced reliance on grid electricity, thereby lowering greenhouse gas emissions. Improved water management measures, such as rainwater harvesting, soakage pits, and enhanced drainage systems, will reduce leakages, minimize localized flooding, and improve site resilience. Strengthening of healthcare waste management systems will support safe segregation and disposal practices.

418. In addition, the project will improve accessibility and safe mobility for all users, including elderly and persons with disabilities, while enhancing patient comfort, dignity, and visitor convenience. The revamp will also reduce occupational health and safety risks, lower long-term operational and utility costs, and extend the functional lifespan of existing facilities. Short-term employment opportunities during implementation are expected to contribute to local economic activity. Overall, the project aligns with sustainable and resilient healthcare infrastructure development objectives.

5.4 POTENTIAL ADVERSE IMPACTS

419. In addition to the positive impacts, the project also poses potential significant adverse environmental and social impacts. The Project is implemented in three key stages, i.e: Pre-Construction/Planning and Design Stage, Construction Stage and Operation and Maintenance (O&M) Stage.

420. Adverse impacts envisaged at these three (03) stages of the proposed project along with their proposed remedial or mitigation measures are detailed below:

5.5 ADVERSE IMPACTS DURING PLANNING AND DESIGN AND PRE-CONSTRUCTION PHASE

421. Potential adverse impacts during the planning and design stage of the project is given below:

5.5.1 Design-Stage Considerations: Hospital Layout, Utilities, and Infrastructure

Potential Impacts

422. Decisions made during the design and pre-construction phase regarding the hospital layout, internal circulation, wards, isolation units, utility systems, and external development can influence operational efficiency, infection control, safety, and environmental performance once construction begins. If not adequately considered, these design-stage decisions may lead to adjustments during construction or affect the long-term functionality of the hospital. Impacts are expected to be high, site-specific in scale, and long-term as design-stage decisions can significantly affect hospital operational efficiency, infection control, safety, and overall functional performance.

Mitigation Measures

- Coordinated design reviews will be conducted to integrate environmental, operational, and energy efficiency considerations in the design, including drainage, HVAC, and plumbing systems.
- All existing utilities, including water supply, sewerage, electrical, medical gas, natural gas, and fire-fighting systems, will be identified and mapped, and appropriate connection points (tie-ins) will be determined for integrating new systems with the existing infrastructure.
- Consultations with hospital staff, administration, and relevant authorities will be conducted during the design stage to ensure operational requirements are met and regulatory compliance is achieved.
- Structural and geotechnical assessments will be undertaken to guide safe retrofitting, foundation stability, and civil works planning.
- Energy-efficient systems, renewable energy options, and climate-resilient features will be integrated into the design.
- Safe access, circulation, and emergency exits for staff, patients, and visitors will be planned and incorporated into the design.
- A service continuity plan will be prepared to ensure uninterrupted hospital services, including electricity, water, medical gases, and emergency access, during renovation works.

5.5.2 Topography

Potential Impacts

423. The project mainly involves renovation of existing buildings and upgrading internal systems such as plumbing, fire-fighting, electrical, ICT, ELV, medical gas, HVAC, and rooftop solar installations, which will occur within the existing building footprint and are not expected to affect site topography. Minor and localized disturbances to ground levels may occur during external works such as installation of underground tanks, rainwater

harvesting systems, utility pipelines, storm drainage, natural gas piping, and construction of roads and paved areas, requiring limited excavation and trenching. The impacts are expected to be negligible, site-specific, and short-term in duration.

Mitigation Measures

- Excavation, trenching, and grading will be limited to designated work areas required for external development and utility installation.
- Disturbed ground surfaces will be restored and compacted after completion of underground works and paving activities.
- Proper drainage and surface slopes will be ensured in paved areas, roads, and walkways to prevent water accumulation or localized flooding.
- Existing landscaped and undisturbed areas within the hospital premises will be protected from unnecessary disturbance during construction activities.

5.5.3 Seismic Hazard

Potential Impact

424. As the project area may be exposed to seismic activity, existing buildings and newly installed systems could be vulnerable to earthquake forces if structural conditions are not properly assessed during the design stage. Aging structural components or inadequate retrofitting may increase the risk of damage, potentially affecting building safety and continuity of hospital services. However, since the project mainly involves renovation within the existing hospital premises with limited structural modifications, impacts are expected to be moderate to high, site-specific, and long-term.

Mitigation Measures

425. The revamp of infrastructure will be designed and constructed in accordance with the Seismic Building Code of Pakistan 2021 (SBC-2021) to ensure compliance with the minimum requirements for seismic safety of structures.

5.5.4 Air

426. The proposed hospital sites are situated within already developed urban environments where elevated PM_{10} and $PM_{2.5}$ levels are prevalent. Prolonged exposure to poor ambient air quality may affect patient comfort and recovery, particularly for sensitive groups, while excessive dust may also affect the efficiency and maintenance requirements of hospital equipment and HVAC systems. The impact is considered high, site-specific, and long-term in nature.

Mitigation Measures

- Energy-efficient HVAC systems with proper ventilation and air circulation will be incorporated in the hospital design to improve indoor air quality.
- Solar energy systems and energy-efficient equipment will be promoted to reduce dependence on conventional energy sources and associated emissions.

- Sensitive areas such as isolation wards, burn units, and counselling rooms will be planned away from direct roadside exposure where feasible.
- Landscaping and plantation within available hospital spaces will be encouraged to improve the micro-environment and reduce dust levels.

5.5.5 Noise

Potential Impact

427. Elevated ambient noise levels exceeding applicable standards were observed at all project hospitals, mainly due to their location within congested urban and commercial areas with continuous traffic movement and public activity. However, sensitive hospital receptors including patients, attendants, and healthcare staff may remain exposed to existing external traffic noise, particularly in wards located near main roads and hospital entrances. Impacts are expected to be high, site specific and long term.

Mitigation Measures

- Sensitive areas such as ICUs, isolation wards, burn units, and counselling rooms will be located away from major roadside exposure where feasible.
- Existing boundary walls will be maintained and strengthened, where required, to reduce external noise intrusion.
- Plantation and green buffers will be promoted within available hospital spaces to help reduce noise and improve the hospital environment.
- Internal traffic circulation and parking management will be improved to minimize congestion and unnecessary vehicle movement within hospital premises.
- Use of unnecessary vehicle horns within hospital premises will be discouraged through signage and hospital management measures.

5.5.6 Resource Conservation

Potential Impact

428. The project will involve the use of water, fuel, and construction materials. Excessive water consumption for construction activities, workers or for equipment cleaning could place minor stress on local water supplies. Construction materials such as cement, aggregates, structural steel, pipes, and lining materials are mostly non-renewable; inefficient use could reduce the availability of these resources for future projects. Fuel consumption for machinery and equipment may also result in air emissions if not managed properly. The overall impact on natural resources is moderately negative but manageable due to the limited scope of hospital upgrades.

429. Impacts are expected to be moderate, site-specific, and short-term in nature.

Mitigation Measures

430. Following practices shall be adopted to conserve these natural resources:

- Non-potable water will be used for cleaning, curing, and dust control.
- Workers will be trained on simple water-saving practices.
- Leftover materials will be reused wherever feasible.
- Machinery will be maintained in good condition, and engines will be turned off when not in use.
- Locally available fuel of good quality (low-sulphur if available) will be used.
- Basic site layout planning and waste segregation will be implemented.

431. Resources Conservation Plan is attached as **Annex-VII.**

5.5.7 Flora

Potential Impact

432. The project is limited to rehabilitation works within existing hospital premises, and no tree cutting or removal of vegetation is envisaged. Therefore, impacts on flora are expected to be negligible. Minor risks to vegetation may arise from site mobilization during subsequent stages if not properly planned. Impacts are expected to be negligible to low, site-specific, and short-term in nature.

Mitigation Measures

- Project design ensures avoidance of all existing trees and green areas within hospital premises;
- Space planning for material storage and temporary facilities will be restricted to already paved or disturbed areas;
- Provision for landscaping and plantation using native species has been incorporated to enhance green cover.

5.5.8 Fauna

Potential Impact

433. The project area comprises an urban hospital environment with limited habitat value, primarily supporting urban-adapted fauna (e.g., birds and small mammals). As works are confined within existing premises, impacts on fauna are expected to be minimal to. Impacts are expected to be negligible, site-specific, and short-term in nature.

Mitigation Measures:

- Design provisions will ensure that no natural habitats are disturbed;
- Landscaping plans will incorporate native vegetation, which may support local urban biodiversity;
- Subsequent project phases will ensure controlled site activities to minimize disturbance to urban fauna.

5.5.9 Land Acquisition and Resettlement

Potential Impact

434. No private land acquisition is required, and the project does not involve construction outside the existing hospital boundary. Thus, no impacts on private land, residential, or commercial structures are anticipated during the design or construction phases.

5.5.10 Temporary Acquisition of Land

Potential Impacts

435. The hospital revamp works will be confined within the existing hospital premises. Limited temporary space may be required for material storage, equipment placement, and vehicle parking. Any such use will be small-scale and short-term in nature and may be managed in hospital premises. The required land will be used within the hospital area. No temporary land acquisition is required. Hence there will be no impact.

Mitigation Measures

- Contractor facilities will, as far as possible, be established within the hospital boundary in coordination with hospital management.
- Temporary areas will be clearly demarcated to avoid disruption to hospital operations.
- If external land is required, it will be obtained through voluntary short-term lease agreements.
- All temporarily used areas will be restored to their original condition after completion of works.
- A Construction Camp/Layout Plan will be prepared in consultation with PMIU.

5.5.11 Existing Utilities

Potential Impacts

436. Excavation and trenching for activities such as water supply and sewerage pipelines, natural gas piping, storm drainage, electrical systems, and paved areas may pose a risk of accidental disturbance or damage to existing underground utilities**.** These may include water supply lines, sewerage pipelines, electrical cables, communication lines, fire-fighting pipelines, and medical gas systems. Any damage could lead to temporary disruption of essential hospital services**.** However, the Impacts are expected to be moderate, site-specific, and short-term in nature.

Mitigation Measures

437. Mitigation measures will include:
    - Utility surveys and mapping will be conducted prior to construction.
    - Existing utility lines will be clearly marked and protected on site.
    - Careful excavation methods will be adopted, particularly near identified utilities.

- Coordination with hospital management and relevant utility providers will be carried out prior to commencement of works.
- Temporary arrangements will be ensured, where required, to maintain continuity of essential services.

5.5.12 Physical and Cultural Resources

Mitigation Measures

438. The hospital revamp works will be confined within the existing hospital premises. No graveyards, shrines or other physical and cultural resources except mosques are located within the project boundary. Therefore, no direct impact on such resources is anticipated.

439. However, minor and temporary inconvenience may occur due to construction-related noise, dust, or traffic movement in surrounding areas, which could indirectly affect access or comfort due to construction activities. Impacts are expected to be negligible to low, site-specific, and short-term in nature.

Mitigation Measures

- All necessary arrangements including schedule of construction work and obstruction free and safe access will be made to avoid any disturbance to the mosques located in the hospital premises.

5.6 ADVERSE IMPACTS DURING CONSTRUCTION STAGE

5.6.1 Excavation

Potential Impact

440. Small scale excavation may be required for upgrading existing hospital utilities such as sewerage, drainage, water supply lines, and minor external works. As the project focuses on rehabilitation rather than new construction, excavation activities will be localized and short-term across all project sites.

441. Potential impacts include temporary soil disturbance, spoil generation, dust emissions, restricted access, interference with ambulance movement, and occupational safety risks. These impacts may be relatively more pronounced at urban and high-traffic facilities such as Naseerullah Khan Babar Memorial Hospital and DHQ Hospital Charsadda due to congestion and high patient flow, while dust-related impacts may be more noticeable at DHQ Hospital Karak because of dry conditions. At DHQ Hospital Haripur and DHQ Hospital Abbottabad, better site conditions and dispersion may help reduce overall impact intensity. There is also a possibility of encountering undocumented utilities or, in rare cases, physical cultural resources.

442. Impacts are expected to be moderate to high, site-specific, and short-term in nature.

Mitigation Measures

- Excavation will be carried out in small, phased sections, and works will be scheduled during off-peak hours to maintain hospital operations and emergency access.
- Dust will be controlled through water sprinkling and covering of spoil and transport vehicles with enhanced attention in drier areas such as DHQ Hospital Karak.
- Excavated material will be reused where feasible, and surplus material will be disposed of at approved sites.
- Barriers, fencing, and signage will be installed to protect patients, staff, and visitors.
- Proper shoring and trench support will be used to prevent collapse and ensure worker safety.
- Underground utilities will be identified and mapped prior to excavation to avoid service disruption.
- Controlled methods will be applied near older structures, and the EMP Chance-Find Procedure will be implemented if artifacts are encountered.
- Close coordination with hospital administration will be maintained to ensure safe access and emergency routes.
- Regular air quality and safety inspections will be conducted, particularly near sensitive units such as Intensive Care Units (ICUs), Operation Theatres (OTs), and isolation wards.
- Workers will be trained on safety, hazard identification, infection prevention, and emergency response.

5.6.2 Construction campsites and Contractor Facilities

Potential Impact

443. The contractor's site office and any temporary facilities will be established within the existing hospital premises at locations approved by the SC and PMIU in coordination with the Hospital Administration across all project sites. Given the limited scale of works, only small, temporary areas will be utilized for site office, material storage, and equipment placement.

444. However, if such facilities are established within or in close proximity to functional areas of the hospital, they may result in localized and short-term impacts may occur. These may be relatively more noticeable at congested facilities such as Naseerullah Babar Hospital, Maulvi Ji Hospital and DHQ Hospital Charsadda and Women and Children Hospital, Abottabad due to higher patient flow and limited space availability. Potential Impacts include minor vegetation disturbance, noise and visual intrusion, and the generation of solid waste and wastewater. Inadequate management of these facilities could also lead to sanitation issues, potential water contamination, vector breeding, and obstruction of access routes, including emergency pathways.

445. Considering the operational sensitivity of the healthcare environment and the presence of patients and critical services, these impacts are assessed as moderate, site-specific, and short-term, and can be effectively managed through appropriate siting, planning, and implementation of standard environmental and safety measures.

446. Impacts are expected to be high, site-specific, and short-term in nature.

Mitigation Measures

- The contractor's site office and any temporary facilities will be located within designated areas approved by the SC and Hospital Administration, avoiding sensitive zones such as wards, emergency units, and access routes.
- The footprint of temporary facilities will be minimized, and no unnecessary clearing of vegetation or disturbance to landscaped areas will be permitted.
- Adequate sanitation arrangements, including clean toilets, safe drinking water, and proper wastewater disposal arrangements, will be provided and maintained, with strict prohibition of discharge into open drains or land.
- Solid waste will be properly segregated, collected, and disposed of through authorized municipal services, and oil traps and designated maintenance areas will be established to prevent soil and water contamination.
- Dust, noise, and visual disturbance will be minimized through good housekeeping practices, enclosures, water sprinkling, controlled material storage, and appropriate scheduling of activities with keen attention in congested hospitals such as Naseerullah Babar Hospital.
- All access routes, including emergency pathways, will be kept clear and unobstructed at all times to avoid disruption to hospital operations.
- Vector control measures will be implemented, including proper waste handling, drainage of stagnant water, and regular site cleaning.
- Adequate worker facilities, including food, rest, and hygiene arrangements, will be ensured in accordance with national regulations and applicable labor standards, and workers will be trained and bound by a Code of Conduct under an approved Construction Camp Management Plan (including the Labor Management Plan), with a Community Liaison Officer appointed to address grievances.
- All temporary facilities and camps will be dismantled promptly upon completion of works, and the sites will be restored to their original condition.
- Regular monitoring and supervision will be carried out to ensure compliance with environmental, health, and safety requirements.

5.6.3 Air Quality

Potential Impact

447. Air quality may be temporarily affected during rehabilitation works due to dust generation from demolition, excavation, material handling, and movement of construction vehicles within the hospital premises. Demolition of existing structures and finishes may generate additional fine particulate matter, while exhaust emissions from diesel-powered machinery and vehicles may release pollutants such as PM, NO_x, SO_2, CO, and VOCs.

448. The magnitude of air quality impacts will vary across project sites depending on local environmental conditions. Relatively higher impacts are expected at Naseerullah Babar Hospital, Maulvi Jee Hospital, and DHQ Hospital Charsadda due to higher urban activity, traffic congestion, and baseline particulate levels. At DHQ Hospital Karak, ambient air

quality is generally influenced by lower emissions; however, dry conditions and exposed soil may increase dust generation during construction activities. In contrast, comparatively lower impacts are anticipated at DHQ Hospital Haripur and DHQ Hospital Abbottabad due to better vegetation cover, terrain, and dispersion conditions.

449. Given the sensitivity of hospital environments particularly in proximity to OPDs, ICUs, operation theaters, and isolation wards even short-term exposure to dust and emissions may adversely affect patients, healthcare staff, and sensitive medical equipment.

450. The risk is higher at more congested, high-patient-load facilities such as Naseerullah Babar Hospital and DHQ Hospital Charsadda, while relatively less congested sites, including DHQ Hospital Karak and DHQ Hospital Haripur, may experience comparatively lower exposure.

451. Impacts are expected to be high, site-specific, and short-term in nature.

Mitigation Measures

- Dust emissions from demolition, excavation, and material handling will be controlled through regular water sprinkling on exposed surfaces and covering of stockpiles and transport vehicles with enhanced dust suppression applied in relatively arid and dust-prone areas such as DHQ Hospital Karak.
- Well-maintained, low-emission equipment will be used, open burning will be strictly prohibited, and engines will be switched off when not in use to minimize exhaust emissions particularly in more urban and traffic-influenced settings such as Naseerullah Babar Hospital.
- Dust screens or temporary enclosures will be installed around high-dust activities, particularly during demolition and dismantling works.
- Dust-generating activities, including demolition works, will be scheduled during off-peak hospital hours to minimize disturbance to patients and staff.
- Demolition debris will be promptly collected, covered, and transported to approved disposal sites to prevent dust dispersion.
- Workers will be provided with appropriate PPE, including dust masks, and trained in their proper use.
- Regular air quality monitoring will be conducted near sensitive hospital units (e.g., ICUs, OTs, isolation wards) to ensure compliance with applicable NEQS standards.
- Warning signage will be installed, and timely communication with hospital administration will be maintained regarding high-dust activities.
- All monitoring results and corrective actions will be properly documented and implemented as required.

5.6.4 Noise

Potential Impact

452. Activities including demolition, excavation, drilling, material handling, and vehicle movement may generate temporary noise and minor vibration across all project sites.

453. Noise may disturb patients, healthcare staff, and visitors. particularly in high-activity and congested facilities such as Naseerullah Babar Hospital, Maulvi Jee and DHQ Hospital Charsadda. Vibration may also pose limited risk to older hospital structures including Naseerullah Babar Hospital and parts of DHQ Hospital Karak, if demolition or heavy equipment operations are not carefully controlled. At comparatively less congested sites such as DHQ Hospital Haripur and DHQ Hospital Abbottabad, impacts may be relatively lower due to better spatial layout and dispersion of activities.

454. Impacts are expected to be high, site-specific, and short-term in nature.

Mitigation Measures

- Low-noise equipment, including machinery used for demolition, excavation, and compaction, will be selected and fitted with silencers or mufflers, and regularly maintained to prevent excessive noise and vibration on all sites.
- High-noise and vibration-generating activities, including demolition, drilling, excavation, and compaction, will be scheduled during off-peak hospital hours and conducted in small, phased sections with stricter controls at congested facilities such as Naseerullah Babar Hospital and DHQ Hospital Charsadda. to minimize disturbance and vibration propagation.
- Vibration-intensive methods will be avoided near older or structurally sensitive hospital buildings, particularly at Naseerullah Babar Hospital and parts of DHQ Hospital Karak, and monitoring and visual inspections will be carried out to ensure no damage occurs.
- Temporary acoustic barriers or enclosures will be installed near sensitive units to reduce noise propagation where required.
- Work schedules will be planned to avoid simultaneous high-noise or high-vibration activities near sensitive areas, and worker rotation will be implemented to minimize prolonged exposure.
- Workers will be provided with appropriate PPE, including ear protection, and trained in its proper use.
- Noise and vibration monitoring will be conducted near sensitive hospital areas (ICUs, OTs, wards) to ensure compliance with NEQS standards, and corrective actions will be implemented if required.
- Demolition and construction debris will be promptly handled and removed to reduce the duration of noise- and vibration-generating activities.
- Advance coordination with hospital management will be maintained, and a grievance mechanism will be established to address complaints from patients, staff, or visitors.

5.6.5 Traffic Management

Potential Impact

455. Rehabilitation works within operational hospital premises including material transport, equipment movement, partial pathway closures, and temporary use of parking areas may temporarily disrupt internal traffic circulation in all project sites. Such disruptions could cause congestion and restrict access for patients, visitors, ambulances, and service vehicles. These disruptions may be more pronounced at relatively congested facilities such as Naseerullah Babar Hospital, DHQ Hospital Charsadda and DHQ Hospital Abbottabad due to higher patient load and limited internal space, whereas comparatively less congested layouts at DHQ Hospital Karak, DHQ Hospital Haripur, and may experience relatively lower levels of disruption.

456. Given the critical need for uninterrupted emergency access, any obstruction could have moderate to high, site specific and short-term impacts.

Mitigation Measures

- Construction activities will be carried out in phased sections to ensure continuous access to emergency and critical care units.
- Coordination with hospital administration will be maintained to ensure uninterrupted ambulance access at all times with stricter control at high-traffic facilities such as Naseerullah Babar Hospital.
- Alternate entry and exit routes within the hospital premises will be clearly demarcated and communicated to staff, patients, and visitors.
- Communication will be provided to hospital staff, patients, and visitors regarding temporary route changes, parking restrictions, or access diversions.
- Material deliveries and heavy vehicle movements will be scheduled during off-peak hospital hours to minimize congestion.
- Dedicated pathways will be provided for pedestrians, and separate routes will be maintained for construction vehicles to avoid conflicts.
- Visible directional signage, safety barricades, and protective barriers will be installed along construction zones and temporary routes.
- Personnel will be stationed at key locations during peak construction activities to guide vehicles and pedestrians safely and ensure unobstructed access for ambulances and hospital staff.

457. A site-specific Traffic Management Plan will be prepared in coordination with hospital management at each facility to ensure safety, mobility, and minimal disruption during rehabilitation works. A framework Traffic Management Plan is attached as **Annex-VIII.**

5.6.6 Impact on Soil

Potential Impact

458. Soil impacts from the proposed rehabilitation works are expected to be localized, minor, and short-term, as activities are limited to upgrading and rehabilitation within the existing hospital premises. Temporary soil disturbance may occur during minor excavation for storm drainage, sewerage, water supply lines, underground utilities, equipment foundations, and site leveling for external works such as pavers, landscaping, boundary walls, parking sheds, and underground tanks.

459. Potential impacts may include minor erosion of exposed soil, temporary disruption of surface drainage if excavated material or stockpiles are not managed properly, and localized dust or contamination from accidental spills of fuel, lubricants, or construction waste. These impacts may be relatively more noticeable at drier sites such as DHQ Hospital Karak due to lose soil conditions, while at more congested urban facilities such as Naseerullah Khan Babar Memorial Hospital and DHQ Hospital Charsadda, improper handling of excavated material may lead to localized drainage blockage and access disruption. At comparatively better managed and vegetated sites such as DHQ Hospital Haripur and DHQ Hospital Abbottabad, impacts are expected to be relatively less pronounced.

460. Given the urban, developed, and compact nature of hospital sites, these impacts are expected to be low to moderate, site-specific, and short-term in nature.

Mitigation measures

- Excavations for utilities or minor external works will be kept as small and short-term as possible to minimize soil disturbance.
- Excavated materials will be managed within the work area to avoid blocking access routes, drains, or patient pathways.
- Regular water sprinkling will be applied to exposed soil or loose material to control dust with increased frequency in drier areas such as DHQ Hospital Karak.
- Refuelling and maintenance of machinery will be carried out on impermeable surfaces or with drip trays to prevent soil contamination.
- Construction waste and debris will be collected promptly and disposed of at approved locations to prevent contamination and obstruction.
- Equipment movement will be restricted to the immediate work area to avoid damage to surrounding paved or landscaped surfaces especially in DHQ Hospital Haripur and DHQ Hospital Abbottabad with relatively more green spaces.
- Disturbed areas, including small patches of soil along access routes, will be restored promptly with paving, landscaping, or other appropriate surface treatment.
- Workers will be trained in dust control, spill prevention, and basic soil protection measures, and compliance will be monitored regularly.

5.6.7 Community Health and Safety

Potential Impact

461. During the hospital rehabilitation works, minor excavation, material handling, and movement of equipment within operational hospital premises may pose risks to patients, visitors, staff, and nearby pedestrians. Potential impacts include:

- Accidents from vehicle or equipment movement within hospital premises.
- Exposure to dust, noise, and minor vibrations, particularly affecting vulnerable patients (children, elderly, or those with pre-existing conditions).
- Localized contamination from accidental spills of fuel, lubricants, or construction materials.
- Increased risk of communicable diseases among hospital users/visitors if hygiene, sanitation, and infection prevention measures are not maintained.
- Slips, trips, falls, or collisions due to temporary obstacles or uneven surfaces.

462. Impacts are expected to be moderate, site-specific, and short-term in nature.

Mitigation Measures

- Construction activities will be confined to clearly demarcated work areas, with restricted access through barricades and signage.
- Safe and uninterrupted access for patients, staff, and emergency vehicles will be maintained at all times through phased works and designated routes.
- Movement of construction vehicles and equipment will be controlled within the site, and low speed limits will be enforced to minimize accident risks.
- Dust, noise, and minor vibration will be minimized through water sprinkling, proper equipment maintenance, and scheduling of works during less sensitive hours.
- All work areas near sensitive hospital units will be secured with barriers and warning signs to prevent accidental exposure.
- Good housekeeping will be maintained, including timely removal of debris, proper waste management, and prevention of water stagnation.
- Refuelling and storage of fuels or lubricants will be carried out in controlled areas to prevent spills and contamination.
- Workers will be trained on site safety, infection prevention, hygiene practices, and appropriate conduct within hospital premises.
- A site-specific Health, Safety, and Environment (HSE) Plan and GRM will be implemented to address safety concerns and complaints.
- Advance information will be provided to hospital staff and visitors regarding construction activities affecting access or movement.

5.6.8 Occupational Health and Safety

Potential Impact

463. Occupational health and safety (OHS) risks are associated with minor rehabilitation works within operational hospitals, including small-scale excavation, utility works, equipment installation, and material handling. As hospitals will remain operational during construction, workers may also interact with patients, healthcare staff, and visitors, increasing the need for effective safety and infection prevention measures.

464. Potential hazards include slips, trips, and falls; injuries from hand and power tools; exposure to dust, noise, and electrical hazards; manual handling injuries; and potential exposure to infectious agents while working in clinical areas. Improper handling of demolition debris, chemicals, or other hazardous materials may also pose health and safety risks. These risks will be managed through work area segregation, infection prevention and control (IPC) measures, safe handling of hazardous materials, provision and use of appropriate PPE, emergency response arrangements, and prompt reporting and investigation of incidents, in accordance with the EMP and contractor's site-specific management plans.

465. Impacts are expected to be moderate to high, site-specific, and short-term in nature.

Mitigation Measures

- All works will be carried out in compliance with applicable occupational health and safety regulations and international good practices.
- PPE including helmets, gloves, safety footwear, masks, goggles, and high-visibility vests will be provided and its use will be strictly enforced.
- The Contractor shall prepare and implement Occupational Health and Safety (OHS) Plan, Infection Prevention and Control (IPC) Plan, and Emergency Response Plan (ERP) before commencement of works.
- Workers will be trained through regular toolbox talks on hazard identification, safe work practices, equipment handling, infection prevention, and emergency procedures.
- Active construction work areas will be secured with barricades, warning signage, and controlled access to prevent unauthorized entry and accidental exposure.
- Hazardous materials, chemicals, fuels, and demolition wastes shall be identified, handled, stored, and disposed of in accordance with approved procedures and applicable regulations.
- All machinery and equipment will be properly maintained, and safe operating procedures will be followed to minimize mechanical, electrical, and noise-related risks.
- First aid facilities will be made available on-site, and arrangements will be ensured for prompt medical assistance in coordination with hospital services.
- Good housekeeping will be maintained, including proper material storage, debris removal, and safe site layout to reduce risks of slips, trips, and falls.
- Workers' health and hygiene will be monitored, including pre-employment fitness checks, use of existing sanitation facilities, and adherence to infection prevention protocols. Sanitation Plan is attached as **Annex-IX.**

- A designated safety supervisor will be assigned to monitor compliance, maintain records, and ensure implementation of all OHS measures.

5.6.9 Generation of Solid Waste

Potential Impact

466. Rehabilitation works within hospital premises will generate solid waste, including construction and demolition debris, excavated material, packaging waste, and domestic waste from contractor staff. The estimated quantities are discussed in **section 3.18.**

467. Additional small quantities of construction-related waste may also arise from repair and upgrading activities. If not properly managed, this waste may result in localized hygiene issues, visual nuisance, blockage of drainage systems, and vector breeding within hospital premises.

468. Impacts are expected to be moderate, site-specific, and short-term in nature.

Mitigation Measures

469. Mitigation measures will include:

- Waste will be segregated at source into recyclable, reusable, and non-recyclable categories.
- Waste will be stored in designated, covered containers to prevent littering, odor, and pest attraction.
- Construction debris and excavated material will be reused on-site where feasible (e.g., backfilling or levelling).
- Non-hazardous waste will be disposed of through authorized municipal services, and open dumping or burning will be strictly prohibited.
- Adequate waste collection bins will be provided at work areas and designated staff zones.
- Hazardous waste (e.g., oils, lubricants, chemicals) will be stored separately and disposed of through licensed contractors.
- Good housekeeping practices will be maintained to prevent accumulation of waste and debris within hospital premises.
- Workers will be trained on proper waste handling, segregation, and site responsibilities.
- Waste management practices will be regularly monitored as part of the contractor's EMP.
- Roles and responsibilities for waste management will be clearly defined in the contractor's Code of Conduct and site procedures.

470. A comprehensive plan for construction waste management shall be prepared for construction stage (framework plan attached as **Annex-X**).

5.6.10 Generation of Wastewater

Potential Impact

471. The project will generate small quantities of wastewater from activities such as minor excavation and utility works, limited concrete mixing or patching, equipment cleaning, and domestic use by contractor staff. The estimated quantities are discussed in **section 3.17.**

472. If not properly managed, this wastewater may lead to localized contamination of hospital grounds or drainage systems, formation of stagnant water, odor generation, and increased risk of vector breeding, potentially affecting hygiene within hospital premises.
473. Impacts are expected to be moderate, site-specific, and short-term in nature.

Mitigation Measures

- Existing hospital sanitation facilities will be utilized by workers to avoid the need for temporary sanitation arrangements.
- Construction-related wastewater (e.g., concrete wash, equipment cleaning, oils, and lubricants) will be collected and managed in designated areas and will not be discharged into hospital drains or surrounding areas.
- Designated equipment and vehicle cleaning areas will be established with appropriate containment measures such as sediment traps or oil-water separators.
- Fuels, oils, and chemicals will be stored on impermeable surfaces with secondary containment to prevent leakage and contamination.
- Stormwater will be diverted away from work areas to prevent waterlogging, mixing with wastewater, and potential contamination.
- Non-potable water will be reused where feasible for dust suppression and minor construction activities.
- Good housekeeping practices will be maintained to prevent wastewater accumulation, blockages, or stagnant water within hospital premises.
- Workers will be trained on water conservation, hygiene, and proper wastewater handling practices.
- Drainage systems and wastewater handling practices will be regularly inspected to identify and address leaks, blockages, or contamination risks.
- A site-specific wastewater management approach will be implemented in coordination with hospital administration, and records of wastewater generation and disposal will be maintained.
- All wastewater management practices will comply with applicable environmental regulations and hospital sanitation standards.

5.6.11 Impact on Water Resources

Potential Impact

474. The activities within existing hospital premises such as minor excavation, utility upgrades, and equipment installation may result in limited and localized impacts on water resources across all project sites. Key considerations include:

- Localized runoff from disturbed surfaces, cement works, or equipment cleaning, which may enter internal drainage systems if not properly controlled.
- Risk of minor contamination from accidental spills of fuel, oil, or chemicals, potentially affecting soil or stormwater drains.
- Slight increase in water demand for construction-related activities; however, this remains minimal due to the small workforce and short duration of works.
- Continued reliance on existing hospital water supply and sewerage systems, with wastewater routed through established plumbing to municipal systems and no direct discharge to natural water bodies.

475. Impacts are expected to be low to moderate, site-specific, and short-term in nature.

Mitigation Measures

- Workers will utilize existing hospital sanitation facilities, eliminating the need for temporary arrangements and preventing uncontrolled wastewater discharge.
- Construction-related wastewater (e.g., from concrete works, equipment cleaning, or minor activities) will be collected and managed in designated areas and will not be allowed to mix with hospital sewage or enter storm drains.
- Equipment and vehicles will be cleaned only in designated service areas equipped with appropriate containment measures such as sediment traps and oil-water separators.
- Fuels, oils, and chemicals will be stored on impermeable, bunded surfaces and kept away from drainage lines.
- Spill prevention and response procedures will be implemented, and workers will be trained in spill containment, cleanup, and reporting.
- Runoff from minor excavation or disturbed areas will be controlled using temporary barriers or diversion measures to prevent entry into drainage systems.
- Water use for construction activities will be minimized and monitored, and workers will be encouraged to follow water conservation practices.
- Existing hospital sewerage connections will be maintained, and no direct discharge into natural water bodies or open drains will occur.
- Regular inspections will be carried out to ensure proper functioning of drainage systems and compliance with environmental regulations and hospital sanitation protocols.

5.6.12 Hazardous Waste Management

Potential Impact

476. Generation of hazardous waste is expected to be limited in scale, primarily associated with equipment maintenance, minor rehabilitation activities, and the controlled use of small quantities of chemical products within hospital premises.

477. Key potential impacts include:

- Localized contamination of soil and drainage systems due to accidental spills, leaks, or improper disposal of hazardous substances.
- Deterioration of environmental quality within hospital premises, including risks of odor, staining, or unsafe conditions if hazardous waste is not properly contained.
- Potential health and safety risks to workers and hospital users from exposure to toxic, flammable, or irritant substances, particularly in confined or sensitive areas.
- Blockage or damage to drainage infrastructure if hazardous residues (e.g., cement slurry or chemicals) enter the drainage system.

478. Impacts are expected to be moderate, site-specific, and short-term in nature.

Mitigation Measures

- Fuels, oils, and chemicals will be stored in designated, bunded areas on impermeable surfaces, away from drains and sensitive hospital utilities.
- Cement wash water and chemical residues will be collected in sealed containers and will not be discharged into hospital drainage systems; disposal will be carried out through approved waste management channels.
- Spill prevention and response measures will be implemented, including availability of spill kits and training of personnel in containment, clean-up, and reporting procedures.
- Hazardous materials and wastes will be clearly labelled, segregated, and handled using appropriate PPE.
- Regular inspections will be conducted to identify leaks, damaged containers, or unsafe storage and handling practices.
- Hazardous waste generated in small quantities will be removed from site promptly through licensed contractors for safe treatment and disposal.
- All hazardous waste management practices will comply with applicable provincial environmental standards (NEQS) and hospital safety protocols.

5.6.13 Disturbance to Hospital Services and Shifting of Units

Potential Impact

479. The proposed revamp works within an operational hospital setting may result in temporary disruption to routine healthcare services and necessitate the relocation of certain functional units. This may lead to localized impacts on patient flow, access, and service efficiency. Disruptions may be relatively more pronounced at high-patient-load

and spatially constrained facilities such as Naseerullah Babar Hospital, Maulvi Ji Hospital and DHQ Hospital Charsadda and DHQ Hospital Abbottabad whereas comparatively less congested sites such as DHQ Hospital Karak and DHQ Hospital Haripur may experience relatively lower levels of disruption.

480. Impacts are expected to be high, site-specific, and short-term in nature.

Mitigation Measures

- A comprehensive service continuity plan will be prepared in coordination with hospital administration, identifying relocation strategies for affected units;
- Temporary functional arrangements will be established within available spaces to maintain uninterrupted delivery of critical healthcare services;
- Construction activities will be scheduled to avoid peak operational hours, where feasible;
- Wayfinding signage and information dissemination will be implemented to ensure safe and efficient movement of patients, staff, and visitors;
- Continuous coordination with hospital management will be maintained to ensure uninterrupted operation of emergency and essential services.
- Service continuity Plan is attached as **Annex-XI.**

5.6.14 Disturbance to Utilities

Potential Impact

481. The activities may involve tie-ins, minor excavation, and replacement or upgrading of existing utility connections, which could lead to temporary disruption of essential services including electricity, water supply, sewerage, medical gases, communication systems, and drainage. Such interruptions may affect critical hospital functions such as operation theaters, wards, laboratories, and emergency services if not properly managed.

482. There is also a risk of accidental damage to underground or concealed utilities (e.g., pipelines, cables, or drainage lines), which could result in service outages, safety hazards, or localized flooding/contamination within hospital premises.

483. Impacts are expected to be moderate to high, site-specific, and short-term in nature.

Mitigation Measures

- Hospital administration staff and patients will be informed in advance of any planned utility interruptions, and regular updates will be provided during works to ensure awareness, maintain safety, and minimize disruption to hospital operations.
- Tie-ins, repairs, or service interruptions will be scheduled during off-peak hours or planned maintenance windows to minimize impact on hospital operations.
- All utility works will be performed by qualified and authorized personnel following safety and technical standards.

- Exposed or nearby utility lines will be protected with physical barriers, clear markings, and warning signage during construction activities.
- Backup systems, including generators, water storage, and alternative communication lines, will be maintained to ensure continuity of critical hospital services during planned outages.
- Hospital administration will be immediately notified in case of accidental utility damage to enable rapid restoration.
- All utility works, temporary disruptions, and restoration timelines will be documented for monitoring, reporting, and accountability.

5.6.15 Disposal of Mucking Material

Potential Impact

484. Mucking material will be generated from minor excavation works within existing hospital premises for utility repairs, drainage improvement, foundation adjustments, or small-scale civil rehabilitation.

485. The excavated material will primarily consist of soil, broken concrete, masonry debris, and small quantities of dismantled pipes or pavement. If not properly managed, temporary impacts may include:
- Obstruction of internal hospital access roads or walkways
- Dust generation affecting patients, staff, and visitors
- Visual nuisance within hospital premises
- Potential hygiene concerns if mixed with wastewater or old drainage lines

486. Impacts are expected to be low to moderate, site-specific, and short-term in nature.

Mitigation Measures

- Excavated soil suitable for reuse will be used for backfilling or leveling within hospital premises where feasible.
- Excess or unsuitable material will be promptly removed to approved municipal or licensed disposal sites.
- Temporary stockpiles, if unavoidable, will be placed away from access routes, covered, and regularly watered to control dust and runoff.
- All excavation and waste material will be stored in designated areas within the hospital premises to prevent obstruction and safety hazards.
- Trucks transporting debris will be covered to avoid spillage during transit.
- Records of quantities, storage locations, and disposal will be maintained for monitoring and compliance.
- Hospital staff and administration will be informed of storage locations and disposal schedules to ensure safety and minimal disruption.
- Construction personnel will be trained on safe handling of muck, debris, and minor hazardous materials to prevent contamination or accidents.

5.6.16 Emergency Preparedness and Response

Potential Impact

487. Rehabilitation works under project are small to medium scale but occur within operational hospital facilities. Key potential risks include:

488. **A. Workplace and Fire Emergencies**

- Injuries to workers from excavation, working at heights, electrical works, or equipment handling.
- Fire hazards from welding, electrical short circuits, or improper storage of fuels and chemicals.
- Temporary obstruction of hospital access routes affecting ambulances and emergency response.
- Accidental damage to internal utilities (electricity, water, medical gases).
- Exposure of patients, staff, or visitors to unsafe work zones.

B. Natural and Man-Made Disasters

- Earthquakes, floods, or extreme weather events causing injuries, damage to hospital infrastructure, and disruption of healthcare services.
- Accidental incidents (e.g., chemical spills, structural failures) posing health and safety risks to staff, patients, visitors, and workers.

489. Impacts are expected to be high, site-specific, and short-term in nature.

Mitigation Measures

A. Workplace and Fire Emergencies

- A site-specific Health, Safety, and Emergency Response Plan (ERP) will be developed and implemented.
- Risk assessments and job safety analyses will be conducted prior to commencement of works.
- Adequate PPE will be provided and its use will be strictly enforced.
- Workers will be trained on emergency procedures, fire safety, and evacuation protocols.
- Flammable materials will be stored securely in ventilated areas away from patient care zones.
- Fire extinguishers, first aid kits, and clear ambulance and emergency access will be maintained at all times.
- Active work zones will be barricaded and clearly signposted to prevent unauthorized access.
- Utility mapping will be completed prior to excavation to avoid accidental damage.
- Coordination with hospital administration will be maintained for planned outages and emergency drills.

- Backup power and water systems will be utilized to ensure continuity of hospital services.
- Work schedules will be adjusted during extreme weather conditions to ensure safety.
- All incidents, near-misses, and corrective actions will be documented and reported.

B. Natural and Man-Made Disasters

- The Emergency Response Plan (ERP) will be aligned with local emergency services, fire, and medical authorities to ensure rapid response.
- Periodic simulation drills will be conducted for hospital staff, patients, and contractors to prepare for evacuation and emergency situations.
- Key emergency contact numbers and procedures will be prominently displayed throughout hospital premises and construction zones.
- Hospital staff, contractors, and workers will be trained on disaster response and emergency procedures.
- Incident reporting procedures will be implemented for near-misses and hazards, with prompt corrective actions taken.

490. This comprehensive approach ensures the safety of patients, staff, visitors, and workers, while maintaining uninterrupted healthcare services during hospital rehabilitation works. Detailed ERP procedures are provided in **Annex-XII.**

5.6.17 Flora and Fauna

491. No significant impacts on flora or fauna are anticipated, as the project is limited to existing hospital premises. Any minor or unexpected vegetation removal will be compensated through the proposed plantation and landscaping, including native trees and shrubs, to enhance the site's green cover and overall environment.

492. Care will be taken to avoid disturbance to any urban-adapted fauna present on site.

5.6.18 Discovery of Heritage Sites/ Structures during Excavation

Potential Impact

493. Given that the project site is an already developed hospital facility, the likelihood of encountering archaeological resources is very low. However, in the unlikely event of any chance archaeological discovery during limited excavation works, construction activities will be temporarily halted and relevant authorities will be informed in accordance with applicable regulations.

Mitigation Measures

- The Chance-Find Procedure (**Annex-XIII**) will be followed in case of any discovery of artifacts or culturally sensitive remains.
- Work in the immediate area will be halted, and the site will be secured.
- The contractor will notify the SC, who will coordinate with the relevant archaeology authority for assessment.

- Works will resume only after clearance from the concerned authority.
- Workers will be briefed to identify and report any potential heritage finds.

494. These measures will ensure appropriate handling of rare discoveries with minimal disruption to hospital operations.

5.6.19 Social/ Cultural Conflicts

Potential Impact

495. A limited number of skilled and unskilled workers (approximately 25 per site) will be engaged for the project, with the majority sourced locally or from existing contractor personnel, thereby minimizing labor influx. However, the temporary presence of workers within operational hospital premises may lead to minor social and institutional risks.

496. These include potential disruption due to differences in behavior or cultural practices, minor community safety concerns related to worker movement, and public health risks such as transmission of communicable diseases if hygiene and infection prevention measures are not maintained.

497. Impacts are expected to be low to moderate, site-specific, and short-term in nature.

Mitigation Measures

- Prioritize recruitment of local workers and existing contractor staff to minimize labor influx and reduce potential social tensions.
- Provide induction and training for all workers on local customs, hospital rules, hygiene, infection prevention, and respectful behavior.
- Limit worker movement to designated work areas and restrict entry into sensitive hospital zones to prevent disruption to staff, patients, and visitors.
- Plan and phase construction activities to minimize prolonged presence of workers in high-traffic or sensitive hospital areas.
- Implement hygiene measures, use of hospital sanitation facilities, and regular health screening to reduce risks of communicable disease transmission.
- Maintain accessible channels for hospital staff and visitors to report issues or concerns related to worker behavior or social conflicts.
- Conduct regular oversight to ensure compliance with behavioral standards, site rules, and health protocols, with corrective actions applied as needed.

5.6.20 GBV, Child Labour and Forced Labour

Potential Impact

498. Although labor influx is limited, there remains a risk of inappropriate worker conduct, including harassment or gender-based violence (GBV), which may affect hospital staff, patients, or visitors, particularly women and vulnerable groups. There is also a likelihood of child labor engagement, forced labour or other non-compliance with labor regulations, which could result in reputational and legal implications.

499. Impacts are expected to be moderate to high, site-specific, and short-term in nature.

Mitigation Measures

- Contractors will comply with national labor laws, including prohibition of child labor (<15 years) and restrictions on hazardous work for adolescents, and all bidding documents will reflect these requirements.
- Workers will sign an individual Code of Conduct (CoC) prior to deployment, and contractors will enforce CoCs addressing gender-based violence (GBV), sexual exploitation and abuse (SEA), and sexual harassment (SH).
- Mandatory induction and periodic training will be provided on professional behavior, gender sensitivity, GBV prevention, and consequences of violations.
- Access to sensitive hospital areas will be controlled to prevent unauthorized entry by workers.
- A confidential GRM will be established, including female-friendly reporting channels within hospital settings, for staff, patients, and community members.
- Contractors will prioritize hiring local adult labor to minimize labor influx risks.
- Non-compliance with CoC or labor provisions will result in penalties, suspension, or contract termination.
- Regular supervision and monitoring will be conducted to ensure adherence to CoCs and corrective actions applied as needed.

5.7 ANTICIPATED IMPACTS DURING OPERATIONAL PHASE

500. During the operational phase of the KPHSSP hospital revamp, improvements in management, and service delivery are expected. However, certain environmental and social impacts may arise during operation. The anticipated negative impacts and their corresponding mitigation measures are presented in the following sections to ensure regulatory compliance and effective environmental management.

5.7.1 Water Supply & Usage

Potential Impact

501. Hospital operations require substantial water for patient care, sanitation, HVAC systems, cleaning, and other daily activities. Overuse or inefficient water management can strain local water resources, reduce availability for surrounding communities, and increase operational costs. Improper storage or handling may also risk contamination of potable water supplies. Impacts are expected to be moderate, site-specific, and long-term in nature.

Mitigation Measures:

- Water-efficient fixtures, taps, and appliances will be installed.
- Regular maintenance of plumbing systems will be conducted to prevent leaks and wastage.
- Potable and non-potable water systems will be kept separate and secure to prevent contamination.
- Periodic monitoring of water consumption, supply pressures, and water quality will be carried out to ensure adequacy and early detection of contamination.

- Awareness measures, including signage and staff orientation, will be implemented to promote water conservation among hospital staff and visitors.

5.7.2 Wastewater and Sewage

Potential Impact

502. Hospitals operations will generate municipal and biomedical effluent that, if improperly treated or discharged, may contaminate soil, groundwater, or receiving water bodies. Chemical, biological, and pharmaceutical constituents in effluents may harm aquatic ecosystems and public health. Impacts are expected to be high, site-specific, and long-term in nature.

Mitigation Measures:

- On-site pretreatment systems for medical and laboratory wastewater will be installed and operated prior to discharge.
- Wastewater streams will be segregated at source into domestic (sanitary) and medical/laboratory effluents. Domestic sewage will be discharged into municipal sewers, while medical and laboratory effluents will be pretreated prior to safe disposal.
- Wastewater quality will be regularly monitored to ensure compliance with NEQS and IFC standards.
- Staff will be trained on proper handling, segregation, and disposal of wastewater to maintain hygiene and safety.
- Plumbing and treatment systems will be periodically maintained to prevent leaks, blockages, and contamination.

5.7.3 Solid Waste Generation

Potential Impact

503. Hospital operations generate various categories of solid waste, including infectious and pathological waste, sharps, pharmaceutical waste, chemical waste, general domestic refuse, and packaging materials. Inadequate segregation, handling, storage, or disposal may result in environmental contamination, occupational health risks, vector breeding, and potential public health impacts on surrounding communities. Impacts are expected to be high, site-specific, and long-term in nature.

Mitigation Measures:

- Waste will be segregated at source into infectious, hazardous, and general waste streams in accordance with Hospital Waste Management Rules, 2005.
- Color-coded, labeled, and covered containers will be provided for safe temporary storage in designated areas.
- Waste will be collected regularly and disposed of through licensed medical and municipal waste contractors, with separate handling for hazardous and general waste.
- Hospital staff will be trained periodically on proper waste segregation, handling, and emergency response procedures.

- A Hospital Waste Management Plan will be implemented and maintained in line with Hospital Waste Management Rules, 2005 and WHO guidelines, including record-keeping and monitoring.
- Existing deficiencies in healthcare waste management will be addressed through implementation of the CAP (Section 9.13)

5.7.4 Energy Consumption and Air Quality

Potential Impact

504. Hospital operations including lighting, HVAC systems, diagnostic and life-support equipment create high electricity demand. Power outages or unreliable supply can disrupt critical services, especially in ICUs, operating theaters, and laboratories. Backup generators may be needed during outages, which can emit pollutants affecting indoor and outdoor air quality. Energy use also contributes to the hospital's overall environmental footprint. Impacts are expected to be moderate to high, site-specific, and long-term in nature.

Mitigation Measures:

- Energy-efficient lighting, HVAC systems, and medical equipment will be implemented to optimize electricity consumption.
- Backup generators will be installed in properly ventilated enclosures with automatic switchover, and will be regularly maintained to ensure operational readiness.
- Solar photovoltaic panels and other renewable energy sources will be integrated, where feasible, to support critical units and reduce reliance on fossil fuels.
- Energy consumption will be monitored, and HVAC and lighting operations will be optimized to minimize energy use.
- Air quality near generator exhausts and ventilation intakes will be periodically monitored to ensure compliance with environmental and occupational standards.
- Records of generator operation, maintenance, and emissions will be maintained as part of the EMP.

5.7.5 Noise Pollution

Potential Impact

505. Hospital operations may generate noise from medical equipment, backup generators, ambulance movements, and general operational activities. Elevated noise levels may adversely affect patient recovery, staff performance, and nearby residential receptors if not properly managed. Impacts are expected to be moderate, site-specific, and long-term in nature.

Mitigation Measures:

- Regular maintenance and proper operation of medical equipment and generators will be ensured to minimize noise emissions.

- Soundproofing materials and acoustic enclosures will be installed in sensitive areas such as ICUs, operating theaters, and generator rooms.
- Generators will be located in designated areas with appropriate noise attenuation measures.
- Non-essential high-noise activities will be scheduled during daytime hours where feasible.
- Hospital staff will be trained and encouraged to implement noise minimization practices throughout the premises.

5.7.6 Traffic and Accessibility

Potential Impact

506. Increased movement of patients, visitors, ambulances, and service vehicles may result in traffic congestion near hospital entrances, delays in emergency response, and elevated road safety risks for pedestrians and motorists. Impacts are expected to be moderate to high, site-specific, and long-term in nature.

Mitigation Measures:

- Clearly designated entry and exit points will be established, with organized parking to streamline vehicle movement.
- Coordination with local traffic authorities will ensure smooth traffic flow and unobstructed emergency access.
- Adequate signage, road markings, and designated pedestrian pathways will be provided to enhance safety.
- Separate routes and loading areas will be maintained for service and supply vehicles to prevent interference with patient and visitor traffic.
- Clear access corridors for ambulances and emergency vehicles will be maintained at all times.

5.7.7 Patient and Staff Safety

Potential Impact

507. Hospital operations present occupational and public safety risks, including exposure to infectious and biohazardous materials; electrical hazards; fire risks; slips, trips, and falls; and equipment-related accidents. Vulnerable groups such as children, elderly patients, pregnant women, and individuals with limited mobility may be particularly susceptible to injury. Impacts are expected to be moderate to high, site-specific, and long-term in nature.

Mitigation Measures:

- Conduct regular safety inspections, risk assessments, and hazard audits across all hospital facilities.
- Install and maintain clear safety signage, handrails, non-slip flooring, adequate lighting, and emergency illumination systems.
- Implement fire safety systems, including alarms, extinguishers, and evacuation procedures, and test them periodically.

- Provide ongoing training to staff on occupational health and safety (OHS), infection prevention and control (IPC), and emergency response protocols.
- Ensure PPE is available and correctly used by staff handling biohazardous or hazardous materials.
- Maintain robust incident reporting and corrective action procedures.

- Existing gaps in fire safety preparedness will be addressed through CAP actions related to emergency response planning, training, and periodic drills.

5.7.8 Infection Control and Public Health

Potential Impact

508. Hospital environments are inherently susceptible to communicable disease transmission. Inadequate hygiene practices, overcrowding, poor ventilation, or improper handling of infectious materials may increase the risk of healthcare-associated infections among patients, staff, and visitors. Impacts are expected to be high, site-specific, and long-term in nature.

Mitigation Measures:

- Comprehensive Infection Prevention and Control (IPC) protocols will be implemented and enforced in accordance with WHO and national health guidelines.
- Routine cleaning, disinfection, and sterilization of medical instruments, high-touch surfaces, and patient care areas will be carried out.
- Ventilation systems, including upgraded HVAC units, will be maintained fully functional, particularly in wards, operating theaters, ICUs, and isolation rooms.
- Dedicated isolation facilities for infectious patients will be provided to prevent cross-contamination.
- Regular staff training on IPC practices, hand hygiene, and proper use of PPE will be conducted, with continuous compliance monitoring.
- Public health awareness among patients and visitors will be promoted through clear signage and informational materials.

5.7.9 Environmental and Community Impacts

Potential Impact

509. Improper operational practices, such as uncontrolled waste disposal, excessive energy or water use, and traffic congestion, can indirectly affect the surrounding community's environment and quality of life.

510. Hospital operation may attract informal services (food vendors, parking attendants), which could increase local congestion, littering, or minor social conflicts. Impacts are expected to be moderate, site-specific, and long-term in nature.

Mitigation Measures:

- Continuous monitoring of water, waste, air, and noise parameters will be carried out.

- Community engagement and a GRM will be maintained for timely resolution of complaints.
- Sustainable hospital management practices will be adopted to minimize negative impacts.
- Informal vendor activities around the hospital will be regulated and monitored.
- Designated service areas for vendors will be provided.
- Local communities will be engaged in awareness programs about hospital operation norms.

5.7.10 Noise and Odor from pretreatment of Medical Waste

Potential Impact

511. Operation of on-site medical waste management activities, including autoclaving, laundry, and sterilization units, may generate localized noise and occasional odors. If not adequately controlled, these may affect hospital staff, patients, and nearby sensitive receptors. Impacts are expected to be low to moderate, site-specific, and long-term in nature.

Mitigation Measures:

- Enclosed and properly ventilated treatment and sterilization units will be installed to minimize noise and odor emissions.
- Adequate spatial separation shall be maintained between noise-generating facilities and sensitive areas such as wards and ICUs will be appropriately sited away from patient wards, where feasible.
- Regular inspection and preventive maintenance of equipment will be conducted to reduce operational noise and fugitive emissions.
- Non-essential high-noise activities will be scheduled during daytime hours, where practicable.
- Operational performance will be monitored to ensure compliance with applicable environmental standards and hospital waste management procedures.

5.7.11 Staff and Visitor Traffic Management

Potential Impact

512. Congestion at parking areas, ambulance bays, and main entrances can lead to delays, stress, and increased risk of accidents, especially during emergencies. Impacts are expected to be moderate to high, site-specific, and long-term in nature.

Mitigation Measures:

- Clear drop-off and pick-up zones will be defined.
- Signage will be provided, and traffic management personnel will be deployed to regulate flow.
- Separate access routes for emergency vehicles, staff, and visitors will be established to reduce conflicts.

5.7.12 Emergency Preparedness and Disaster Management

A. Natural Disasters

Potential Impact

513. Natural disasters such as earthquakes or floods may cause structural damage, injuries, and operational disruptions. Impacts are expected to be high, site-specific, and long-term in nature.

Mitigation Measures:

- Compliance with the Seismic Building Code of Pakistan (SBC-2021) will be ensured.
- An Emergency Response Plan (ERP) will be implemented, with staff training and periodic drills conducted.
- Emergency equipment and contact numbers will be clearly displayed.
- Minor incidents and near-misses will be logged to inform preventive measures.

B. Fire Safety

Potential Impact

514. Fires due to electrical faults, flammable chemicals, or oxygen cylinders may threaten patients, staff, and nearby communities. Impacts are expected to be high, site-specific, and long-term in nature.

Mitigation Measures:

- Comprehensive fire detection and suppression systems will be installed and maintained.
- Fire drills and emergency evacuation plans for staff and patients will be conducted regularly.
- Flammable materials will be stored and handled safely.
- Clear signage for fire exits and emergency routes will be provided.

5.7.13 Climate Change Impacts

515. The hospitals are located in districts exposed to varying climate change and disaster-related hazards. The hospitals in Peshawar are primarily vulnerable to extreme heat, intense rainfall, urban flooding, and poor air quality; DHQ Charsadda to riverine and localized flooding; DHQ Karak to heatwaves, water scarcity, and dust storms; DHQ Haripur to intense rainfall, localized flooding, and windstorms; and DHQ Abbottabad (Women and Children Block) to heavy rainfall, landslides, and seismic hazards. These hazards may disrupt hospital access, damage buildings and critical infrastructure, interrupt essential utilities such as electricity, water supply, sanitation, drainage, and communications, and affect the reliability of medical equipment. They may also restrict staff and patient access, disrupt the supply of medicines and medical consumables, increase the risk of healthcare-associated infections and disease outbreaks, and

compromise the continuity of essential healthcare services, particularly emergency and critical care. Impacts are expected to be moderate to high, site-specific, and long-term in nature.

Mitigation Measures:

516. The proposed design incorporates climate-resilient and disaster risk reduction measures, including upgraded drainage and sewerage systems, energy-efficient HVAC and lighting, rooftop solar photovoltaic systems, improved water supply and filtration facilities, and strengthened emergency infrastructure, thereby enhancing the resilience and operational continuity of the participating hospitals under changing climatic conditions.

6 ANALYSIS OF THE ALTERNATIVES

517. This section presents an analysis of project alternatives considered during planning and design of the KPHSSP, including the 'no-project' option. The comparison covers environmental and social considerations to identify the most environmentally feasible and socially acceptable option. The analysis ensures that the selected alternative minimizes adverse impacts while maximizing project benefits in terms of improved healthcare delivery and infrastructure.

518. The alternatives considered during the study are as follows:'

- No Project Option;
- Revamp of Existing Healthcare Infrastructure (Parallel multi sites vs. Phased Implementation); and
- Energy Alternative (Grid vs. Solar Integration)

6.1 NO PROJECT OPTION (NPO)

519. Under the "no project" scenario, the proposed interventions under KPHSSP, including revamping and upgrading of healthcare facilities, would not be implemented. Consequently, the existing conditions of public health facilities across Khyber Pakhtunkhwa would persist and are likely to deteriorate further over time. The healthcare system currently faces several infrastructural and environmental challenges, including:

- Aging and poorly maintained hospital buildings with inadequate ventilation, space constraints, and structural deficiencies.
- Inefficient water supply and lack of proper wastewater management systems, leading to sanitation issues.
- Inadequate healthcare waste management practices, posing risks to public health and the environment.
- Overcrowded facilities and limited service capacity affecting quality of care.
- Poor indoor air quality and outdated ventilation systems increasing infection risks.
- High energy consumption due to inefficient electrical systems and reliance on conventional energy sources.
- Lack of climate-resilient infrastructure, making facilities vulnerable to extreme weather events.

520. While this option avoids short-term construction-related impacts such as dust, noise, and temporary disruptions, it fails to address critical deficiencies. Environmental conditions and healthcare service delivery are expected to worsen over time, making the "no project" option unappealing.

6.2 WITH PROJECT OPTION

521. Implementation of KPHSSP through revamping of existing healthcare facilities will result in short term environmental and social impacts however will significantly improve environmental and social conditions of the health facilities.

- Temporary impacts such as dust, noise, and emissions during construction will occur but can be effectively mitigated.
- Improved water supply, sanitation, and wastewater systems will enhance hygiene conditions.
- Proper healthcare waste management systems will reduce environmental contamination and health risks.
- Upgraded ventilation and facility design will improve indoor air quality and infection control.
- Energy-efficient systems will reduce energy consumption and operational costs.
- Improved infrastructure will enhance patient care, accessibility, and service delivery.
- Climate-resilient features will strengthen the ability of facilities to withstand extreme weather conditions.

522. Hence, despite short-term impacts, the project will lead to long-term environmental sustainability and improved healthcare outcomes.

6.2.1 Alternative I- Full Implementation (Simultaneous Construction at 30 Sites)

523. Alternative revamp and construction activities will be carried out simultaneously across all 30 healthcare facilities under KPHSSP.

- Construction-related impacts such as dust, noise, waste generation, and emissions will occur simultaneously at multiple locations, increasing cumulative environmental pressure.
- Resource consumption (materials, water and energy) will be high and concentrated over a shorter duration.
- However, simultaneous construction may lead to significant disruption in healthcare services, affecting patient care and hospital operations across KP.
- Environmental management and monitoring may become challenging due to the scale and concurrency of activities. While this option provides fast-track improvements across KP, it involves higher environmental intensity and operational risks.

524. While this option provides fast-track improvements across KP, it involves higher operational risks.

6.2.2 Alternative II- Phased Implementation Option

525. Under the phased implementation scenario, revamping works will be executed in stages across the 30 healthcare facilities.

- Construction impacts such as dust, noise, and emissions will be localized and spread over time, making them easier to manage.
- Resource utilization will be distributed, reducing peak environmental stress.

- Environmental improvements such as better sanitation, waste management, and air quality will be achieved progressively.
- Healthcare services will remain operational with minimal disruption, as only selected facilities or sections are upgraded at a time.
- Lessons learned in earlier phases can be applied to improve environmental performance in later stages.
- Overall system resilience and environmental benefits will increase gradually.

526. This option provides a balanced approach, reducing environmental and operational risks while ensuring steady improvements.

6.3 ENERGY ALTERNATIVES

6.3.1 Alternative I-Conventional Grid-Based System backed up by Generators

527. The conventional approach relies primarily on grid electricity, supported by diesel generators during outages. While widely used, this system has several limitations:

- Continued reliance on grid electricity and diesel generators, which are subject to supply interruptions.
- Higher greenhouse gas emissions and air pollutants, contributing to environmental degradation.
- Increased noise generated from generators
- Increased operational costs due to energy inefficiency and fuel consumption.
- Vulnerability to power outages, which can disrupt critical healthcare services.

528. Overall, this option provides a familiar energy supply but is less sustainable and less reliable, especially for critical hospital operations.

6.3.2 Alternative II- Solar Energy Integration (Preferred Option)

529. Integrating solar energy with the existing grid enhances both environmental sustainability and energy resilience of healthcare facilities. Key benefits include:

- Installation of rooftop solar photovoltaic (PV) systems integrated with grid supply, allowing hospitals to generate clean energy onsite.
- Reduction in greenhouse gas emissions and dependence on fossil fuels, improving environmental performance.
- Improved energy efficiency and long-term cost savings, as solar power reduces fuel and electricity expenses.
- Enhanced reliability of power supply, particularly for critical hospital operations during outages.
- Minimal environmental impact after installation, as solar systems operate silently and without emissions.

530. By combining solar energy with the grid, hospitals can maintain uninterrupted operations while significantly reducing their carbon footprint and operational costs.

Table 6.1: Comparison of Alternatives

Aspect	No Project	Option 1		Option 2	
		Full Implementation (30 Sites Simultaneously)	**Phased Implementation**	**Conventional Grid + Generators**	**Solar Energy Integration**
Air & Noise	Continued deterioration	High, cumulative impacts at all sites	Localized, manageable impacts	High localized impacts	Slightly lower due to reduced generator runtime
Water & Sanitation	Poor conditions persist	Rapid improvement across all sites	Gradual improvement	No direct change	No direct change
Healthcare Waste	Unsafe practices continue	Immediate system-wide improvement	Progressive improvement	Not affected directly	Not affected directly
Energy Use & Emissions	High and inefficient	High initial demand	Gradual efficiency improvement	High demand; reliance on fossil fuels	Lower emissions; renewable contribution reduces fossil fuel use
Resource Consumption	No change but current use is inefficient	High, concentrated demand	Distributed demand	High fuel and electricity use	Reduced fossil fuel use; improved efficiency
Public Health	Poor outcomes persist	Rapid improvement	Gradual improvement	Not affected directly	Not affected directly
Operational Impact	No disruption but compromised service	Simultaneous disruption across all facilities	Minimal disruption	Vulnerable to outages	Improved reliability for critical loads
Environmental Management	Not applicable	Difficult due to scale	Easier and more effective	Challenging due to generator use	Slightly easier with reduced emissions
Cost & Feasibility	No cost, worsening conditions	High upfront cost	Distributed, manageable cost	Lower initial cost but higher operational cost	Higher upfront cost but long-term savings
Overall Outcome	Deterioration	Fast but disruptive	Balanced and sustainable	Energy supply less sustainable	Energy supply reliable and environmentally sustainable

6.3.3 Selected Option: Phased Implementation

531. The phased implementation approach combined with solar energy integration has been selected as the most feasible and sustainable option for KPHSSP.

532. While simultaneous implementation across all 30 sites offers rapid benefits, it poses significant environmental management challenges, high resource demand, and disruption to healthcare services. The no project option is not viable due to continued deterioration of infrastructure and environmental conditions.

533. The selected approach ensures that:

- Environmental impacts are minimized and effectively managed
- Healthcare services remain operational during implementation
- Costs are distributed over time, improving financial feasibility
- Energy efficiency and sustainability are enhanced through solar integration
- Environmental and social benefits are progressively realized
- Implementation is adaptive and responsive to lessons learned

534. Thus, this approach represents a balanced, practical, and environmentally sustainable solution, aligned with the objectives of KPHSSP.

7 INFORMATION DISCLOSURE, CONSULTATION AND PARTICIPATION

7.1 CONSULTATION, PARTICIPATION AND INFORMATION DISCLOSURE STRATEGY (CPID)

535. Consultations, participation, and information disclosure (CPID) are an integral part of project plannings and implementation strategy for the hospital revamp project. CPID is an ongoing process that: (i) begins at the project preparation stage and continues throughout the project cycle; (ii) ensures timely disclosure of relevant and adequate information in a manner that is easily accessible and understandable to all stakeholders, including hospital staff, patients, attendants, workers, and nearby communities; (iii) enables the documentation and addressing of stakeholder concerns; (iv) is conducted in an inclusive, transparent, and gender-responsive manner, free of intimidation or coercion, and tailored to the needs of vulnerable groups; and (v) facilitates the incorporation of stakeholder feedback into decision-making, including construction planning, mitigation of disruptions, health and safety measures, and overall project implementation. Consultations are carried out in a manner appropriate to the hospital environment and the nature of project activities.

536. As part of CPID, meaningful consultations were carried out with hospital administration, healthcare staff, patients and attendants, workers, and other key stakeholders during preliminary assessments and project planning. Project-specific stakeholders were identified through initial social and environmental assessments, stakeholder consultations, and interactions conducted through meetings, focused discussions, and key informant interviews to capture their views, concerns, and recommendations. These consultations focused on minimizing disruption to hospital services, ensuring patient and worker safety, and improving overall implementation arrangements. The feedback and recommended actions have been incorporated into the project design and implementation planning.

7.2 STAKEHOLDER CONSULTATIONS DURING PROJECT PROCESSING PHASE

537. The main project stakeholders identified include hospital administration, healthcare staff (doctors, nurses, and support staff), patients and their attendants, project workers, and nearby communities. Other stakeholders include visitors, and relevant government departments involved in health services and project oversight. These stakeholders have varying levels of interest and involvement in the project, particularly in relation to continuity of healthcare services, safety, access, and overall facility operations during the rehabilitation works. The consultant engaged with these stakeholders to understand their views, concerns, and suggestions regarding project implementation and incorporated their feedback into planning and execution arrangements.

7.3 APPROACH FOR THE CONSULTATION AND INFORMATION DISSEMINATED

538. Public information dissemination and consultations were carried out during the project preparation stage through meetings, focused discussions, key informant interviews, and individual consultations. The consultation process was aimed at engaging all relevant stakeholders and ensuring that hospital administration, medical staff, patients and attendants, workers, and nearby communities were informed in advance, consulted, and given the opportunity to participate during project planning and implementation. This process helped explain the project objectives and scope, address concerns related to service continuity, access, safety, and construction-related disturbances, and reduce uncertainties among stakeholders. The following approaches were used to carry out the consultation process:

- Consultative meetings with hospital administration and relevant stakeholders
- Discussions with hospital staff.
- Focus group discussions with patients, attendants, and workers
- Key informant interviews with hospital management and project personnel

539. The public consultation and information disclosure sessions were carried out to inform hospital stakeholders including administration, staff, patients, attendants, workers, and nearby communities about the project objectives, planned construction/rehabilitation activities, potential impacts, health and safety measures, service disruptions, and available grievance redress mechanisms, and to record their concerns and views. The following issues were discussed and disclosed during the consultation meetings:

- Introduction of the hospital revamp project, its components, activities, and expected outcomes
- Schedule and sequencing of construction and renovation works
- Potential impacts on hospital operations, patients, staff, and visitors
- Measures to ensure continuity of healthcare services during construction
- Occupational health, safety, and environmental management provisions
- Access and mobility arrangements for patients, staff, and visitors
- Communication and coordination mechanisms during project implementation
- Grievance redress procedures and contact points for raising concerns
- Feedback and suggestions from stakeholders regarding mitigation of disruptions and improvement of project implementation

7.4 DEPARTMENTAL CONSULTATIONS

540. The consultation were held at departmental level, the details of officials contacted are given in **Table 7.1** below:

Table 7.1: List of Government Officials Consulted

Sr. No.	Date	Name of Department/ Office	Name of Person	Designation
Department Consultations				
1.	16-02-26	Environmental Protection Agency Khyber Pakhtunkhwa	Ramzan Ali	Inspector Headquarter
			Muhammad Fawad Ghauri	Monitoring Inspector

Sr. No.	Date	Name of Department/ Office	Name of Person	Designation
			Bilawal Bilal	Monitoring Inspector
2.	16-02-26	Culture, Tourism, Archaeology & Museums Department Khyber Pakhtunkhwa	Syed Shoaib Gillani	Chief Planning Officer
3.	16-02-26	Khyber Pakhtunkhwa Wildlife Department	Akhal Ali Sehad Badsha	Super Intended Wildlife
			Mohsin Farooq	Chief Conservator Wildlife
			Nafees Zafar	Assistant Technical
4.	16-02-26	Khyber Pakhtunkhwa Forest Department	Ahmad Jalil	Chief Conservator of Forest
5.	16-02-26	Khyber Pakhtunkhwa Fisheries Department	Fawad Khalil	Director Headquarter
			Zubair Ali	Senior Director
			Muhammad Ilias	Director
6.	17-02-26	Water and Sanitation Services Peshawar	Muhammad Ijaz	Manager Water Supply and Waste Water Management
			Zameer ul Hussan	GM Planning
7.	18-02-26	Local Government, Elections and Rural Government Department	Siraj Muneer	Senior Chief Planning Officer
8.	18-02-26	Irrigation Department Khyber Pakhtunkhwa	Mustajab Khan	Sub divisional Officer of Peshawar
			Shireen Khan	Executive Engineer
9.	19-02-26	Khyber Pakhtunkhwa Health Care Commission	Dr. Shafaq Haider	Director Registration

7.4.1 Consultations with Departments

541. Meetings and consultations were held with officials of relevant government departments, hospital management authorities, and other key institutions. The following points were discussed to provide information about the hospital revamp project:

- Location and scope of the hospital project
- Objectives and expected outcomes of the revamp
- Potential impacts on hospital operations, patient care, and staff work and access
- Measures to ensure continuity of healthcare services during construction
- Roles and responsibilities of different departments, hospital units, and external service providers
- Existing services provided at the hospital and surrounding areas, and any anticipated disruptions
- Coordination mechanisms for smooth project implementation

542. During the meetings, the officials expressed their full cooperation for the hospital revamp project and provided valuable feedback to support effective planning and implementation.

7.4.2 Views & Suggestions of the Officials of Departments

543. The responses of the participants during departmental consultations on the hospital revamp project were recorded. Overall, the officials from relevant government departments expressed that the project is expected to have a positive impact on hospital operations, patient care, and service delivery. They also provided suggestions to improve coordination between departments, ensure continuity of essential services during construction, and address safety, access, and operational issues. The key feedback and recommendations from these departmental consultations are summarized in **Table 7.2**

Table 7.2: Detail of Issues/Points Raised/Discussed during Departmental Consultations

Sr. No.	Department/ Organization	Stakeholder Views/Concerns
1.	Environmental Protection Agency Khyber Pakhtunkhwa	• Emphasis was put on implementation of proper waste disposal methods and best management practices shall be adopted during construction. • It was recommended to strengthen hospital infection control and waste management systems by incorporating appropriate treatment facilities for pathological waste, such as dedicated containment/treatment tanks, along with chemical sterilization systems for operation theatres and critical areas to ensure effective disinfection of floors and equipment. • Peshawar Institute of Cardiology was cited as a standard for international hospital qualifications • Audits will be required for hospitals made before 1997, which contain over 100 beds. However, this will be considered a separate case and will follow a separate report structure.
2.	Culture, Tourism, Archaeology & Museums Department Khyber Pakhtunkhwa	• The hospitals have a positive correlation with tourist rates and surrounding hotel occupancy. • Better hospitals will provide better and higher quality services to tourists who fall ill. • No archeological sites are known to be located any of the listed hospital premises.
3.	Khyber Pakhtunkhwa Wildlife Department	• No protected areas or species are currently known to be present on the listed hospital premises.
4.	Khyber Pakhtunkhwa Forest Department	• No protected areas or species are currently known to be present on the listed hospital premises.
5.	Khyber Pakhtunkhwa Fisheries Department	• No protected areas or species are currently known to be present on the listed hospital premises.
6.	Water and Sanitation Services Peshawar	• Concerns were raised over hazardous solid and water waste being mixed in municipal waste without being segregated or pretreated. • It is recommended that water providers sign a MOU with the relevant hospitals. • Hazardous and municipal waste must be segregated before dumping. Lack of separation will result in direct infection of scavengers at the dumping sites. • It is recommended that hospitals install appropriate on-site waste treatment systems, including incineration or alternative

Sr. No.	Department/ Organization	Stakeholder Views/Concerns
		pre-treatment technologies, within the hospital premises to ensure safe and effective management of healthcare waste. • Liquid waste must be catered to with preliminary treatment on the hospital premises before being mixed with municipal liquid waste. • The hospitals are required to sign MOU's with relevant private or government bodies to assist in segregation and hazardous waste disposal. • KPEPA and KP Health Care Commission was cited as suggested bodies to ensure compliance and implementation. • KP Water Authority is also recommended to look into proper disposal of liquid waste however reservations are stated as the relevant body is only existent on paper and has no current office.
7.	Local Government, Elections and Rural Government Department	• Meetings will be held to see if mitigation levels are possible and at what capacity.
8.	Irrigation Department Khyber Pakhtunkhwa	• Concerns were expressed over hazardous solid and water waste being infiltrated into irrigation water without being treated. • Sewage treatment of such waste is not available resulting in a big sanitation issue. • This will affect over 25 million people. • Due to lack of sanitation plants sewage will be dumped from one drain to another. • Installation of septic tanks is emphasised.
9.	Khyber Pakhtunkhwa Health Care Commission	• Follow international indicators and adhere to corridors. • As the facilities are horizontally laid out on the building site, the ICU, CCU and OR should be located near each other, preferably a separate section for each with a maximum of four beds per room. • Double glasses windows should be installed to ensure proper cooling of rooms and to aid in conservation of energy.

Plate 7-1 shows the pictorial view of departmental consultation meetings held in the project area.

Plate 7-1: Photo Log of Department Consultations



Irrigation Department Khyber Pakhtunkhwa



Local Government, Elections and Rural Development Department



Water and Sanitation Services Peshawar



Khyber Pakhtunkhwa Wildlife Department



Environmental Protection Agency Khyber Pakhtunkhwa



Culture, Tourism, Archaeology & Museums Department Khyber Pakhtunkhwa



Khyber Pakhtunkhwa Fisheries Department

7.4.3 Public Consultation and Participation Process

544. For ascertaining the perceptions of different stakeholders about the project (during/ after construction) meetings were held within the project area of influence. These meetings were held in an open atmosphere, in which participants expressed their views freely. Informal group discussions were also held as an additional tool for the assessment of the perceptions of the stakeholders about the project and potential impacts both positive and adverse likely to occur due to its implementation.

7.4.3.1 Methods of Public Consultation

545. The following methods were used for public consultation with project stakeholders in order to ascertain their stakes regarding project implementation. Consultations were conducted at appropriate locations within and around the project hospitals to ensure effective stakeholder participation. The views of the beneficiaries were formally recorded through;

- Formal Group Meetings
- Informal Group Meetings
- Individual meetings

7.4.3.2 Locations of the Public Consultations

546. The detail of the locations with number of participations is provided in the **Table 7.3.**

Table 7.3: Stakeholders Contacted in the Villages/Town

Sr. No.	Village/ Town	Participants
1	Naseerullah Khan Babar Hospital, Peshawar	07
2	Molvi Jee Hospital, Peshawar	13
3	DHQ Hospital, Charsadda	14
4	DHQ Hospital (Women and Children Block), Abbottabad	13
5	DHQ Hospital, Haripur	08
2	DHQ Hospital, Karak	14

7.4.3.3 Categories of Stakeholders Contacted

547. Different categories of stakeholders contacted, during consultation is shown in the **Table 7.4**.

Table 7.4: Stakeholders Contacted in the Project Area

Sr. No.	Stakeholder Category
1	Patients
2	Attendants
3	Nearby Commuters
4	Hospital Staff

7.4.4 Consultations with Hospital Staff, Patients, Attendants and Nearby Commuters

548. Extensive consultations have been conducted with the local present in the project area to take their views and incorporating in the project planning. Six consultative meetings were held with more than 69 participants in the Study Area. The major categories participated in these meetings were hospital staff, patients, attendants, and nearby commuters. The details of the participants with villages are given in **Table 7.5** below:

Table 7.5: Consultation Meetings and Participants

Sr. No.	Date	Venue	Occupation	Name
1	16-02-2026	Naseerullah Khan Babar Hospital, Peshawar	Bio-Medical Engineer	Farooq Azam
			Machine operator	Mahreen Ahmed
			Labour	Nadir Khan
			Businessman	Said Mehmood
			Student	Muhammad Farhan
			Security Officer	Amir Rafiq
			Un employed	Zabit Khan
2	17-02-2024	Molvi Jee Hospital, Peshawar	Ward Boy	Aman Ullah
			Security Officer	Muhammad Ali
			Businessman	Mubashir Shafiq
			Private Job	Saif-ur-Rehman
			Businessman	Mohsin Safir
			Security Guard	Kashif
			Housewife	Shamim
			Housewife	Ayesha
			Businessman	Muhammad Hashim
			Nurse	Laiba
			Nurse	Ulfat
			Nurse	Shagufta Nazir
			Ward Boy	Muhammad Aslam
3	17-02-2026	DHQ Hospital, Charsadda	Medical Student	Ihtesham-ul-Haq
			House Officer	Haris Khan
			House Officer	Sohail Ahmed
			Internee	Muhammad Tayyab
			Admin	Asif Khan
			Student	Muhammad Rahim
			Nurse	Rabia

Sr. No.	Date	Venue	Occupation	Name
			Nurse	Rehana Yasmeen
			Labour	Hayatullah
			Businessman	Abbas-ul-Haq
			Student	Danyal Khan
			House Officer	Lateef-ur-Rehman
			Govt. Job	Muhammad Anas
			Teacher	Tahir Jan
			Lab Incharge	Asif Ali Khan
4	18-02-2026	DHQ Hospital, Karak	Lab Technician	Naqibullah
			Lab Trainee	Mushahid Khalil
			EMR Technologist	Sikandar Nawaz
			EMR Technologist	Hamza Raheem
			Radiologist	Fareela
			Technician	Tahir
			Health officer	Fahim
			Health officer	Zakir
5	22-02-2026	DHQ, Hospital (Women and Children Block), Abbottabad	In charge Class 4	Muhammad Jamil
			Transport Supervisor	Gul Sheraz
			Nurse (LHV)	Sara Zes Qureshi
			Nurse (LHV)	Safina Nasir
			Nurse (LHV)	Saira Shah
			Lab Technician	Muhammad Amjad
			Lab In charge	Abid Hussain
			Chief Technologist	Ajaz Hussain
			Unemployed	Usman Ali
			House officer	Amna Skhawat
			Medical Officer	Nosheen Bibi
			TMO	Azka Babar
			House Officer	Gulfam Shah
6	22-02-2026	DHQ Hospital, Haripur	Businessman	Fiaz
			Tecaher	Ijaz
			Doctor	Abdullah Zaib
			Retired	Sheirdil Khan
			Livestock	Mukhtyar
			Beauty Parlour	Emaan
			Govt. Employee	Hamza Ali
			Doctor	Kashif

7.5 STAKEHOLDERS AND THEIR APPREHENSIONS

549. **Plate 7-2** shows the pictorial view of interviews and consultation meetings held in the project area. **Table 7.6** contains the list of major apprehensions.

Table 7.6: Major Apprehensions and suggestions of the respondents in the Project Area

Sr. No.	Hospital	Apprehensions	Response
1	Naseerullah Khan Babar Hospital, Peshawar	• There will be issues with the patient's relocation and patients management as the of the hospital is less and no further rooms are available. • The main entry gate should primarily be used for emergency purposes. If construction materials need to be brought in, the back gate should be used instead. • A relocation plan should be made by the contractor • Construction in the day time will be very disturbing for the patients.	• A relocation plan will be made by the contractor to cope with any issues with the patients and the project will be done in phases. • Back gate will be used by the contractor to bring the construction supplies in and out of the hospital. • Unused hospital rooms shall be made available during the construction phase for the patients • Construction will be proposed to start after the OPD hours to cope with the over crowdedness and disturbance to the patients.
2	Molvi Jee Hospital	• The renovations of each area should not start at once • There will be issues of noise pollution and disturbance to the patients. • Demolition waste will impact the patients and it will increase indoor air pollution for they patients. • Provision of ambulance is required for the hospital	• The renovations will begin in phase wise construction. • Noise dampeners will be used and it will be proposed to start the low patients timing • Indoor air quality will be monitored and no demolition works will start near the sensitive areas such. • Ambulance and other equipment are not part of the project and will be made available upon request submitted to PD by the MS of the hospital.
3	DHQ Hospital, Charsadda	• Waiting areas are not available in the hospital and no proper sanitation or toilet facilities are available. • There should be proper drinking water facilities in the hospital and should be clean and hygienic • Restrooms for staff are unavailable and should be included in the project. • The water supply of the hospital need to be replaced. While replacing there can be water shortages in the major areas of the hospital that needs to be coped with	• Waiting areas are included in the projects and all the waiting areas will be renovated and developed. • Drinking water facilities and proper water supply shall be ensured during the construction phase. • Water supply during construction will not be affected and if any damage is made the contractor will fix it.
4	DHQ Hospital (Women and Children Block), Abbottabad	• There will be traffic congestion and parking issues in the hospital due to less space • The reception for OPD is in worst condition and need renovations • Epoxy floors are not available in the operation theatres	• Traffic management plan will be prepared by the contractor and proper parking will be done for contractor's vehicles. • The receptions in the hospital will also be renovated and updated • Noise and vibration will be avoided near the sensitive areas of the hospital unless necessary.

Sr. No.	Hospital	Apprehensions	Response
		• Noise and vibration issues may disturb the sensitive patients.	
	DHQ Hospital Haripur	• The distance for traveling of the patients from one ward to another is prolonged and no shed is available. During rain they get wet. • No construction waste should be allowed inside the premises of the hospital. • All the workers should be hired from the local communities • Issues such as air and noise pollution and patients displacement should be avoided and proper management plan should be devised with cooperation of hospital staff.	• Proper roofed walkways will be developed. • Waste management plan will be prepared by the contractor for any type of construction waste. The contractor will coordinate with the local Municipal administration for dumping of the waste material. • Proper mitigation measure will be followed to cope with the issues of air and noise pollution in the hospital. For patients relocation, a management plan will be developed by the contractor.
	DHQ Hospital Karak	• Staffrooms needs to be addressed in this project as well. • Water have become a big issue due to salination and odour and water supply needs to be changed. • There should be proper security measures made during construction phase for the security of staff and patients. • Security should also be increased during the operations phase as well.	• All the renovation will be done in accordance with the scope of work. • Water supply of the whole hospital shall be renovated and renewed • Proper security measures shall be made during construction phase and proper hospital protocols shall be followed.

550. In general, the consulted respondents considered the project beneficial for the health sector, particularly in terms of improved healthcare facilities and hygienic conditions. Indirect benefits identified by respondents include increased local employment opportunities, improved household incomes, and potential poverty reduction. However, awareness of the proposed project among surveyed respondents was generally low. Accordingly, additional information disclosure and stakeholder engagement will be undertaken during project implementation to ensure that affected and interested stakeholders are adequately informed about project activities, implementation schedules, potential impacts, mitigation measures, and the grievance redress mechanism.

551. Concerns raised during consultations regarding healthcare waste management, wastewater disposal, drinking water quality, occupational health and safety, and emergency preparedness have been incorporated into the CAP. Relevant corrective actions have been included to address these issues during project implementation and operation.

Plate 7-2: Photolog for Consultations and Socioeconomic Survey



Naseerullah Khan Babar Memorial Hospital



DHQ Hospital Charsadda



DHQ Hospital Charsadda



DHQ Hospital Karak



DHQ Hospital Charsadda



Molvi Jee Hospital

8 GRIEVANCE REDRESS MECHANISM

8.1 INTRODUCTION

552. The grievance redress mechanism[22] (GRM) will address grievances arising from environmental and social impacts of the project. This section shows the structure, roles, and functions of the GRM, to address the grievances arising due to construction activities and the execution of the project works. The purpose of the GRM is to receive, review and resolve grievances or concerns raised during the execution of the project works from the community.

553. In the first instance, efforts will be made to avoid grievances through strong consultations participation and information disclosure strategy, and the project activities will be conducted in accordance with best international practices and approved EMP. Nevertheless, it may be expected that some problems cannot be resolved through CPID actions and, therefore, an accessible and effective GRM may be required. Thus, the project will put in place its GRM structures from the beginning of its implementation, i.e., as soon as activities for project design and preparation or implementation commence. The GRM will remain intact throughout the project implementation period to address the community concerns and issues arising during the execution of project works.

554. Problems or complaints to be addressed by the GRM during the planning and implementation of the project are expected to primarily arise from contractor activities. These may include: (i) construction-related disturbances such as noise, dust, vibration, and restricted access within or around health facilities; (ii) disruption to hospital operations, patient services, and utilities (water, electricity, waste management); (iii) occupational health and safety concerns affecting workers, patients, and visitors; (iv) community health and safety risks, including improper site management, traffic issues, and unsafe material storage; (v) labor-related grievances such as working conditions, wage delays, or worker misconduct; (vi) inadequate communication or lack of prior notice regarding construction schedules; (vii) improper waste disposal, sanitation, and environmental management practices; and (viii) concerns regarding timely resolution of complaints and responsiveness of the contractor or project management.

555. The GRM will operate in compliance with applicable national laws, including occupational health and safety regulations, environmental protection laws, and hospital policies, as well as ADB, SPS 2009 where relevant. It will ensure that all complaints are properly documented, investigated, and addressed with appropriate remedial actions.

[22] As per SPS 2009, a mechanism to receive and facilitate the resolution of displaced persons' concerns and grievances about physical and economic displacement and other project impacts, paying particular attention to the impacts on vulnerable groups. It addresses displaced persons' concerns and complaints promptly, using an understandable and transparent process that is gender-responsive, culturally appropriate, and readily accessible to displaced persons at no cost and without retribution. The mechanism will not impede access to the country's judicial or administrative remedies. However, the DP (s) are free to go to the Court of Law as and when desired.

8.2 STRUCTURE OF GRIEVANCE REDRESS MECHANISM

556. The formal GRM provided for this project has a three-tiered structure including: (i) Health center level grievance redress set-up at each subproject site; (ii) Project-level GRM at PMIU/C&W in Peshawar; and (iii) Department of Health level GRM at the provincial office. Grievances will initially be recorded and addressed at the health center/subproject site. Complaints that remain unresolved will be escalated to the PMIU/C&W level for review and resolution. Any grievances not resolved at this stage will be referred to the Department of Health (DoH) level for final consideration and resolution. Thus, the GRM will enable resolution of grievances at the local/project level by mobilizing local recourse and providing successive levels of review at the PMIU and Department of Health levels for difficult and complex issues that are not resolved at the preceding tier.

557. To ensure that all geographic reaches and relevant administrative units involved in the project are covered under the GRM, it will set up: (i) a local-level mechanism with grievance redress focal points and Grievance Redress Committee-I (GRC-I) at each affected hospital site; (ii) Grievance Redress Committee-II (GRC-II) at the PMIU/C&W level, as applicable; and (iii) Grievance Redress Committee-III (GRC-III) at the Department of Health level to review and resolve grievances that remain unresolved at the PMIU level. The functions and responsibilities for each level of the GRM are explained below.

8.2.1 Health Center Level GRC-I

558. The Tier I GRC will be established at the health center level and headed by the Medical Superintendent (MS) of the respective hospital. It will serve as the first-level grievance redress body for complaints received directly from the community. The Tier I GRC for the project will be constituted with the following representatives:

- EHS Specialist, SC
- Social and Gender specialist, SC
- Resident Engineer/Assistant Resident Engineer, C&W
- Representative from local community,
- Other relevant staff as required.

559. Meeting at least fortnightly, the health center Level GRC reviews and resolves a wide range of grievances including environmental and social concerns, and other project-related complaints within 07 working days. Any complaints that cannot be resolved at this level will be formally escalated to the Tier II GRM at PMIU/C&W with documented reasons and recommendations. The Site Grievance Focal Points (SGFP) or at Site Grievance Committee (SGC) will be established to receive the complaints.

560. The Tier-I GRC will maintain a Complaint Register to document all grievances, including:

- Complainant's name and contact details
- Date of complaint
- Summary of the issue
- Findings and recommendations

- GRC decision and communication date
- Status of implementation or escalation if unresolved

561. Multiple channels will be made available for aggrieved persons to submit their concerns and grievances which include:

- **In-person submissions** at the field office/contractor's site office, and through meetings.
- **Telephone/helpline** numbers dedicated for receiving complaints.
- **Written complaints** submitted to PMIU staff, social mobilizers, or directly to the SGFP SGC.
- **Email submissions** through official project email addresses.
- **Complaint/suggestion boxes** placed at accessible locations in field or nearby at project site.

8.2.2 PMIU/C&W Level GRC-II

562. If the complainant is not satisfied with the decision of the Tier-I GRC, they may escalate the grievance to the second tier of the GRM, i.e., the PMIU C&W senior management, within Fourteen (14) days of receiving the GRC decision. Complaints submitted at this level, along with the records of the GRC proceedings, will be registered, and the complainant will be acknowledged.

563. The PMIU C&W staff will review the GRC records and may request any additional supporting documents or evidence from the complainant. If needed, the PMIU C&W team may visit the hospital site to meet the complainant, observe the issue, and collect further information to verify the grievance. The Tier-II GRC will be headed by the Project Director, PMIU, as Head/Convener.

564. After completing the review and investigation, the PMIU C&W will finalize recommendations, obtain approval from the appropriate authority and communicate the decision to both the concerned site authority and the complainant within 15 days of receipt of the complaint.

565. The GRC will be headed by the Project Director as convener and includes the following members:

- Environmental Safeguard Specialist, PMIU
- Social & Gender Safeguard Specialist, PMIU
- Hospital administration representative
- C&W representative
- Other relevant staff or department representatives as required

566. This GRC will be formally notified and operationalized to ensure prompt resolution of grievances arising from hospital site works.

- Recording grievances from hospital staff, patients, attendants, and workers; acknowledging receipt; investigating issues; and summoning complainants, if required,

to provide information or evidence. The GRC will aim to resolve complaints within 15 days of receipt.

- Communicating decisions and recommendations to the hospital administration, contractor, and complainants, and following up on implementation.
- Establishing an information dissemination system to keep complainants informed of progress and decisions at both field and PMIU C&W levels.
- Maintaining a Complaint Register accessible to stakeholders, containing brief information about complaints, GRC decisions, and current status.
- Keeping a complete record of all complaints received, including actions taken, to ensure transparency and accountability.

8.2.3 Department of Health Level GRC-III

567. If the complainant is not satisfied with the decision of the Tier-II GRC, the grievance may be escalated to the third tier of the GRM, i.e., the Department of Health (DoH), within fourteen (14) days of receiving the Tier-II decision. Complaints submitted at this level, together with the records of the previous proceedings, will be registered and acknowledged.

568. The Tier-III GRC will comprise a four-member committee established at the Department of Health level. The Department of Health shall nominate all four members of the committee and designate one of the nominated members as its Head/Convener.

569. The DoH Level GRC will review the records of the grievance and may seek additional information or supporting evidence from the complainant, the PMIU, the concerned hospital, or other relevant project authorities, as required.

570. Following review and investigation, the Tier-III GRC will finalize its recommendations and communicate the decision to the complainant and the concerned authorities within fourteen (14) days of receipt of the complaint.

571. The Tier-III GRC will be formally notified and operationalized by the Department of Health to ensure final review and prompt resolution of grievances that remain unresolved at the PMIU level.

- Recording and acknowledging escalated grievances; reviewing the proceedings and decisions of Tier I and Tier II; undertaking additional investigation where required; and summoning the complainant or relevant officials to provide information or evidence.
- Communicating its decisions and recommendations to the PMIU, hospital administration, contractor, relevant authorities, and the complainant, and following up on implementation.
- Maintaining complete records of all grievances received, deliberations held, decisions made, and actions taken to ensure transparency and accountability.

572. At any stage, the complainant retains the right to seek remedies through the court of law if they are not satisfied with the outcome of the GRM. The GRM does not restrict access to legal recourse.

8.3 GENDER BASED VIOLENCE COMMITTEE (GBV)

573. The Gender-Based Violence (GBV) Committee will be established to safeguard the rights and well-being of women, particularly those with overlapping vulnerabilities, during the planning and implementation of the project. Headed by the Project Director and other members, the committee will be addressing GBV issues.

574. The committee will play a central role in promoting gender inclusivity during community consultations and will ensure that all voices are heard. It will conduct awareness sessions, distribute informational materials, and provide gender-sensitivity training to construction staff. In addition, the committee will implement outreach programs to inform women and vulnerable groups about available reporting mechanisms. Through these efforts, the GBV Committee will work to prevent and mitigate gender-based risks while fostering a safe, respectful, and inclusive project environment. the formation of the GBV committee is depicted in **Table 8.1** while Its key functions and responsibilities are outlined below.

Table 8.1: Formation of Gender Based Violence Committee

Project Director	**Head/Convener**
Representative from E&S Staff	Member
Gender Expert, PMIU	Secretary
Representative of SC	Member
Representative of Contractor	Member
Service providers and NGOs working on these issues will be engaged (if required)	

- To ensure that the women of the area, including those with overlapping vulnerabilities, are not negatively affected by the project.
- To ensure easy access for reporting all type of incidents or any related activity having any gender related aspects.
- To establish anonymous reporting mechanisms to ensure the confidentiality requirements of the complainant(s).
- Grievances, GBV component may in context to the restrictions in their movement during construction, impact of the privacy or any other project related or issues in the vicinity.
- To facilitate the aggrieved / complainant (if any) to lodge their complaints and get their concerns resolved through this GBV Committee.
- Conduct awareness sessions and distribute informational materials.
- Ensure community consultations include women to promote inclusivity.
- To aware construction staff on gender sensitivity and GBV prevention.
- Conduct outreach programs to inform women/complainants about reporting mechanisms.

8.4 INFORMATION DISSEMINATION AND COMMUNITY OUTREACH

575. The GRM will establish an information dissemination system to inform hospital staff, patients, attendants, workers, and nearby communities about their rights under applicable national regulations, occupational health and safety standards, and project safeguards. Stakeholders will be made aware of the three-tier GRM, its functioning, the complaint process at the site-level focal points, the project-level GRC at PMIU/C&W,

and the escalation process to the Department of Health Level GRC, along with the contact details of focal members at each level.

576. The site-level focal points will send acknowledgements upon receipt of complaints and inform complainants about planned site visits or meetings to ensure their participation. They will also provide regular updates on the progress of complaint resolution. Besides formal communication, the SGFPs will maintain close liaison with complainants at the hospital site, providing guidance on the GRM and updates on the status of complaints at the site, PMIU/C&W, and Department of Health levels, as applicable.

577. Complainants will be kept informed throughout the grievance resolution process and will be facilitated to attend and participate in proceedings at the site, project, and Department of Health levels. The steps of the hospital GRM are summarized in **Table 8.2**.

Table 8.2: Steps in the Grievance Resolution Process

Sr. No.	Description
1.	Each hospital site will have a Site Grievance Focal Point (SGFP) or a small Site Grievance Committee (SGC) to serve as the first point of contact for all complaints related to construction, service disruptions, occupational health and safety, and environmental concerns. The site focal point will coordinate with hospital administration, project staff, and contractor representatives (Tier-I GRC).
2.	Any complaints received at the site will be recorded and investigated by the SGFP/SGC, with assistance from hospital administration, PMIU technical staff, SC, and contractor representatives' i.e Tier-I GRC. Resolution at the site level will be attempted within 7 days wherever possible.
3.	Complaints not resolved at the site level will be forwarded to the Project-level GRC at PMIU by the complainant or through the site-level Tier-I GRC. The Tier-II GRC will register the complaint, send acknowledgement, and initiate investigation, including site visits if needed. The Tier-II GRC will communicate its decision to the complainant and concerned site authority within 15 days of receipt of the complaint.
4.	Complaints not resolved at the PMIU level, or where the complainant is dissatisfied with the Tier-II decision, may be escalated to the Department of Health Level GRC (Tier-III). The Tier-III GRC, comprising four members nominated by the Department of Health, including a designated Head/Convener, will review the case and communicate its decision to the complainant within 14 days of receipt.
5.	At any stage, complainants retain the right to seek remedies through the court of law if they are not satisfied with the outcome of the GRM. The GRM does not restrict access to legal recourse.

Complaint intake → Hospital / Site (Tier I) → PMIU / C&W (Tier II) → Department of Health (Tier III)

COMPLAINT INTAKE	**In person | Telephone / Helpline | Written complaint | Email | Complaint / Suggestion Box** SGFP / SGC serves as the first point of contact at the hospital site.	**EDITABLE CONTACTS** Helpline: [_____] Email: [_____] Focal person: [_____]
↓ **Proceed to Tier I**		
TIER I **Hospital / Health Center Level GRC-I** HEAD **Medical Superintendent (MS)**	**PROCESS & CONTACT** • SGFP / SGC receives, registers and coordinates investigation of site-level complaints. • Tier-I GRC addresses environmental, social, OHS and other project-related grievances. • Complaint Register captures issue, findings, decision, communication date and implementation / escalation status. • GRC meets at least fortnightly. **Contact / route:** Use the intake channels above. If unresolved, escalate with records, documented reasons and recommendations.	**TIMELINE** **Resolve within 7 working days**
↓ **If unresolved / dissatisfied: escalate within 14 days of the Tier-I decision**		
TIER II **Project Level - PMIU / C&W GRC-II** HEAD / CONVENER **Project Director, PMIU**	**PROCESS & CONTACT** • Registers and acknowledges the escalated complaint together with Tier-I proceedings. • Reviews evidence; may request supporting documents and conduct a hospital site visit where needed. • Finalizes recommendations and communicates the decision to the complainant and concerned site authority. • Maintains records and follows up implementation. **Contact / route:** Escalation may be made by the complainant or through Tier-I GRC. PMIU phone: [_____] Email: [_____].	**TIMELINE** **Decision within 15 days of receipt**
↓ **If unresolved / dissatisfied: escalate within 14 days of the Tier-II decision**		
TIER III **Department of Health Level GRC-III** COMMITTEE **4 DoH-nominated members; one designated Head / Convener**	**PROCESS & CONTACT** • Registers and acknowledges the escalated grievance with the records of previous proceedings. • Reviews Tier-I and Tier-II records; may seek additional information or evidence from relevant parties. • Undertakes additional investigation where required and communicates the Tier-III decision. • Maintains complete records and follows up implementation. **Contact / route:** Submit the escalated grievance and prior records to the notified DoH GRC. DoH phone: [_____] Email: [_____].	**TIMELINE** **Decision within 14 days of receipt**
LEGAL RECOURSE: At any stage, the complainant may seek remedies through the court of law. The GRM does not restrict access to legal recourse.		

Figure 8.1: Three-Tier Grievance Redress Mechanism (GRM)

9 ENVIRONMENTAL MANAGEMENT PLAN

578. The EMP sets out the measures necessary to prevent, mitigate, and manage potential environmental and social impacts associated with the proposed project. It provides a systematic framework for the implementation of mitigation measures, monitoring of key environmental parameters, and ensuring compliance with applicable regulatory and safeguard requirements throughout the construction and operational phases.

579. The EMP further defines institutional roles and responsibilities, identifies capacity-building requirements, and outlines budgetary allocations to facilitate effective implementation, monitoring, and sustainable project performance.

9.1 OBJECTIVES

580. The main objectives of this section are to:

- Identify and assess the project's potential environmental and social impacts and define appropriate mitigation and management measures in accordance with the requirements of ADB, SPS 2009.
- Clearly delineate the roles and responsibilities of the Executing Agency, Implementing Agency, Contractor, SC, and other relevant stakeholders to ensure effective implementation, supervision, and compliance monitoring.
- Integrate environmental and social safeguards into project design, construction, and operational phases to ensure compliance with national regulatory requirements and ADB safeguard provisions.
- Establish a structured monitoring and reporting framework, including measurable indicators, monitoring frequency, documentation requirements, and corrective action mechanisms.
- Promote meaningful stakeholder engagement, information disclosure, and grievance redress in line with ADB's consultation and participation principles.
- Identify institutional capacity needs, training requirements, and budgetary allocations necessary to ensure effective implementation and long-term sustainability of safeguard measures.

9.2 INSTITUTIONAL SETUP FOR IMPLEMENTATION AND MANAGEMENT OF PROJECT

581. The key institutions involved during the construction phase include the Project Management Implementation Unit (PMIU) led by the Project Director (PD), ADB Safeguards team, the SC, and the Contractor(s) in coordination with hospital administration. The implementation of the EMP will be carried out through coordinated efforts among these institutions.

582. The following staff will be involved in the implementation of EMP:
- PD, PMIU;
- Environmental Safeguard Specialist, Gender & Social Safeguard Specialist, PMIU;

- E&S Specialist, SC;
- Environmental & Social Health and Safety (ESHS) specialist, Construction Contractor(s); and
- ADB Safeguards Team.
- Hospital designated Focal Person

583. The PMIU will ensure that the EMP is fully integrated into bidding and contract documents, making compliance a contractual obligation for contractors. Contractors shall be required to prepare and implement a Site Specific EMP (SSEMP) consistent with ADB SPS (2009), national regulatory requirements, and approved safeguard documents prior to commencement of works.
584. No construction activities, including establishment of camps or mobilization of equipment, shall commence without prior approval of the SSEMP and necessary statutory clearances.

585. The organizational structure for EMP implementation for KPHSSP is given in **Figure 9.1.**

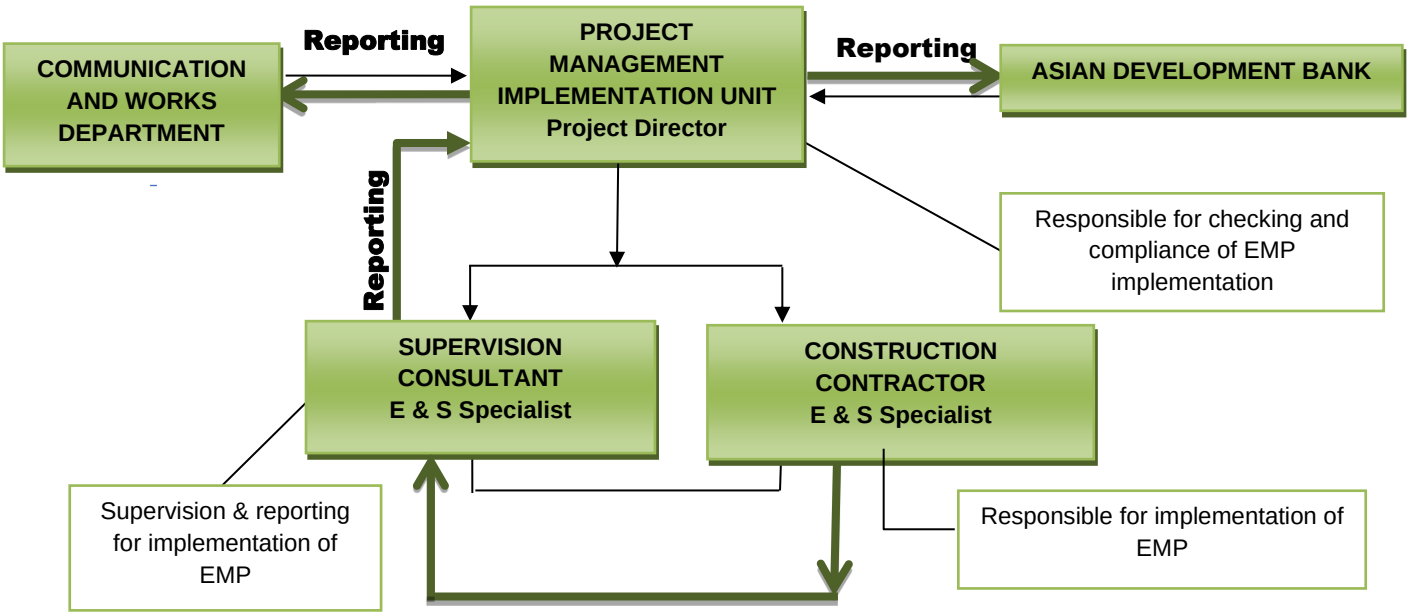


Figure 9.1: Organizational Setup for Implementation of EMP at Construction Phase

9.3 ROLES AND RESPONSIBILITIES

a) Asian Development Bank

586. The ADB serves as the financing institution and the oversight authority for environmental and social safeguards under its SPS 2009. In accordance with ADB requirements, this IEE report, including the EMP, is subject to ADB review and approval prior to project implementation. Throughout the project lifecycle, the executing agency is responsible for submitting regular monitoring reports to ADB. Furthermore, ADB reserves the right to conduct periodic supervision missions and audits to verify implementation of the EMP and to confirm ongoing compliance with ADB's environmental and social standards.

b) Project Management Implementation Unit (PMIU)

i. Project Director

587. The PD of the PMIU will be primarily responsible for overall project execution and coordination, ensuring timely delivery in accordance with approved frameworks. The PD is accountable for ensuring compliance with relevant national regulations, the requirements of the EMP and the safeguard policies of the ADB.

588. The core responsibilities of the PD encompass the following:

- Providing strategic direction and supervision to ensure the effective implementation of all measures outlined in the EMP;
- Serving as the principal focal point for all safeguard-related communications with ADB, including the submission of monitoring reports and facilitation of supervision missions; and
- Directing and overseeing contractors, consultants, and service providers responsible for executing the project and implementation of EMP to ensure alignment with project objectives and compliance requirements.

ii. Environmental Safeguard Specialist (ESS)

589. The ESS will serve as the technical focal person within the PMIU for all matters pertaining to environmental safeguards. Functioning under the direct supervision of the PD, the ESS will be responsible for the day-to-day oversight, coordination, and monitoring of environmental safeguard compliance throughout the project lifecycle.

590. The primary responsibilities of the ESS include:

- Providing expert advice to the PD, contractors, and other project personnel on the implementation of the EMP and adherence to ADB safeguard policy requirements;
- Conducting regular site inspections to verify the effective implementation of mitigation measures, documenting findings, and preparing monthly or quarterly environmental monitoring reports for submission to the PD and ADB;
- Monitoring contractor performance to ensure compliance with approved EMP provisions, contract conditions, and relevant national environmental laws;
- Facilitating meaningful stakeholder engagement, including assisting with the organization of public consultations, managing grievance redress mechanisms, and ensuring timely disclosure of project information; and
- Coordinating training sessions and awareness programs for contractors and project staff on environmental requirements.

iii. Social & Gender Safeguard Specialist (S&GSS)

591. The S&GSS will serve as the technical focal person within the PMIU for all matters pertaining to gender & social safeguards. Functioning under the direct supervision of the

PD, the S&GSS will be responsible for the day-to-day oversight, coordination, and monitoring of gender and social safeguard compliance throughout the project lifecycle.

592. The primary responsibilities of the S&GSS include:

- Providing expert advice to the PD, contractors, and other project personnel on the implementation of the EMP and adherence to ADB safeguard policy requirements;
- Conducting regular site inspections to verify the effective implementation of mitigation measures, documenting findings, and preparing monthly or quarterly gender and social monitoring reports for submission to the PD and ADB;
- Monitoring contractor performance to ensure compliance with approved EMP provisions, contract conditions, and relevant national environmental laws;
- Facilitating meaningful stakeholder engagement, including assisting with the organization of public consultations, managing grievance redress mechanisms, and ensuring timely disclosure of project information; and
- Coordinating training sessions and awareness programs for contractors and project staff on gender and social management requirements.

c) Supervision Consultant

593. Independent E&S personnel will be engaged by SC to oversee the implementation of the EMP and to ensure contractor compliance with environmental, social, health, and safety requirements. The SC will function under the overall guidance of the PMIU E&S Experts and will be responsible for day-to-day safeguards monitoring throughout the construction phase.

594. The primary responsibilities of the E&S SC include:

- Reviewing and endorsing the contractor's site-specific environmental and social management plans to ensure alignment with the approved EMP and ADB requirements;
- Conducting regular site inspections to verify that day-to-day construction activities adhere to EMP provisions and contractual HSE obligations;
- Maintaining close coordination with contractors and PMIU E&S Experts to facilitate timely implementation of mitigation measures and address any emerging issues;
- Preparing and delivering environmental, health, and safety training programs for contractor staff and site personnel;
- Undertaking systematic monitoring of environmental and social parameters on-site, documenting observations, and identifying any deviations from approved plans;
- Preparing and submitting periodic monitoring and evaluation reports to the PMIU E&S Experts for review, in accordance with the reporting schedule defined in the EMP; and
- Identifying the need for and recommending additional mitigation measures when unanticipated impacts arise or when existing measures prove insufficient.

595. The E&S team of SC shall comprise the following key personnel:

i. Environment Health and Safety Specialist

596. A qualified professional holding a Bachelor of Science (BSc) degree in Environmental Engineering/Science (or equivalent), with a minimum of ten (10) years of relevant professional experience in environmental management and health and safety for infrastructure projects.

ii. Social and Gender Specialist

597. A qualified professional with a Bachelor's degree in Sociology, Development Studies, or a related field, and at least ten (10) years of experience in implementing social safeguards, stakeholder engagement, labor management, gender equality, child protection, and inclusion of vulnerable groups in infrastructure or development projects.

d) Construction Contractor

598. The Construction Contractor will be responsible for the execution of civil works in accordance with the approved project design, technical specifications, and contractual agreements. In relation to environmental and social safeguards, the Contractor acts as the primary implementing party for on-site mitigation measures and is accountable for compliance with the EMP and applicable ADB safeguard requirements.

599. The environmental and social responsibilities of the Construction Contractor include the following:

- Execution of all environmental and social mitigation measures as specified in the EMP and approved site-specific management plans;
- Ensuring that all construction activities comply with EMP provisions, relevant contractual clauses, and applicable national environmental, health and safety regulations;
- Assignment of appropriately qualified HSE and social staff to oversee day-to-day safeguard implementation and compliance monitoring at the work site;
- Preparation and submission of regular environmental and social monitoring reports to the SC and PMIU, documenting compliance status, incidents, and corrective actions undertaken;
- Timely implementation of corrective measures in response to non-compliances or unforeseen impacts identified by the SC or PMIU;
- Provision of HSE induction and ongoing training programs for all construction personnel to ensure awareness of environmental and social obligations;
- Cooperation with project authorities during public consultations, community interactions, and operation of the grievance redress mechanism; and
- Maintenance and operationalization of site-specific emergency preparedness and response plans to address potential environmental or safety incidents.

600. The E&S team of contractor shall comprise the following key personnel:

i. Environment, Health and Safety Specialist

601. A qualified professional holding a Bachelor of Science (BSc) degree in Environmental Engineering/Science (or equivalent), with a minimum of Eight (08) years of relevant professional experience in environmental and health and safety implementation of infrastructure projects.

ii. Social and Gender Specialist

602. A qualified professional with a Bachelor's degree in Sociology, Development Studies, or a related field, and at least Eight (08) years of experience in implementing social safeguards, stakeholder engagement, labor management, gender equality, child protection, and inclusion of vulnerable groups in infrastructure or development projects.

e) Hospital Administration

603. The Hospital Administration shall facilitate implementation of the EMP while ensuring continuity of healthcare services during construction. Its responsibilities shall include:

- Coordinate with the PMIU, Supervision Consultant (SC), and Contractor to facilitate project implementation within the operational hospital.
- Designate an Environmental and Social (E&S) Focal Person to coordinate environmental, social, health, and safety matters.
- Facilitate site access and scheduling of works to minimize disruption to hospital operations and emergency services.
- Support implementation of Infection Prevention and Control (IPC) measures and ensure segregation of construction activities from patient care areas.
- Continue management of healthcare waste generated by hospital operations in accordance with applicable procedures.
- Implement and monitor CAP actions assigned to the Hospital Administration.
- Coordinate resolution of construction-related environmental, health, and safety issues and complaints through the GRM.
- Participate in environmental inspections, monitoring, audits, and emergency response coordination, as required.
- Review contractor work schedules and site-specific management plans to ensure compatibility with hospital operations and patient safety.
- The Hospital Administration will be responsible for day-to-day implementation of CAP measures. PMIU will oversee CAP implementation and allocate necessary resources. The Supervision Consultant and Environmental Specialist will monitor progress and verify completion of corrective actions. CAP implementation status will be reviewed regularly and reported to ADB through environmental monitoring reports.

9.4 BIDDING AND CONTRACT DOCUMENTS

604. The EMP will be fully integrated into the bidding and contract documents to ensure that all prospective contractors are aware of their environmental and social obligations prior to submitting bids.

605. The PMIU will ensure that the contract documents include specific provisions requiring the successful contractor to prepare and submit a SSEMP for approval by the PMIU and the SC before the commencement of any civil works. The SSEMP will detail how the contractor intends to implement the mitigation measures outlined in the EMP, taking into account site-specific conditions and construction methodologies.

606. Throughout the construction phase, the contractor will be subject to regular monitoring and compliance audits conducted by the SC and PMIU to verify adherence to the environmental and social provisions set forth in the EMP. These audits will assess the effectiveness of mitigation measures, identify any deviations, and ensure timely corrective actions.

607. A copy of the approved EMP will be maintained at the project site at all times during construction and made readily accessible to all relevant personnel, including contractor staff, SC, and visiting ADB missions.

608. Any instance of non-compliance or deviation from the conditions specified in the EMP will constitute a non-compliance with environmental and social requirements. In such cases, the contractor will be required to undertake immediate corrective actions as directed by the PMIU or the SC. Failure to address non-compliance promptly may result in further contractual remedies as stipulated in the bidding documents.

9.5 TRAINING AND CAPACITY BUILDING

609. To strengthen the capacity of the PMIU, contractors, and SC under the KPHSSP, training will be provided on environmental and social safeguards, implementation of mitigation measures, and monitoring and reporting requirements outlined in the EMP.

610. The project will ensure in-house training for PMIU staff, contractors, SC and designated focal persons from Hospital staff through one-day basic training and one-day advanced training sessions. The training will focus on environmental, social, occupational health and safety (OHS), infection prevention and control (IPC), and climate resilience requirements applicable to hospital revamp works. Refresher training and toolbox talks will be conducted periodically throughout construction.

611. The training programme will include, but not be limited to, the following topics:

- Overview of the KPHSSP, project activities, environmental and social commitments, and safeguard requirements.
- ADB SPS 2009, national environmental regulations, and institutional responsibilities.
- EMP implementation, compliance monitoring, and reporting requirements.
- Construction-related environmental management, including dust, noise, wastewater, traffic, and community health and safety.
- Implementation and monitoring of site-specific environmental and social management plans required under the EMP and contract documents; including the Site-Specific Environmental Management Plan (SSEMP), Occupational Health and Safety (OHS) Plan, Waste Management Plan, Traffic Management Plan, Emergency

Preparedness and Response Plan, Infection Prevention and Control Plan, Health and Safety Plan, and other plans necessary to address project-specific environmental and social risks.

- Healthcare waste management during renovation works, including segregation, temporary storage, transportation, and disposal of hazardous and non-hazardous waste.
- Infection Prevention and Control (IPC) measures during construction within operational healthcare facilities.
- Occupational health and safety, including hazard identification, risk assessment, permit-to-work procedures, PPE, emergency preparedness, fire safety, and incident reporting.
- Safe management of asbestos-containing materials, lead-based paint, and other hazardous materials, where encountered.
- Chance-find procedures for physical cultural resources.
- Climate-resilient construction practices, resource efficiency, energy and water conservation, and implementation of climate-responsive design measures.
- Contractor Code of Conduct (CoC), labour management procedures, prevention of GBV, SEA/SH, child labour, and forced labour.
- Stakeholder engagement, GRM, communication with hospital management, patients, and surrounding communities.

9.6 COMMUNICATION & DOCUMENTATION

9.6.1 Meetings and Reports

612. Monthly meetings will be held at site during the construction phase. The purpose of these meetings will be to discuss the routine activities, non-compliances as pointed out by SC and their remedial measures. CAP implementation progress shall be included in quarterly internal reports and semiannual environmental monitoring reports submitted to ADB. The reports shall identify the status of each CAP action as completed, ongoing, delayed, or pending, together with supporting evidence and planned follow-up actions. Various reports will also be produced at periodic time intervals, as provided in **Table 9.1** Indicates reporting mechanism along with information regarding persons responsible for report preparation and review process.

Table 9.1: Periodic Reporting Mechanism

Report	Requirements	Prepared by	Reviewed by	Submitted to
Monthly	Labor/site working conditions, EMP compliance; air, water, noise monitoring	Contractors' E&S Experts	SC E&S Experts	PMIU
Quarterly	Workplace conditions; environmental & social compliance; contractor performance	SC E&S Experts	PMIU	ADB
Semiannual	EMP compliance; corrective actions; risk management	SC E&S Experts	PMIU	ADB
Annual	Consolidated project performance; safeguards & operational summary	PMIU/SC E&S Experts	PMIU/PD	ADB

Report	Requirements	Prepared by	Reviewed by	Submitted to
Project Completion	Overall project implementation; safeguards compliance; lessons learned	SC E&S Experts	PMIU	ADB

9.6.2 Photographic Record and Data Base

613. Contractor and SC will maintain photographic records of all activities during the implementation of the proposed project. Data base of persons involved in monitoring, compliance and effects, HSE database, compliance and non-compliance record according to HSE Plan will also be maintained.

9.6.3 Non-compliance of EMP

614. Failure to comply with the provisions of the EMP by the Contractor will lead to appropriate corrective actions, including financial penalties. Major or persistent non-compliances may also result in the suspension of works or other contractual actions as per the contract terms.

9.7 ENVIRONMENTAL MANAGEMENT MATRIX

615. Environmental Management Matrix is considered as one of the main elements of EMP. It will be used as the management tool for the implementation of mitigation measures. The plan includes following:

- The envisaged impacts as identified in IEE and their recommended mitigation measures; and
- The person/organization directly responsible for adhering to or executing the required mitigation measures.

616. **Table 9.2** presents anticipated environmental and social impacts associated with project activities across the pre-construction, construction, and operation phases, along with corresponding mitigation measures and clearly defined roles and responsibilities for their implementation.

Table 9.2: Environmental Mitigation and Management Matrix

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	Monitoring
Design Phase				
1.	**Design-Stage Considerations** Hospital Layout, Utilities, and Infrastructure Decisions made during the design and pre-construction phase regarding the hospital layout, internal circulation, wards, isolation units, utility systems, and external development can influence operational efficiency, infection control, safety, and environmental performance once construction begins. If not adequately considered, these design-stage decisions may lead to adjustments during construction or affect the long-term functionality of the hospital. The impact is high adverse in nature.	• Coordinated design reviews will be conducted to integrate environmental, operational, and energy efficiency considerations in the design, including drainage, HVAC, and plumbing systems. • Coordinated design reviews will be conducted to integrate environmental, operational, and energy efficiency considerations in the design, including drainage, HVAC, and plumbing systems. • All existing utilities, including water supply, sewerage, electrical, medical gas, natural gas, and fire-fighting systems, will be identified and mapped, and appropriate connection points (tie-ins) will be determined for integrating new systems with the existing infrastructure. • Consultations with hospital staff, administration, and relevant authorities will be conducted during the design stage to ensure operational requirements are met and regulatory compliance is achieved. • Structural and geotechnical assessments will be undertaken to guide safe retrofitting, foundation stability, and civil works planning. • Energy-efficient systems, renewable energy options, and climate-resilient features will be integrated into the design. • Safe access, circulation, and emergency exits for staff, patients, and visitors will be planned and incorporated into the design. • A service continuity plan will be prepared to ensure uninterrupted hospital services, including electricity, water, medical gases, and emergency access, during renovation works.	Design Consultant	PMIU

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	**Monitoring**
2.	**Topography** The project mainly involves renovation of existing buildings and upgrading internal systems such as plumbing, fire-fighting, electrical, ICT, ELV, medical gas, HVAC, and rooftop solar installations, which will occur within the existing building footprint and are not expected to affect site topography. Minor and localized disturbances to ground levels may occur during external works such as installation of underground tanks, rainwater harvesting systems, utility pipelines, storm drainage, natural gas piping, and construction of roads and paved areas, requiring limited excavation and trenching. Overall, the project is not expected to cause significant changes to the site's topography, and the impact is considered low.	• Excavation, trenching, and grading will be limited to designated work areas required for external development and utility installation. • Disturbed ground surfaces will be restored and compacted after completion of underground works and paving activities. • Proper drainage and surface slopes will be ensured in paved areas, roads, and walkways to prevent water accumulation or localized flooding. • Existing landscaped and undisturbed areas within the hospital premises will be protected from unnecessary disturbance during construction activities.	Design Consultant	PMIU
3.	**Seismic Hazard** As the project area may be exposed to seismic activity, existing buildings and newly installed systems could be vulnerable to earthquake forces if structural conditions are not properly assessed during the design stage. Aging structural components or inadequate retrofitting may increase the risk of damage, potentially affecting building safety and continuity of hospital services. However, since the project mainly involves renovation within the existing hospital premises with limited structural modifications, the impact is expected to be low to moderate, provided appropriate seismic design considerations are incorporated.	• The revamp of infrastructure will be designed and constructed in accordance with the Seismic Building Code of Pakistan 2021 (SBC-2021) to ensure compliance with the minimum requirements for seismic safety of structures.	Design Consultant	PMIU
4.	**Resource Conservation** The project will involve the use of water, fuel, and construction materials. Excessive water consumption	Following practices shall be adopted to conserve these natural resources:	Design Consultant	PMIU

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	**Monitoring**
	for construction activities, workers or for equipment cleaning could place minor stress on local water supplies. Construction materials such as cement, aggregates, structural steel, pipes, and lining materials are mostly non-renewable; inefficient use could reduce the availability of these resources for future projects. Fuel consumption for machinery and equipment may also result in air emissions if not managed properly. The overall impact on natural resources is moderately negative but manageable due to the limited scope of hospital upgrades.	• Non-potable water will be used for cleaning, curing, and dust control. • Workers will be trained on simple water-saving practices. • Leftover materials will be reused wherever feasible. • Machinery will be maintained in good condition, and engines will be turned off when not in use. • Locally available fuel of good quality (low-sulphur if available) will be used. • Basic site layout planning and waste segregation will be implemented.		
5.	**Flora** The project is limited to rehabilitation works within existing hospital premises, and no tree cutting or removal of vegetation is envisaged. Therefore, impacts on flora are expected to be negligible. Minor risks to vegetation may arise from site mobilization during subsequent stages if not properly planned.	• Project design ensures avoidance of all existing trees and green areas within hospital premises; • Space planning for material storage and temporary facilities will be restricted to already paved or disturbed areas; • Provision for landscaping and plantation using native species has been incorporated to enhance green cover.	Design Consultant	PMIU
6.	**Fauna** The project area comprises an urban hospital environment with limited habitat value, primarily supporting urban-adapted fauna (e.g., birds and small mammals). As works are confined within existing premises, impacts on fauna are expected to be minimal to negligible.	• Similarly, Design provisions ensure that no natural habitats are disturbed; • Landscaping plans incorporate native vegetation, which may support local urban biodiversity; • Subsequent project phases will ensure controlled site activities to minimize disturbance to urban fauna.	Design Consultant	PMIU
7.	**Temporary Acquisition of Land** The hospital revamp works will be confined within the existing hospital premises. Limited temporary space may be required for material storage, equipment placement, and vehicle parking. Any such use will be small-scale and short-term in nature and may be managed in hospital premises. The required land will	• Contractor facilities will, as far as possible, be established within the hospital boundary in coordination with hospital management. • Temporary areas will be clearly demarcated to avoid disruption to hospital operations. • If external land is required, it will be obtained through voluntary short-term lease agreements.	Design Consultant	PMIU

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	**Monitoring**
	be used within the hospital area. No temporary land acquisition is required. Hence there will be no impact.	• All temporarily used areas will be restored to their original condition after completion of works. • A Construction Camp/Layout Plan will be prepared in consultation with PMIU.		
8.	**Existing Utilities** Excavation and trenching for activities such as water supply and sewerage pipelines, natural gas piping, storm drainage, electrical systems, and paved areas may pose a risk of accidental disturbance or damage to existing underground utilities. These may include water supply lines, sewerage pipelines, electrical cables, communication lines, fire-fighting pipelines, and medical gas systems. Any damage could lead to temporary disruption of essential hospital services. However, the impact is expected to be localized and manageable as works are confined within the existing hospital premises.	• Utility surveys and mapping will be conducted prior to construction. • Existing utility lines will be clearly marked and protected on site. • Careful excavation methods will be adopted, particularly near identified utilities. • Coordination with hospital management and relevant utility providers will be carried out prior to commencement of works. • Temporary arrangements will be ensured, where required, to maintain continuity of essential services.	Design Consultant	PMIU
Construction Phase				
9.	**Excavation** Small scale excavation may be required for upgrading existing hospital utilities such as sewerage, drainage, water supply lines, and minor external works. As the project focuses on rehabilitation rather than new construction, excavation activities will be localized and short-term across all sites Potential impacts include temporary soil disturbance, spoil generation, dust emissions, restricted access, interference with ambulance movement, and occupational safety risks. These impacts may be relatively more pronounced at urban and high-traffic facilities such as Naseerullah Khan Babar Memorial Hospital and DHQ Hospital Charsadda due to congestion and high patient flow, while dust-related	• Excavation will be carried out in small, phased sections, and works will be scheduled during off-peak hours to maintain hospital operations and emergency access. • Dust will be controlled through water sprinkling and covering of spoil and transport vehicles with enhanced attention in drier areas such as DHQ Hospital Karak. • Excavated material will be reused where feasible, and surplus material will be disposed of at approved sites. • Barriers, fencing, and signage will be installed to protect patients, staff, and visitors. • Proper shoring and trench support will be used to prevent collapse and ensure worker safety.	Contractor	SC and PMIU

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	**Monitoring**
	impacts may be more noticeable at DHQ Hospital Karak because of dry conditions. At DHQ Hospital Haripur and DHQ Hospital Abbottabad, better site conditions and dispersion may help reduce overall impact intensity. There is also a possibility of encountering undocumented utilities or, in rare cases, physical cultural resources. Given the sensitivity of hospital environments, impacts are assessed as moderate to high but temporary and site-specific, and can be effectively managed through appropriate mitigation measures.	• Underground utilities will be identified and mapped prior to excavation to avoid service disruption. • Controlled methods will be applied near older structures, and the EMP Chance-Find Procedure will be implemented if artifacts are encountered. • Close coordination with hospital administration will be maintained to ensure safe access and emergency routes. • Regular air quality and safety inspections will be conducted, particularly near sensitive units such as ICUs, OTs, and isolation wards. • Workers will be trained on safety, hazard identification, infection prevention, and emergency response.		
10.	**Construction Camp Site and Contractor Facilities** The contractor's site office and any temporary facilities will be established within the existing hospital premises at locations approved by the SC and PMIU in coordination with the Hospital Administration across all project sites. Given the limited scale of works, only small, temporary areas will be utilized for site office, material storage, and equipment placement. However, if such facilities are established within or in close proximity to functional areas of the hospital, they may result in localized and short-term impacts may occur. These may be relatively more noticeable at congested facilities such as Naseerullah Babar Hospital, Maulvi Ji Hospital and DHQ Hospital Charsadda and Women and Children Hospital, Abottabad due to higher patient flow and limited space availability. Potential Impacts include minor vegetation disturbance, noise and visual intrusion, and the generation of solid waste and wastewater. Inadequate management of these facilities could also lead to	• The contractor's site office and any temporary facilities will be located within designated areas approved by the SC and Hospital Administration, avoiding sensitive zones such as wards, emergency units, and access routes. • The footprint of temporary facilities will be minimized, and no unnecessary clearing of vegetation or disturbance to landscaped areas will be permitted. • Adequate sanitation arrangements, including clean toilets, safe drinking water, and proper wastewater disposal arrangements, will be provided and maintained, with strict prohibition of discharge into open drains or land. • Solid waste will be properly segregated, collected, and disposed of through authorized municipal services, and oil traps and designated maintenance areas will be established to prevent soil and water contamination. • Dust, noise, and visual disturbance will be minimized through good housekeeping practices, enclosures, water sprinkling, controlled material	Contractor	SC and PMIU

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	**Monitoring**
	sanitation issues, potential water contamination, vector breeding, and obstruction of access routes, including emergency pathways.	storage, and appropriate scheduling of activities with keen attention in congested hospitals such as Naseerullah Babar Hospital. • All access routes, including emergency pathways, will be kept clear and unobstructed at all times to avoid disruption to hospital operations. • Vector control measures will be implemented, including proper waste handling, drainage of stagnant water, and regular site cleaning. • Adequate worker facilities, including food, rest, and hygiene arrangements, will be ensured in accordance with national regulations and applicable labor standards, and workers will be trained and bound by a CoC under an approved Construction Camp Management Plan (including the Labor Management Plan), with a Community Liaison Officer appointed to address grievances. • All temporary facilities and camps will be dismantled promptly upon completion of works, and the sites will be restored to their original condition. • Regular monitoring and supervision will be carried out to ensure compliance with environmental, health, and safety requirements.		
11.	**Air Quality** Air quality may be temporarily affected during rehabilitation works due to dust generation from demolition, excavation, material handling, and movement of construction vehicles within the hospital premises. Demolition of existing structures and finishes may generate additional fine particulate matter, while exhaust emissions from diesel-powered machinery and vehicles may release pollutants such as PM, NO_x, SO_2, CO, and VOCs.	• Dust emissions from demolition, excavation, and material handling will be controlled through regular water sprinkling on exposed surfaces and covering of stockpiles and transport vehicles with enhanced dust suppression applied in relatively arid and dust-prone areas such as DHQ Hospital Karak. • Well-maintained, low-emission equipment will be used, open burning will be strictly prohibited, and engines will be switched off when not in use to minimize exhaust emissions particularly in more urban and traffic-influenced settings such as Naseerullah Babar Hospital.	Contractor	SC and PMIU

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	**Monitoring**
	The magnitude of air quality impacts will vary across project sites depending on local environmental conditions. Relatively higher impacts are expected at Naseerullah Babar Hospital, Maulvi Jee Hospital, and DHQ Hospital Charsadda due to higher urban activity, traffic congestion, and baseline particulate levels. At DHQ Hospital Karak, ambient air quality is generally influenced by lower emissions; however, dry conditions and exposed soil may increase dust generation during construction activities. In contrast, comparatively lower impacts are anticipated at DHQ Hospital Haripur and DHQ Hospital Abbottabad due to better vegetation cover, terrain, and dispersion conditions. Given the sensitivity of hospital environments particularly in proximity to OPDs, ICUs, operation theaters, and isolation wards even short-term exposure to dust and emissions may adversely affect patients, healthcare staff, and sensitive medical equipment. The risk is higher at more congested, high-patient-load facilities such as Naseerullah Babar Hospital and DHQ Hospital Charsadda, while relatively less congested sites, including DHQ Hospital Karak and DHQ Hospital Haripur, may experience comparatively lower exposure. However, these impacts are expected to be localized, short-term, and moderate in nature, and can be effectively managed through the implementation of appropriate dust suppression measures, emission controls, and work scheduling.	• Dust screens or temporary enclosures will be installed around high-dust activities, particularly during demolition and dismantling works. • Dust-generating activities, including demolition works, will be scheduled during off-peak hospital hours to minimize disturbance to patients and staff. • Demolition debris will be promptly collected, covered, and transported to approved disposal sites to prevent dust dispersion. • Workers will be provided with appropriate PPE, including dust masks, and trained in their proper use. • Regular air quality monitoring will be conducted near sensitive hospital units (e.g., ICUs, OTs, isolation wards) to ensure compliance with applicable NEQS standards. • Warning signage will be installed, and timely communication with hospital administration will be maintained regarding high-dust activities. • All monitoring results and corrective actions will be properly documented and implemented as required.		
12.	**Noise**	• Low-noise equipment, including machinery used for demolition, excavation, and compaction, will be	Contractor	SC and PMIU

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	Monitoring
	Activities including demolition, excavation, drilling, material handling, and vehicle movement may generate temporary noise and minor vibration across all project sites Noise may disturb patients, healthcare staff, and visitors. particularly in high-activity and congested facilities such as Naseerullah Babar Hospital, Maulvi Jee and DHQ Hospital Charsadda. Vibration may also pose limited risk to older hospital structures including Naseerullah Babar Hospital and parts of DHQ Hospital Karak, if demolition or heavy equipment operations are not carefully controlled. At comparatively less congested sites such as DHQ Hospital Haripur and DHQ Hospital Abbottabad, impacts may be relatively lower due to better spatial layout and dispersion of activities. Impacts are expected to be short-term, localized, and moderate to high due to the sensitive setting, but they are manageable with proper mitigation measures.	selected and fitted with silencers or mufflers, and regularly maintained to prevent excessive noise and vibration. • High-noise and vibration-generating activities, including demolition, drilling, excavation, and compaction, will be scheduled during off-peak hospital hours and conducted in small, phased sections with stricter controls at congested facilities such as Naseerullah Babar Hospital and DHQ Hospital Charsadda to minimize disturbance and vibration propagation. • Vibration-intensive methods will be avoided near older or structurally sensitive hospital buildings, particularly at Naseerullah Babar Hospital and parts of DHQ Hospital Karak, and monitoring and visual inspections will be carried out to ensure no damage occurs. • Temporary acoustic barriers or enclosures will be installed near sensitive units to reduce noise propagation where required. • Work schedules will be planned to avoid simultaneous high-noise or high-vibration activities near sensitive areas, and worker rotation will be implemented to minimize prolonged exposure. • Workers will be provided with appropriate PPE, including ear protection, and trained in its proper use. • Noise and vibration monitoring will be conducted near sensitive hospital areas (ICUs, OTs, wards) to ensure compliance with NEQS standards, and corrective actions will be implemented if required. • Demolition and construction debris will be promptly handled and removed to reduce the duration of noise- and vibration-generating activities. • Advance coordination with hospital management will be maintained, and a grievance mechanism		

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	**Monitoring**
		will be established to address complaints from patients, staff, or visitors.		
13.	**Traffic Management** Rehabilitation works within operational hospital premises including material transport, equipment movement, partial pathway closures, and temporary use of parking areas may temporarily disrupt internal traffic circulation. Such disruptions could cause congestion and restrict access for patients, visitors, ambulances, and service vehicles. These disruptions may be more pronounced at relatively congested facilities such as Naseerullah Babar Hospital, DHQ Hospital Charsadda and DHQ Hospital Abbottabad due to higher patient load and limited internal space, whereas comparatively less congested layouts at DHQ Hospital Karak, DHQ Hospital Haripur, and may experience relatively lower levels of disruption. Given the critical need for uninterrupted emergency access, any obstruction could have moderate to high significance, although impacts are expected to be short-term, localized, and site-specific.	• Construction activities will be carried out in phased sections to ensure continuous access to emergency and critical care units. • Coordination with hospital administration will be maintained to ensure uninterrupted ambulance access at all times with stricter control at high-traffic facilities such as Naseerullah Babar Hospital. • Alternate entry and exit routes within the hospital premises will be clearly demarcated and communicated to staff, patients, and visitors. • Communication will be provided to hospital staff, patients, and visitors regarding temporary route changes, parking restrictions, or access diversions. • Material deliveries and heavy vehicle movements will be scheduled during off-peak hospital hours to minimize congestion. • Dedicated pathways will be provided for pedestrians, and separate routes will be maintained for construction vehicles to avoid conflicts. • Visible directional signage, safety barricades, and protective barriers will be installed along construction zones and temporary routes. • Personnel will be stationed at key locations during peak construction activities to guide vehicles and pedestrians safely and ensure unobstructed access for ambulances and hospital staff. • A site-specific Traffic Management Plan will be prepared in coordination with hospital management to ensure safety, mobility, and minimal disruption during rehabilitation works.	Contractor	SC and PMIU

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	**Monitoring**
14.	**Impact on Soil** Soil impacts from the proposed rehabilitation works are expected to be localized, minor, and short-term, as activities are limited to upgrading and rehabilitation within the existing hospital premises. Temporary soil disturbance may occur during minor excavation for storm drainage, sewerage, water supply lines, underground utilities, equipment foundations, and site leveling for external works such as pavers, landscaping, boundary walls, parking sheds, and UG tanks. Potential impacts may include minor erosion of exposed soil, temporary disruption of surface drainage if excavated material or stockpiles are not managed properly, and localized dust or contamination from accidental spills of fuel, lubricants, or construction waste. These impacts may be relatively more noticeable at drier sites such as DHQ Hospital Karak due to loose soil conditions, while at more congested urban facilities such as Naseerullah Khan Babar Memorial Hospital and DHQ Hospital Charsadda, improper handling of excavated material may lead to localized drainage blockage and access disruption. At comparatively better managed and vegetated sites such as DHQ Hospital Haripur and DHQ Hospital Abbottabad, impacts are expected to be relatively less pronounced. Given the urban, developed, and compact nature of hospital sites, these impacts are expected to be site-specific, short-term, and easily managed through standard soil management practices and good housekeeping.	• Excavations for utilities or minor external works will be kept as small and short-term as possible to minimize soil disturbance. • Excavated materials will be managed within the work area to avoid blocking access routes, drains, or patient pathways. • Regular water sprinkling will be applied to exposed soil or loose material to control dust with increased frequency in drier areas such as DHQ Hospital Karak. • Refuelling and maintenance of machinery will be carried out on impermeable surfaces or with drip trays to prevent soil contamination. • Construction waste and debris will be collected promptly and disposed of at approved locations to prevent contamination and obstruction. • Equipment movement will be restricted to the immediate work area to avoid damage to surrounding paved or landscaped surfaces especially in DHQ Hospital Haripur and DHQ Hospital Abbottabad with relatively more green spaces. • Disturbed areas, including small patches of soil along access routes, will be restored promptly with paving, landscaping, or other appropriate surface treatment. • Workers will be trained in dust control, spill prevention, and basic soil protection measures, and compliance will be monitored regularly.	Contractor	SC and PMIU

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	**Monitoring**
15.	**Community Health and Safety** During the hospital rehabilitation works, minor excavation, material handling, and movement of equipment within operational hospital premises may pose risks to patients, visitors, staff, and nearby pedestrians. Potential impacts include: • Accidents from vehicle or equipment movement within hospital premises. • Exposure to dust, noise, and minor vibrations, particularly affecting vulnerable patients (children, elderly, or those with pre-existing conditions). • Localized contamination from accidental spills of fuel, lubricants, or construction materials. • Increased risk of communicable diseases among hospital users/visitors if hygiene, sanitation, and infection prevention measures are not maintained. • Slips, trips, falls, or collisions due to temporary obstacles or uneven surfaces. These impacts are site-specific, temporary, and moderate, given the controlled and limited nature of the rehabilitation works.	• Construction activities will be confined to clearly demarcated work areas, with restricted access through barricades and signage. • Safe and uninterrupted access for patients, staff, and emergency vehicles will be maintained at all times through phased works and designated routes. • Movement of construction vehicles and equipment will be controlled within the site, and low speed limits will be enforced to minimize accident risks. • Dust, noise, and minor vibration will be minimized through water sprinkling, proper equipment maintenance, and scheduling of works during less sensitive hours. • All work areas near sensitive hospital units will be secured with barriers and warning signs to prevent accidental exposure. • Good housekeeping will be maintained, including timely removal of debris, proper waste management, and prevention of water stagnation. • Refueling and storage of fuels or lubricants will be carried out in controlled areas to prevent spills and contamination. • Workers will be trained on site safety, infection prevention, hygiene practices, and appropriate conduct within hospital premises. • A site-specific Health, Safety, and Environment (HSE) Plan and GRM will be implemented to address safety concerns and complaints. • Advance information will be provided to hospital staff and visitors regarding construction activities affecting access or movement.	Contractor	SC and PMIU
16.	**Occupational Health and Safety** Occupational health and safety risks are associated with minor rehabilitation works within operational	• All works will be carried out in compliance with applicable occupational health and safety regulations and international good practices.	Contractor	SC and PMIU

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	**Monitoring**
	hospitals, including small-scale excavation, utility works, equipment installation, and material handling. Potential hazards include slips, trips, falls, minor injuries from tools and machinery, exposure to dust, noise, and fumes, electrical and mechanical risks, ergonomic stress, and potential exposure to communicable diseases due to work within hospital environments. Impacts are expected to be site-specific, short-term, and manageable with appropriate safety measures.	• PPE including helmets, gloves, safety footwear, masks, goggles, and high-visibility vests will be provided and its use will be strictly enforced. • Workers will be trained through regular toolbox talks on hazard identification, safe work practices, equipment handling, infection prevention, and emergency procedures. • Active work areas will be secured with barricades, warning signage, and controlled access to prevent unauthorized entry and accidental exposure. • All machinery and equipment will be properly maintained, and safe operating procedures will be followed to minimize mechanical, electrical, and noise-related risks. • First aid facilities will be made available on-site, and arrangements will be ensured for prompt medical assistance in coordination with hospital services. • A site-specific Emergency Response Plan (ERP) will be prepared and implemented, including procedures for accidents, fire, and medical emergencies. • Good housekeeping will be maintained, including proper material storage, debris removal, and safe site layout to reduce risks of slips, trips, and falls. • Workers' health and hygiene will be monitored, including pre-employment fitness checks, use of existing sanitation facilities, and adherence to infection prevention protocols. • A designated safety supervisor will be assigned to monitor compliance, maintain records, and ensure implementation of all OHS measures.		
17.	**Generation of Solid Waste** Rehabilitation works within hospital premises will generate solid waste, including construction and	• Waste will be segregated at source into recyclable, reusable, and non-recyclable categories.	Contractor	SC and PMIU

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	**Monitoring**
	demolition debris, excavated material, packaging waste, and domestic waste from contractor staff. With an estimated workforce of approximately 150 workers and an average waste generation rate of 0.5 kg per worker per day, about 12–13 kg of domestic waste may be generated daily. Additional small quantities of construction-related waste may also arise from repair and upgrading activities. If not properly managed, this waste may result in localized hygiene issues, visual nuisance, blockage of drainage systems, and vector breeding within hospital premises. Overall, impacts are expected to be site-specific, temporary, and moderate, and can be effectively managed through appropriate waste management practices.	• Waste will be stored in designated, covered containers to prevent littering, odor, and pest attraction. • Construction debris and excavated material will be reused on-site where feasible (e.g., backfilling or leveling). • Non-hazardous waste will be disposed of through authorized municipal services, and open dumping or burning will be strictly prohibited. • Adequate waste collection bins will be provided at work areas and designated staff zones. • Hazardous waste (e.g., oils, lubricants, chemicals) will be stored separately and disposed of through licensed contractors. • Good housekeeping practices will be maintained to prevent accumulation of waste and debris within hospital premises. • Workers will be trained on proper waste handling, segregation, and site responsibilities. • Waste management practices will be regularly monitored as part of the contractor's EMP. • Roles and responsibilities for waste management will be clearly defined in the contractor's Code of Conduct and site procedures.		
18.	**Generation of Waste Water** The project will generate small quantities of wastewater from activities such as minor excavation and utility works, limited concrete mixing or patching, equipment cleaning, and domestic use by contractor staff. If not properly managed, this wastewater may lead to localized contamination of hospital grounds or drainage systems, formation of stagnant water, odor	• Existing hospital sanitation facilities will be utilized by workers to avoid the need for temporary sanitation arrangements. • Construction-related wastewater (e.g., concrete wash, equipment cleaning, oils, and lubricants) will be collected and managed in designated areas and will not be discharged into hospital drains or surrounding areas. • Designated equipment and vehicle cleaning areas will be established with appropriate containment measures such as sediment traps or oil-water separators.	Contractor	SC and PMIU

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	**Monitoring**
	generation, and increased risk of vector breeding, potentially affecting hygiene within hospital premises. The impacts are expected to be site-specific, temporary, and moderate, and can be effectively managed through proper wastewater handling and disposal practices.	• Fuels, oils, and chemicals will be stored on impermeable surfaces with secondary containment to prevent leakage and contamination. • Stormwater will be diverted away from work areas to prevent waterlogging, mixing with wastewater, and potential contamination. • Non-potable water will be reused where feasible for dust suppression and minor construction activities. • Good housekeeping practices will be maintained to prevent wastewater accumulation, blockages, or stagnant water within hospital premises. • Workers will be trained on water conservation, hygiene, and proper wastewater handling practices. • Drainage systems and wastewater handling practices will be regularly inspected to identify and address leaks, blockages, or contamination risks. • A site-specific wastewater management approach will be implemented in coordination with hospital administration, and records of wastewater generation and disposal will be maintained. • All wastewater management practices will comply with applicable environmental regulations and hospital sanitation standards.		
19.	**Impact on Water Resources** The activities within existing hospital premises such as minor excavation, utility upgrades, and equipment installation may result in limited and localized impacts on water resources. Key considerations include:	• Workers will utilize existing hospital sanitation facilities, eliminating the need for temporary arrangements and preventing uncontrolled wastewater discharge. • Construction-related wastewater (e.g., from concrete works, equipment cleaning, or minor activities) will be collected and managed in designated areas and will not be allowed to mix with hospital sewage or enter storm drains.	Contractor	SC and PMIU

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	**Monitoring**
	• Localized runoff from disturbed surfaces, cement works, or equipment cleaning, which may enter internal drainage systems if not properly controlled. • Risk of minor contamination from accidental spills of fuel, oil, or chemicals, potentially affecting soil or storm water drains. • Slight increase in water demand for construction-related activities; however, this remains minimal due to the small workforce and short duration of works. • Continued reliance on existing hospital water supply and sewerage systems, with wastewater routed through established plumbing to municipal systems and no direct discharge to natural water bodies.	• Equipment and vehicles will be cleaned only in designated service areas equipped with appropriate containment measures such as sediment traps and oil-water separators. • Fuels, oils, and chemicals will be stored on impermeable, bunded surfaces and kept away from drainage lines. • Spill prevention and response procedures will be implemented, and workers will be trained in spill containment, cleanup, and reporting. • Runoff from minor excavation or disturbed areas will be controlled using temporary barriers or diversion measures to prevent entry into drainage systems. • Water use for construction activities will be minimized and monitored, and workers will be encouraged to follow water conservation practices. • Existing hospital sewerage connections will be maintained, and no direct discharge into natural water bodies or open drains will occur. • Regular inspections will be carried out to ensure proper functioning of drainage systems and compliance with environmental regulations and hospital sanitation protocols.		
20.	**Hazardous Waste Management** Generation of hazardous waste is expected to be limited in scale, primarily associated with equipment maintenance, minor rehabilitation activities, and the controlled use of small quantities of chemical products within hospital premises. Key potential impacts include:	• Fuels, oils, and chemicals will be stored in designated, bunded areas on impermeable surfaces, away from drains and sensitive hospital utilities. • Cement wash water and chemical residues will be collected in sealed containers and will not be discharged into hospital drainage systems; disposal will be carried out through approved waste management channels. • Spill prevention and response measures will be implemented, including availability of spill kits and	Contractor	SC and PMIU

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	**Monitoring**
	• Localized contamination of soil and drainage systems due to accidental spills, leaks, or improper disposal of hazardous substances. • Deterioration of environmental quality within hospital premises, including risks of odour, staining, or unsafe conditions if hazardous waste is not properly contained. • Potential health and safety risks to workers and hospital users from exposure to toxic, flammable, or irritant substances, particularly in confined or sensitive areas. • Blockage or damage to drainage infrastructure if hazardous residues (e.g., cement slurry or chemicals) enter the drainage system. Considering the small volumes, short duration, and controlled nature of activities, impacts are expected to be low to moderate, site-specific, and readily manageable through standard hazardous material handling and waste management practices.	training of personnel in containment, cleanup, and reporting procedures. • Hazardous materials and wastes will be clearly labelled, segregated, and handled using appropriate PPE. • Regular inspections will be conducted to identify leaks, damaged containers, or unsafe storage and handling practices. • Hazardous waste generated in small quantities will be removed from site promptly through licensed contractors for safe treatment and disposal. • All hazardous waste management practices will comply with applicable provincial environmental standards (NEQS) and hospital safety protocols.		
21.	**Disturbance to Hospital Services and Shifting of Units** The proposed revamp works within an operational hospital setting may result in temporary disruption to routine healthcare services and necessitate the relocation of certain functional units. This may lead to localized impacts on patient flow, access, and service efficiency. Disruptions may be relatively more pronounced at high-patient-load and spatially constrained facilities such as Naseerullah Babar Hospital, Maulvi Ji Hospital and DHQ Hospital Charsadda and DHQ Hospital Abbottabad whereas comparatively less congested sites such as DHQ Hospital Karak and DHQ Hospital Haripur may experience relatively lower levels of disruption.	• A comprehensive service continuity plan will be prepared in coordination with hospital administration, identifying relocation strategies for affected units; • Temporary functional arrangements will be established within available spaces to maintain uninterrupted delivery of critical healthcare services; • Construction activities will be scheduled to avoid peak operational hours, where feasible; • Wayfinding signage and information dissemination will be implemented to ensure safe and efficient movement of patients, staff, and visitors; • Continuous coordination with hospital management will be maintained to ensure	Contractor	SC and PMIU

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	**Monitoring**
	However, given the limited scope of works within existing premises, the impacts are expected to be high.	uninterrupted operation of emergency and essential services. • Service continuity Plan is attached as **Annex-XI**.		
22.	**Disturbance to Utilities** The activities may involve tie-ins, minor excavation, and replacement or upgrading of existing utility connections, which could lead to temporary disruption of essential services including electricity, water supply, sewerage, medical gases, communication systems, and drainage. Such interruptions may affect critical hospital functions such as operation theaters, wards, laboratories, and emergency services if not properly managed. There is also a risk of accidental damage to underground or concealed utilities (e.g., pipelines, cables, or drainage lines), which could result in service outages, safety hazards, or localized flooding/contamination within hospital premises. Given the sensitive operational environment of hospitals, these impacts are considered site-specific, short-term, and moderate, but can be effectively managed through careful planning, coordination, and controlled execution of works.	• Hospital administration staff and patients will be informed in advance of any planned utility interruptions, and regular updates will be provided during works to ensure awareness, maintain safety, and minimize disruption to hospital operations. • Tie-ins, repairs, or service interruptions will be scheduled during off-peak hours or planned maintenance windows to minimize impact on hospital operations. • All utility works will be performed by qualified and authorized personnel following safety and technical standards. • Exposed or nearby utility lines will be protected with physical barriers, clear markings, and warning signage during construction activities. • Backup systems, including generators, water storage, and alternative communication lines, will be maintained to ensure continuity of critical hospital services during planned outages. • Hospital administration will be immediately notified in case of accidental utility damage to enable rapid restoration. • All utility works, temporary disruptions, and restoration timelines will be documented for monitoring, reporting, and accountability.	Contractor	SC and PMIU
23.	**Disposal of Mucking Material** Mucking material will be generated from minor excavation works within existing hospital premises for utility repairs, drainage improvement, foundation adjustments, or small-scale civil rehabilitation.	• Excavated soil suitable for reuse will be used for backfilling or leveling within hospital premises where feasible. • Excess or unsuitable material will be promptly removed to approved municipal or licensed disposal sites.	Contractor	SC and PMIU

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	**Monitoring**
	The excavated material will primarily consist of soil, broken concrete, masonry debris, and small quantities of dismantled pipes or pavement. If not properly managed, temporary impacts may include: • Obstruction of internal hospital access roads or walkways • Dust generation affecting patients, staff, and visitors • Visual nuisance within hospital premises • Potential hygiene concerns if mixed with wastewater or old drainage lines Given the limited scale of excavation and controlled institutional setting, the impact is site-specific, short-term, and low to moderate.	• Temporary stockpiles, if unavoidable, will be placed away from access routes, covered, and regularly watered to control dust and runoff. • All excavation and waste material will be stored in designated areas within the hospital premises to prevent obstruction and safety hazards. • Trucks transporting debris will be covered to avoid spillage during transit. • Records of quantities, storage locations, and disposal will be maintained for monitoring and compliance. • Hospital staff and administration will be informed of storage locations and disposal schedules to ensure safety and minimal disruption. • Construction personnel will be trained on safe handling of muck, debris, and minor hazardous materials to prevent contamination or accidents.		
24.	**Emergency Preparedness and Response** Rehabilitation works under project are small to medium scale but occur within operational hospital facilities. Key potential risks include: **A. Workplace and Fire Emergencies** • Injuries to workers from excavation, working at heights, electrical works, or equipment handling. • Fire hazards from welding, electrical short circuits, or improper storage of fuels and chemicals.	**A. Workplace and Fire Emergencies** • A site-specific Health, Safety, and Emergency Response Plan (ERP) will be developed and implemented. • Risk assessments and job safety analyses will be conducted prior to commencement of works. • Adequate PPE will be provided and its use will be strictly enforced. • Workers will be trained on emergency procedures, fire safety, and evacuation protocols. • Flammable materials will be stored securely in ventilated areas away from patient care zones. • Fire extinguishers, first aid kits, and clear ambulance and emergency access will be maintained at all times. • Active work zones will be barricaded and clearly signposted to prevent unauthorized access.	Contractor	SC and PMIU

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	**Monitoring**
	• Temporary obstruction of hospital access routes affecting ambulances and emergency response. • Accidental damage to internal utilities (electricity, water, medical gases). • Exposure of patients, staff, or visitors to unsafe work zones. **B. Natural and Man-Made Disasters** • Earthquakes, floods, or extreme weather events causing injuries, damage to hospital infrastructure, and disruption of healthcare services. • Accidental incidents (e.g., chemical spills, structural failures) posing health and safety risks to staff, patients, visitors, and workers. Impacts are moderate but site-specific and manageable with proper planning and preparedness.	• Utility mapping will be completed prior to excavation to avoid accidental damage. • Coordination with hospital administration will be maintained for planned outages and emergency drills. • Backup power and water systems will be utilized to ensure continuity of hospital services. • Work schedules will be adjusted during extreme weather conditions to ensure safety. • All incidents, near-misses, and corrective actions will be documented and reported. **B. Natural and Man-Made Disasters** • The Emergency Response Plan (ERP) will be aligned with local emergency services, fire, and medical authorities to ensure rapid response. • Periodic simulation drills will be conducted for hospital staff, patients, and contractors to prepare for evacuation and emergency situations. • Key emergency contact numbers and procedures will be prominently displayed throughout hospital premises and construction zones. • Hospital staff, contractors, and workers will be trained on disaster response and emergency procedures. • Incident reporting procedures will be implemented for near-misses and hazards, with prompt corrective actions taken. • This comprehensive approach ensures the safety of patients, staff, visitors, and workers, while maintaining uninterrupted healthcare services during hospital rehabilitation works. Detailed ERP procedures are provided in **Annex-XII.**		
25.	**Flora and Fauna**	• Any minor or unexpected vegetation removal will be compensated through the proposed	Contractor in consultation	SC and PMIU

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	**Monitoring**
	No significant impacts on flora or fauna are anticipated, as the project is limited to existing hospital premises.	landscaping, including native trees and shrubs, to enhance the site's green cover and overall environment. • Care will be taken to avoid disturbance to any urban-adapted fauna present on site	with District Administration and Forest Department	
26.	**Discovery of Heritage Sites/ Structures during Excavation** Given that the project site is an already developed hospital facility, the likelihood of encountering archaeological resources is very low. However, in the unlikely event of any chance archaeological discovery during limited excavation works, construction activities will be temporarily halted and relevant authorities will be informed in accordance with applicable regulations.	• The Chance-Find Procedure (**Annex-XIII**) will be followed in case of any discovery of artifacts or culturally sensitive remains. • Work in the immediate area will be halted, and the site will be secured. • The contractor will notify the SC, who will coordinate with the relevant archaeology authority for assessment. • Works will resume only after clearance from the concerned authority. • Workers will be briefed to identify and report any potential heritage finds. • These measures will ensure appropriate handling of rare discoveries with minimal disruption to hospital operations.	Contractor with notification to KP Department of Archaeology and Museums	SC and PMIU
27.	**Social/Cultural Conflicts** A limited number of skilled and unskilled workers will be engaged for the project, with the majority sourced locally or from existing contractor personnel, thereby minimizing labor influx. However, the temporary presence of workers within operational hospital premises may lead to minor social and institutional risks. These include potential disruption due to differences in behavior or cultural practices, minor community safety concerns related to worker movement, and public health risks such as transmission of communicable diseases if hygiene and infection prevention measures are not maintained.	• Prioritize recruitment of local workers and existing contractor staff to minimize labour influx and reduce potential social tensions. • Provide induction and training for all workers on local customs, hospital rules, hygiene, infection prevention, and respectful behaviour. • Limit worker movement to designated work areas and restrict entry into sensitive hospital zones to prevent disruption to staff, patients, and visitors. • Plan and phase construction activities to minimize prolonged presence of workers in high-traffic or sensitive hospital areas. • Implement hygiene measures, use of hospital sanitation facilities, and regular health screening to reduce risks of communicable disease transmission.	Contractor	SC and PMIU

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	**Monitoring**
		• Maintain accessible channels for hospital staff and visitors to report issues or concerns related to worker behaviour or social conflicts. • Conduct regular oversight to ensure compliance with behavioural standards, site rules, and health protocols, with corrective actions applied as needed.		
28.	**Gender Based Violence (GBV) and Child Labour** Although labor influx is limited, there remains a risk of inappropriate worker conduct, including harassment or GBV, which may affect hospital staff, patients, or visitors, particularly women and vulnerable groups. There is also a likelihood of child labor engagement, forced labour or other non-compliance with labor regulations, which could result in reputational and legal implications.	• Contractors will comply with national labour laws, including prohibition of child labour (<15 years) and restrictions on hazardous work for adolescents, and all bidding documents will reflect these requirements. • Workers will sign an individual CoC prior to deployment, and contractors will enforce CoCs addressing GBV, sexual exploitation and abuse (SEA), and sexual harassment (SH). • Mandatory induction and periodic training will be provided on professional behaviour, gender sensitivity, GBV prevention, and consequences of violations. • Access to sensitive hospital areas will be controlled to prevent unauthorized entry by workers. • A confidential GRM will be established, including female-friendly reporting channels within hospital settings, for staff, patients, and community members. • Contractors will prioritize hiring local adult labour to minimize labour influx risks. • Non-compliance with CoC or labour provisions will result in penalties, suspension, or contract termination. • Regular supervision and monitoring will be conducted to ensure adherence to CoCs and corrective actions applied as needed.	Contractor	SC and PMIU

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	**Monitoring**
Operation Phase				
29.	**Water Supply & Usage** Hospital operations require substantial water for patient care, sanitation, HVAC systems, cleaning, and other daily activities. Overuse or inefficient water management can strain local water resources, reduce availability for surrounding communities, and increase operational costs. Improper storage or handling may also risk contamination of potable water supplies. The impact is moderate in nature.	• Water-efficient fixtures, taps, and appliances will be installed. • Regular maintenance of plumbing systems will be conducted to prevent leaks and wastage. • Potable and non-potable water systems will be kept separate and secure to prevent contamination. • Periodic monitoring of water consumption, supply pressures, and water quality will be carried out to ensure adequacy and early detection of contamination. • Awareness measures, including signage and staff orientation, will be implemented to promote water conservation among hospital staff and visitors.	Hospital Administration	Health Department
30.	**Wastewater and Sewage** Hospitals operations will generate municipal and biomedical effluent that, if improperly treated or discharged, may contaminate soil, groundwater, or receiving water bodies. Chemical, biological, and pharmaceutical constituents in effluents may harm aquatic ecosystems and public health. The impact is moderate in nature.	• On-site pretreatment systems for medical and laboratory wastewater will be installed and operated prior to discharge. • Wastewater streams will be segregated at source into domestic (sanitary) and medical/laboratory effluents. Domestic sewage will be discharged into municipal sewers, while medical and laboratory effluents will be pretreated prior to safe disposal. • Wastewater quality will be regularly monitored to ensure compliance with NEQS and IFC standards. • Staff will be trained on proper handling, segregation, and disposal of wastewater to maintain hygiene and safety. • Plumbing and treatment systems will be periodically maintained to prevent leaks, blockages, and contamination.	Hospital Administration	Health Department
31.	**Solid Waste Generation**	• Waste will be segregated at source into infectious, hazardous, and general waste streams in	Hospital Administration	Health Department

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	**Monitoring**
	Hospital operations generate various categories of solid waste, including infectious and pathological waste, sharps, pharmaceutical waste, chemical waste, general domestic refuse, and packaging materials. Inadequate segregation, handling, storage, or disposal may result in environmental contamination, occupational health risks, vector breeding, and potential public health impacts on surrounding communities. The impact is high in nature.	accordance with national healthcare waste management guidelines. • Color-coded, labeled, and covered containers will be provided for safe temporary storage in designated areas. • Waste will be collected regularly and disposed of through licensed medical and municipal waste contractors, with separate handling for hazardous and general waste. • Hospital staff will be trained periodically on proper waste segregation, handling, and emergency response procedures. • A Hospital Waste Management Plan will be implemented and maintained in line with NEQS and WHO guidelines, including record-keeping and monitoring.		
32.	**Energy Consumption and Air Quality** Hospital operations including lighting, HVAC systems, diagnostic and life-support equipment create high electricity demand. Power outages or unreliable supply can disrupt critical services, especially in ICUs, operating theaters, and laboratories. Backup generators may be needed during outages, which can emit pollutants affecting indoor and outdoor air quality. Energy use also contributes to the hospital's overall environmental footprint. The impact is high in nature.	• Energy-efficient lighting, HVAC systems, and medical equipment will be implemented to optimize electricity consumption. • Backup generators will be installed in properly ventilated enclosures with automatic switchover, and will be regularly maintained to ensure operational readiness. • Solar photovoltaic panels and other renewable energy sources will be integrated, where feasible, to support critical units and reduce reliance on fossil fuels. • Energy consumption will be monitored, and HVAC and lighting operations will be optimized to minimize energy use. • Air quality near generator exhausts and ventilation intakes will be periodically monitored to ensure compliance with environmental and occupational standards. • Records of generator operation, maintenance, and emissions will be maintained as part of the EMP.	Hospital Administration	Health Department

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	**Monitoring**
33.	**Noise Pollution** Hospital operations may generate noise from medical equipment, backup generators, ambulance movements, and general operational activities. Elevated noise levels may adversely affect patient recovery, staff performance, and nearby residential receptors if not properly managed. The impact is moderate in nature.	• Regular maintenance and proper operation of medical equipment and generators will be ensured to minimize noise emissions. • Soundproofing materials and acoustic enclosures will be installed in sensitive areas such as ICUs, operating theaters, and generator rooms. • Generators will be located in designated areas with appropriate noise attenuation measures. • Non-essential high-noise activities will be scheduled during daytime hours where feasible. • Hospital staff will be trained and encouraged to implement noise minimization practices throughout the premises.	Hospital Administration	Health Department
34.	**Traffic and Accessibility** Increased movement of patients, visitors, ambulances, and service vehicles may result in traffic congestion near hospital entrances, delays in emergency response, and elevated road safety risks for pedestrians and motorists. The impact is high in nature.	• Clearly designated entry and exit points will be established, with organized parking to streamline vehicle movement. • Coordination with local traffic authorities will ensure smooth traffic flow and unobstructed emergency access. • Adequate signage, road markings, and designated pedestrian pathways will be provided to enhance safety. • Separate routes and loading areas will be maintained for service and supply vehicles to prevent interference with patient and visitor traffic. • Clear access corridors for ambulances and emergency vehicles will be maintained at all times.	Hospital Administration	Health Department
35.	**Patient and Staff Safety** Hospital operations present occupational and public safety risks, including exposure to infectious and biohazardous materials; electrical hazards; fire risks; slips, trips, and falls; and equipment-related accidents. Vulnerable groups such as children, elderly patients, pregnant women, and individuals with limited mobility	• Conduct regular safety inspections, risk assessments, and hazard audits across all hospital facilities. • Install and maintain clear safety signage, handrails, non-slip flooring, adequate lighting, and emergency illumination systems.	Hospital Administration	Health Department

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	**Monitoring**
	may be particularly susceptible to injury. The impact is high in nature.	• Implement fire safety systems, including alarms, extinguishers, and evacuation procedures, and test them periodically. • Provide ongoing training to staff on occupational health and safety (OHS), infection prevention and control (IPC), and emergency response protocols. • Ensure PPE is available and correctly used by staff handling biohazardous or hazardous materials. • Maintain robust incident reporting and corrective action procedures.		
36.	**Infection Control and Public Health** Hospital environments are inherently susceptible to communicable disease transmission. Inadequate hygiene practices, overcrowding, poor ventilation, or improper handling of infectious materials may increase the risk of healthcare-associated infections (HAIs) among patients, staff, and visitors. The impact is moderate in nature.	• Comprehensive Infection Prevention and Control (IPC) protocols will be implemented and enforced in accordance with WHO and national health guidelines. • Routine cleaning, disinfection, and sterilization of medical instruments, high-touch surfaces, and patient care areas will be carried out. • Ventilation systems, including upgraded HVAC units, will be maintained fully functional, particularly in wards, operating theaters, ICUs, and isolation rooms. • Dedicated isolation facilities for infectious patients will be provided to prevent cross-contamination. • Regular staff training on IPC practices, hand hygiene, and proper use of PPE will be conducted, with continuous compliance monitoring. • Public health awareness among patients and visitors will be promoted through clear signage and informational materials.	Hospital Administration	Health Department
37.	**Environmental and Community Impacts** Improper operational practices, such as uncontrolled waste disposal, excessive energy or water use, and traffic congestion, can indirectly affect the surrounding community's environment and quality of life.	• Continuous monitoring of water, waste, air, and noise parameters will be carried out. • Community engagement and a GRM will be maintained for timely resolution of complaints. • Sustainable hospital management practices will be adopted to minimize negative impacts.	Hospital Administration	Health Department

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	**Monitoring**
	Hospital operation may attract informal services (food vendors, parking attendants), which could increase local congestion, littering, or minor social conflicts. The impact is low in nature.	• Informal vendor activities around the hospital will be regulated and monitored. • Designated service areas for vendors will be provided. • Local communities will be engaged in awareness programs about hospital operation norms.		
38.	**Noise and Odor from pretreatment of Medical Waste** Operation of on-site medical waste management activities, including autoclaving, laundry, and sterilization units, may generate localized noise and occasional odors. If not adequately controlled, these may affect hospital staff, patients, and nearby sensitive receptors. The impact is low to moderate in nature.	• Enclosed and properly ventilated treatment and sterilization units will be installed to minimize noise and odor emissions. • Adequate spatial separation shall be maintained between noise-generating facilities and sensitive areas such as wards and ICUs will be appropriately sited away from patient wards, where feasible. • Regular inspection and preventive maintenance of equipment will be conducted to reduce operational noise and fugitive emissions. • Non-essential high-noise activities will be scheduled during daytime hours, where practicable. • Operational performance will be monitored to ensure compliance with applicable environmental standards and hospital waste management procedures.	Hospital Administration	Health Department
39.	**Staff and Visitor Traffic Management** Congestion at parking areas, ambulance bays, and main entrances can lead to delays, stress, and increased risk of accidents, especially during emergencies. The impact is moderate in nature.	• Clear drop-off and pick-up zones will be defined. • Signage will be provided, and traffic management personnel will be deployed to regulate flow. • Separate access routes for emergency vehicles, staff, and visitors will be established to reduce conflicts.	Hospital Administration	Health Department
40.	**Emergency Preparedness and Disaster Management** **Natural Disasters**	• Compliance with the Seismic Building Code of Pakistan (SBC-07) will be ensured.	Hospital Administration	Health Department

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	**Monitoring**
	Natural disasters such as earthquakes or floods may cause structural damage, injuries, and operational disruptions. The impact is high in nature.	• An Emergency Response Plan (ERP) will be implemented, with staff training and periodic drills conducted. • Emergency equipment and contact numbers will be clearly displayed. • Minor incidents and near-misses will be logged to inform preventive measures.		
41.	**Fire Safety** Fires due to electrical faults, flammable chemicals, or oxygen cylinders may threaten patients, staff, and nearby communities. The impact is high in nature.	• Comprehensive fire detection and suppression systems will be installed and maintained. • Fire drills and emergency evacuation plans for staff and patients will be conducted regularly. • Flammable materials will be stored and handled safely. • Clear signage for fire exits and emergency routes will be provided.	Hospital Administration	Health Department

9.8 MONITORING PLAN

617. To ensure the effective implementation of mitigation measures, a monitoring plan will be integrated with the mitigation plan across all stages of the project. The Contractor will conduct continuous field-level monitoring, while the SC will review and validate the Contractor's monitoring activities to ensure compliance and effectiveness.

9.8.1 Monitoring Mechanism

618. Safeguard monitoring is an essential tool for assessing whether the adopted environmental and social management measures are meeting their stated objectives. Two complementary methodologies shall be applied to monitor the proposed actions under the EMP:

- Compliance monitoring: To check the compliance of actions proposed by the EMP by visual observation, photographic documentation and the use of checklists etc.; and
- Effects monitoring: To monitor the consequences of program/activities on the biophysical and social environment; as applicable, the effects are repeatedly measured by applying selected indicators.

619. Monitoring will be carried out to ensure that the mitigation plans are regularly and effectively implemented. It will be performed at three levels. C&W through PMIU will ensure EMP monitoring regularly to ensure that the mitigation plans are being effectively implemented SC will monitor regularly the mitigation plans are being effectively implemented. At contractor's level, the environmental monitoring checklist will be filled on daily basis by their environmental manager.

9.8.2 Monitoring Plan

620. Monitoring plan during pre-construction and construction phases of the project is proposed to establish the baseline condition and ensure contractors compliance with the mitigation measures and evaluation along with the monitoring indicators and frequency **(Table 9.3)** whereas instrumental monitoring and testing in **Table 9.4.**

621. The monitoring plan for the construction phases is designed to ensure the Contractor's compliance with prescribed mitigation measures. It also defines monitoring indicators and monitoring frequency, as presented in **Table 9.3.** Instrumental monitoring and laboratory testing requirements are provided separately in **Table 9.4.**

Table 9.3: Environmental Monitoring Schedule

Sr. No.	Receptor	Monitoring Parameters / Performance Indicator	Locations	Monitoring Mechanism	Monitoring and Reporting Frequency	Responsibility	
						Implementation	Supervision
1.	Water Resources/ Water Quality	Compliance with all parameters as per NEQS.	Monitoring locations will be finalized by the Contractor in the site-specific EMP, subject to approval by the SC.	Visual checks of laboratory activities Discrete grab sampling and laboratory testing of water samples by KP-EPA approved Laboratory for monitoring.	Once before the start of construction activity On quarterly basis during the construction	Contractor (through KP-EPA-approved laboratory)	Supervision Consultant (SC); PMIU
2.	Soil Contamination	Soil contamination, uncontrolled solid waste disposal activities at sites.	Monitoring locations will be finalized by the Contractor in the site-specific EMP, subject to approval by the SC.	Visual observations and checks of laboratory activities Sampling and laboratory testing for soil samples.	Once before the start of construction activity On quarterly basis during the construction	Contractor	Supervision Consultant (SC); PMIU
3.	Dust Emissions	Compliance with PM_{10} $PM_{2.5}$ as per NEQS	Monitoring locations will be finalized by the Contractor in the site-specific EMP, subject to approval by the SC.	Visual checks of laboratory activities Onsite Ambient Air Monitoring equipment	Once before the start of construction activity On quarterly basis during the construction	Contractor (through KP-EPA-approved laboratory)	Supervision Consultant (SC); PMIU
4.	Noise Pollution	Compliance with dBA Leq. as per NEQS	Monitoring locations will be finalized by the Contractor in the site-specific EMP, subject to approval by the SC.	Visual checks of laboratory activities Monitoring of noise level at site.	Once before the start of construction activity On quarterly basis during the construction	Contractor (through KP-EPA-approved laboratory)	Supervision Consultant (SC); PMIU

Sr. No.	Receptor	Monitoring Parameters / Performance Indicator	Locations	Monitoring Mechanism	Monitoring and Reporting Frequency	Responsibility	
						Implementation	Supervision
5.	Fumes and Gases	Monitoring of CO, CO_2, SO_x, NO_x, HC and $PM_{2.5}$ PM_{10} and compliance with NEQS Vehicular emissions as per NEQS	Monitoring locations will be finalized by the Contractor in the site-specific EMP, subject to approval by the SC.	Visual checks of laboratory activities Onsite monitoring of ambient air quality will be preferred.	Once before the start of construction activity On quarterly basis during the construction		Supervision Consultant (SC); PMIU
6.	Ecological Resources	Disturbance to plants which can be avoidable. Implementation of Plantation Plan	Monitoring locations will be finalized by the Contractor in the site-specific EMP, subject to approval by the SC.	Visual checks to ensure that only marked trees are cut within the Project Boundary Monitoring of animals / birds hunting.	Once prior to the start of construction Monitoring and reporting on monthly basis during the construction stage.	Contractor	Supervision Consultant (SC); PMIU

Table 9.4: Instrumental Monitoring and Lab Testing

Item No.	Components	Parameters	No. of Samples	Frequency	Duration	Amount (Rs.)	Responsibility
A	**Construction Phase (24 Months)**						
1	**Air Quality**	As per NEQS	1	Quarterly	24 hours	520,000/-@ Rs. 65,000/ sample	Contractor (through KP-EPA-approved laboratory)
2	**Drinking Water Quality**		1	Quarterly	-	256,000/- @ Rs. 32,000/sample	
3	**Waste Water Quality**		1	Quarterly	-	256,000/- @ Rs. 32,000/sample	
4	**Noise Level**		1	Quarterly	24 hours	40,000/-@ Rs. 5,000/point	
					Sub-Total (A)	**1,072,000**	
B	**Operation (For One year)**						
1	**Air Quality**	As per NEQS	1	Once	24 hours	65,000/-@ Rs. 65,000/ sample	Hospital Administration (through KP-EPA-approved laboratory)
2	**Drinking Water Quality**		1	Once	-	32,000/- @ Rs. 32,000/sample	
3	**Waste Water Quality**		1	Once	-	30,000/- @ Rs. 30,000/sample	
4	**Noise Level**		1	Once	24 hours	5,000/-@ Rs. 5,000/point	
					Sub-Total (B)	**132,000**	
					Total (A+B)	**1,204,000**	

9.9 MANAGEMENT PLANS AND WORKERS COC

622. Various management plans have been identified to ensure the effective implementation of the EMP across all phases of the proposed project. These plans will be further developed and updated by the Contractor to reflect site-specific conditions, and will be submitted to the SC for review and approval prior to the commencement of construction activities. The identified plans are listed below:

- Tree Plantation Plan;
- HSE Management Plan;
- Emergency Preparedness and Response Framework;
- Waste Management Plan;
- Traffic Management Plan;
- Change Management Plan;
- Sanitation Plan;
- Resource Conservation Plan; and
- Service Continuity Plan.

623. The worker CoC shall be developed by the Contractor's ESHS staff to address SEA, SH, GBV, and child labour, and will be submitted for approval by the SC. Once approved, the Code will be displayed prominently at the project site in the form of banners, and copies of the approved document will be made available on-site. All workers will be informed of its provisions through training and awareness sessions to ensure full understanding and compliance. This Code will clearly define acceptable behavior, prohibit all forms of misconduct, and outline disciplinary measures for violations

9.9.1 Tree Plantation Plan

624. As an Environmental enhancement measure trees will be planted. These plants can be raised within or nearby the project vicinity under the supervision of PMIU at later stage, to improve the landscape of the area. These plants can be raised in area at an average 10'*10' rate of spacing while technically observing site quality and capacity in the light of plantation objectives. A comprehensive tree plantation plan for proposed project is provided in **Annex-IV.**

9.9.2 HSE Management Plan

625. Health risks and work safety problems may result at the workplace if the working conditions provide unsafe and/or unfavorable working environment due to storage, handling and transport of hazardous construction material. Workers will be provided with safe and healthy working environment considering risks inherent to the particular sector and specific classes of hazards in Project Area. During construction phase, Contractor will be responsible for all HSE related issues and to comply with national laws and international standards for occupational health and safety. The ultimate goal of the plan is to eliminate any injury to human and damage to facilities, materials and the environment. The Guideline HSE Plan is attached as **Annex-XV** in IEE**.**

626. The following measures are identified for health, safety, and environment protection during all activities of the proposed project to minimize risk of accidents, which could endanger the life of personnel, cause damage to properties and environment:

- All contractor staff shall be well informed and trained on the HSE policies and guidelines;
- Contractor shall provide adequate health services as well as site first aid services for its workforce;
- The main priority of the contractor shall be to prevent accidents during mobilization, construction phase of the proposed Project. Prevention of workplace accidents during the construction activities will be achieved using approved work plan/instructions by the supervisors;
- Work safety measures and good workmanship practices shall be followed by the contractor to ensure no health risks for workers;
- Provision of adequate sanitation, washing, cooking and dormitory facilities for workers from other cities;
- Proper maintenance of facilities for workers shall be monitored;
- Provision of protective clothing for labour handling hazardous materials, e.g. helmet, adequate footwear for bituminous pavement works, protective goggles, etc. and contractor will ensure strict use of wearing these protective clothing during work activities;
- Elaboration of a contingency planning by the contractor at work site in case of major accidents shall be carried out. A comprehensive emergency preparedness and response plan will be developed and implemented at site;
- A site-specific fire-fighting plan also needs to be developed and implemented by Contractor during construction phase;
- Accidents shall be reported and investigated by the Contractor. All personnel shall be encouraged to report all accidents/incidents and to cooperate in the investigation of such occurrence. A comprehensive accident/incident report will be produced for review and necessary action;
- Adequate signage, lightning devices, barriers, and persons with flags during construction to manage traffic at haulage shall be conducted;
- The communicable disease of most concern during construction phase, like sexually-transmitted diseases such as HIV/AIDS, will be prevented by successful initiative typically involving health awareness, education initiatives, training heath workers in disease treatment, immunization program and providing health service;
- Reducing the impacts of vector borne diseases on long-term health effect of workers will be accomplished through implementation of diverse interventions aimed at eliminating the factors that lead to disease;
- All construction activities shall be properly managed through careful planning and the applicable and relevant HSE policies; and
- Prior approval from SC will be sought before starting any construction related activity.

9.9.3 Emergency Preparedness and Response Framework

627. The framework provides an overview of the procedures to mitigate and control the impacts on community, on occupational health and safety, on the environment and on the Project in the event of emergency situations and to respond in life threatening situations usually occurring suddenly and unexpectedly during the construction and operational phases of the proposed project. This framework applies to all the processes of emergency responses to accidental calamities that can occur in an office, construction area and living area as well as first aids and emergency responses as per actual

environmental situations during construction. This framework also provides a general reference and a basis for a detailed sub-plans and procedures that have to be developed by the Contractor before the initiation of the construction of the project and will be approved by the proponent. The Guideline Emergency Preparedness and Response Plan is attached as **Annex-XII** in IEE**.** The framework needs to be developed with following objectives:

- Outline the applicable standards with regards to emergency preparedness and response;
- Define the emergency preparedness and response procedures utilized during the construction phase;
- Define persons and departments involved in emergency preparedness and their roles and responsibilities; and
- Define training requirements.

628. Various categories of risks can be envisaged in a working or construction environment. The response to each hazard will be different. A few types of emergencies/accidents will include the following:

- Natural risk: earthquake, flood, and other natural disaster;
- Political risk: civil strife, upheaval, riot, kidnap, and terrorist attack;
- Construction: fire, traffic accident, falling, hit and electric shock;
- Public health: dengue fever, malaria, food sanitation, high-temperature operation, insect sting, and
- Security: injury and property loss resulted from theft, robbery, and law case.

629. To minimize human suffering and financial losses, all personnel must know their responsibilities under the emergency preparedness and response plan. The plan will be used to set emergency procedures, implement and communicate the procedures and ensure that any required training has been completed. Planning for emergencies will include the following points:

- Hazard identification/assessment;
- Emergency resources;
- Communication systems;
- Administration of the plan;
- Emergency response procedure;
- Communication of the procedure; and
- Debriefing and post-traumatic stress procedure.

9.9.4 Waste Management Plan

630. Management of solid and hazardous waste is one of the most important issues during construction phase of the project. It is estimated that around 25 workers will be accommodated in the construction camp during construction phase, who will utilize water for washing, cooking and bathing purposes. That will generate sewage at the construction camps. In addition to that construction camp will generate solid waste at

site. Similarly, a considerable amount of solid waste will be generated during the operation phase of the proposed project.

631. The major components of the workers' camp waste are garbage, putrescible waste, rubbish and small portion of ashes and residues, wastewater from camps toilets and washing yards, etc. The construction waste will include wastewater, oil spillage from machinery and solid waste (damaged or spoiled materials, temporary and expendable construction materials, etc.). Insecure and unhygienic disposal of the wastes may cause degradation of soil, land and water resources. However, a criterion has been developed for the solid and hazardous waste management at site. The criterion is as follows:

- All the anticipated solid wastes will be collected through a properly designed solid waste management system. Enough number of containers will be placed inside the camps and within the construction area for the collection of various types of waste;
- These containers will help the component separation of various types of waste at source. Classification will be based on organic waste, recyclable waste, reusable waste (for resource and recovery) and waste for disposal site. Based on the conditions of the region, organic waste will be frequently collected to avoid odor problems;
- Recyclable, reusable and waste for disposal site will be collected twice a week and on alternate days and will be transferred to a properly designed disposal site;
- The sewage system for camps shall be properly designed (pit latrines or, as required, septic tanks) to receive all sanitary wastewaters;
- Lined wash areas shall be constructed within the camp site or at site, for the receipt of wash waters from construction machinery;
- Medical waste and construction waste will be handled with care.;
- Construction waste i.e., waste concrete, bricks, cement, etc. will be disposed of at the designated areas; and
- Construction workers and supervisory staff will be encouraged and educated to practice waste minimization, reuse and recycling to reduce quantity of the waste for disposal.

9.9.5 Traffic Management Plan

632. A comprehensive traffic management plan will be developed by Contractor mentioning routes to be followed for transportation of construction machinery and materials e.g. cement, steel, gravels, sand, etc. to mitigate any impact that are envisaged upon the patients and staff. Traffic management plan will comprise following contents necessarily:

- Goals and objectives of plan;
- Purpose & Scope;
- Project specific traffic;
- Roles & responsibilities of contractors' environmental personnel;
- Routes to be followed along with necessary maps;
- Transportation timing; and
- Mechanism to address road accidents (if occurs).

9.9.6 Change Management Plan

633. The IEE and EMP have been prepared at feasibility phase of the proposed Project. Both are living documents and it has been foreseen that during the detailed design phase the documents may be updated and the EMP has to be refined. The EMP will be refined in the light of updated results of ambient air quality, noise, drinking water and surface water/wastewater. It will further be updated in the light of possible adverse environmental impacts and if necessary then any additional mitigation and enhancement measures will also be added to the EMP. Any sort of change in EMP has to be informed to all concerned personnel/departments.

9.9.7 Sanitation Plan

634. A Sanitation Plan shall be developed and implemented by the Contractor to ensure adequate hygiene and sanitation conditions at the project site. The plan will include provision of clean and sufficient toilets, handwashing facilities, safe drinking water, and proper waste collection and disposal systems. It will define regular cleaning schedules, maintenance responsibilities, and measures to prevent contamination and health risks especially in those areas where isolation wards are present. Separate facilities for male and female workers will be ensured where applicable, and awareness will be provided to workers on hygiene practices for hospital. The plan shall comply with relevant national regulations and international ESHS standards, and will be regularly monitored for effectiveness.

9.9.8 Resource Conservation Plan

635. A Resource Conservation Plan shall be developed and implemented for the hospital project to promote efficient use of natural resources and minimize environmental impacts. The plan will focus on optimizing water and energy consumption through measures such as installation of water-saving fixtures, rainwater harvesting, energy-efficient lighting, and use of renewable energy where feasible. It will also include strategies for minimizing material waste, promoting reuse and recycling of construction materials, and responsible procurement of sustainable resources. Specific attention will be given to high-demand hospital operations, ensuring efficient use of medical equipment, HVAC systems, and utilities. The plan will define roles and responsibilities, monitoring mechanisms, and performance targets, and will be regularly reviewed and updated to ensure continuous improvement in resource efficiency throughout the project lifecycle.

9.9.9 Service Continuity Plan

636. The Service Continuity Plan (SCP) shall be prepared prior to commencement of works and implemented throughout the construction phase to ensure uninterrupted healthcare service delivery, patient safety, and compliance with environmental and social safeguards. The plan shall identify critical services and potential disruption risks, and define appropriate mitigation measures, including backup arrangements, temporary service alternatives, and clear assignment of roles and responsibilities. It will also establish communication protocols, emergency response procedures, and coordination

mechanisms with the hospital administration and SC. The SCP shall be regularly reviewed, updated, and, where necessary, tested to ensure its continued effectiveness in maintaining essential hospital services throughout the project implementation period.

9.10 CHANCE FIND PROCEDURE

637. In case of any chance find, the Contractor will immediately report through SC to Archaeology Department, KP and take further suitable action to preserve those antiques or sensitive remains. Representative of the Director will visit the site and observe the significance of the antique, artifact and cultural (religious) properties and significance of the Project. The report will be prepared by representative and will be given to the Director. The documentation will be completed and if required suitable action will be taken to preserve those antiques and sensitive remains. In case any artifact, antiques and sensitive remains are discovered, chance find procedures will be adopted by construction contractor workers as follows:

- Stop the construction activities in the areas of chance find;
- Delineate the discovered site or area;
- Consult with the local community and Archaeological Department, KP;
- The suggestion of the local communities and the concerned authorities will be incorporated during taking the preventive measures to conserved the antique, artefact and Cultural (religious) properties;
- Secure the site to prevent any damage or loss of removable objects. In case of removable antiquities or sensitive remain, a night guard shall be arranged until the responsible local authorities take over; and
- After stopping work, the Contractor must immediately report the discovery to the SC.

9.11 GRIEVANCE REDRESSAL MECHANISM

638. In order to receive and facilitate the resolution of affected peoples' concerns, complaints, and grievances about the project's environmental performance, an Environmental GRM will be established for the proposed project. The GRM will address affected people's concerns and complaints proactively and promptly, using an understandable and transparent process that is gender responsive, culturally appropriate and readily accessible to all segments of the affected people at no costs and without retribution.

639. The SC will facilitate the PIU for the establishment of a Grievance Redress Committee (GRC) at project location prior to the Contractor's mobilization to site. The functions of the GRC are to address the concerns and grievances of the local communities and affected parties as necessary. A complaint register will be maintained at workers' camp on routine basis. The complaint register will contain minimum of the following information:

- Name and address of complainant;
- Complaint description;
- Action taken/recommended;
- Name of responsible person;

- Status of resolution of complaints; and
- Other necessary information/record and reasons in case issue not resolved.

9.12 EMP COST

640. Implementation of the recommendations of the IEE during the construction phase is the sole responsibility of the Contractor and the monitoring activities will be carried out by the SC. Cost for environmental management and monitoring will be the part of the contract document with the Contractor. It must be noted that environmental cost will not be a separate entity because all of its components will be addressed in the bidding document under various heads of account. Cost for environmental management for each site is provided in **Table 9.5.** Break up of estimated cost for the implementation of HSE Management and PPE for each location is given in **Table 9.6 and Table 9.7** respectively. The contactor(s) shall be paid for these items after providing the implementation and cost incurred evidences duly approved by SC and PIU. Hence, the estimated EMP cost for Phase 1 is **Rs. 55,592,400**.

Table 9.5: Environmental Management Cost

Sr. No.	Item	Description	Amount (PKR) per Hospital
1	Environmental Monitoring Cost	Air, Noise and Water quality testing on quarterly basis for 24 months	1,204,000
2	Cost of training and capacity building	Four training sessions during the construction period	350,000
3	Cost of hiring HSE and social specialist for EMP implementation	One HSE Specialist and one Social and gender Specialist for 24 months	4,800,000
4	Cost of Health & Safety and other miscellaneous items (**Refer Table 9.6**)	Cost of PPEs, water sprinkling medical screening of workers, construction waste handling and worker welfare facility etc.	2,411,400
5	Cost of Tree Plantation as environmental enhancement measure	Lump sum	500,000
		Grand Total	**9,265,400**

Table 9.6: HSE Management Cost

Sr. #.	Items	Description	Amount (PKR) per Hospital
1	Water Sprinkling	Lumpsum	100,000
2	Medical screening for workers	Rs. 5000 per employee and for 25 employees	125,000
3	Material Storage, handling and use	One no. of tarpaulins of Rs. 32,000 for one year	32,000
4	Handling/ transportation of solid waste including hazardous material	Rs. 30,000/month for a period of 24 months will be required for transportation of material	720,000
6	Provision of Safety sign boards, safety cones, warning tapes etc.	Lumpsum	55,000
7	Fire extinguishers in case of fire	3 Nos. DCP fire extinguisher @ Rs. 3300/-	52,400
		3 Nos. CO_2 fire extinguisher @ Rs. 7500/-	

Sr. #.	Items	Description	Amount (PKR) per Hospital
		1 No Fire alarm@Rs.20,000/-	
8	Cost of PPE*	Refer **Table 9.7**	1,327,000
		Total	**2,411,400**

Table 9.7: Break Up of PPEs

Sr. No.	Items	Quantity	Rate (Rs.)	Amount (PKR) per Hospital
	PPEs			
I	Face masks.	2600	100	260,000
II	Safety Shoes	50	6000	300,000
III	Safety Helmet	50	1500	75,000
IV	Safety Goggles	100	550	55,000
V	Safety Jackets	50	1000	50,000
VI	Gloves	600	600	360,000
VII	First Aid Box	1	6000	6,000
VIII	Ear Plugs	2600	85	221,000
			Total	**Rs.1,327,000/-**
	Time required for Construction = 24 months			
	No. of labour required = 25			
	Detail of PPE			
I	Dust masks	1 dust mask to be used in a week by each labourer		
II	Safety Shoes	1 Pair of safety shoes for one year for each labourer		
III	Safety Helmet	1 safety Helmet for one year for each Worker		
IV	Safety Goggles	2 safety goggles for each labourer		
V	Safety Jackets	1 safety Jackets (Hi Vis) for each labourer		
VI	Gloves	1 pair of gloves for each labourer for a month		
VII	First Aid Box	1 first aid box		
VIII	Ear Plugs	2 set of ear plug for each labourer		

9.13 IMPLEMENTATION OF THE CAP

641. The CAP identifies corrective measures required to address existing environmental deficiencies at the participating hospitals. The identified actions shall be implemented prior to and during the rehabilitation works, with selected actions continuing during hospital operation to ensure sustained compliance with applicable environmental requirements and ADB SPS (2009). **Table 9.8** outlines CAP for the hospitals in phase 1.

Table 9.8: Corrective Action Plan

Sr. No.	Hospital	Existing Environmental Liability	Corrective Action	Responsibility			Indicator	Timeline	Indicative Cost (PKR) Annual Basis
				Implementation	Monitoring	Funding Source			
1	**Naseerullah Khan Babar Hospital**	• Inadequate healthcare waste segregation; no on-site treatment; poor record keeping. • No on-site wastewater treatment; direct discharge to municipal sewer. • Gaps in PPE provision and use, electrical safety, housekeeping, hazardous materials, signage, sharps and biological exposure controls. • Limited/overdue fire extinguishers; no fire detection/alarm or fixed firefighting system; inadequate escape routes/signage; no documented emergency procedures, training or drills. • No structured environmental monitoring programme and limited institutional capacity.	**Medical Waste:** • Provide colour-coded bins and sharps containers; • Provide waste-segregation signage at waste-generation and temporary storage areas. • Establish daily waste-generation and disposal records; • Establish a documented arrangement with an approved healthcare-waste treatment and disposal facility in accordance with national regulations and international good practice. Where feasible, prioritize environmentally sound non-incineration treatment technologies • Provide/upgrade a secure designated temporary healthcare-waste storage area with washable surfaces, controlled access and protection from weather, patients and unauthorized persons. • Maintain waste transfer manifests/receipts or equivalent evidence of treatment and final disposal.	Hospital Administration	HSE Focal Person/ PMIU Safeguards Unit	Funding by ADB under KPHSSP.	**Waste**: • 100% of identified waste-generation points provided with appropriate colour-coded bins and sharps containers. • Waste-segregation signage installed at relevant locations. • Daily waste records • Approved waste treatment/disposal arrangement documented and disposal records maintained.	Within 3 months from commencement of the project.	Cost included in KPHSSP
			Wastewater: • Rehabilitate/upgrade the internal sewerage network and discharge connection to eliminate leakage, blockage and uncontrolled discharge. • Rehabilitate existing septic tanks, including structural repairs, inlet/outlet improvements, watertight access covers and appropriate desludging arrangements. • Install screens at appropriate drainage points to prevent solids and debris from entering the wastewater system. • Apply source-specific controls/pre-treatment for wastewater streams requiring additional control, such as grease traps for kitchen wastewater and screens/lint traps for laundry wastewater.	Hospital Administration	HSE Focal Person/ PMIU Safeguards Unit	Included in the approved scope of work for the current project.	**Wastewater**: • Rehabilitated sewerage network completed and functional; discharge connection inspected and documented. • Septic tank rehabilitated, leak-free and operational; inspection/commissioning record available. • Wastewater quality monitoring conducted at least annually through a KP-EPA approved laboratory, with results demonstrating compliance with applicable national environmental quality standards (NEQS) or corrective actions implemented where exceedances are identified.	After completion of rehabilitation works	Included in the approved scope of work for the current project.

Sr. No.	Hospital	Existing Environmental Liability	Corrective Action	Responsibility			Indicator	Timeline	Indicative Cost (PKR) Annual Basis
				Implementation	Monitoring	Funding Source			
			• Ensure appropriate management of laboratory chemicals, pharmaceuticals and other hazardous liquid wastes and prevent their discharge into the wastewater system. • Establish routine inspection and maintenance of the wastewater collection system and septic tanks. • Establish scheduled septic-tank inspection and desludging, with records maintained. • Conduct periodic wastewater quality monitoring,	Hiring of KP-EPA approved Laboratory	HSE Focal Person	Health Department Budget	• Monitoring Records.	Annual basis after completion of rehabilitation works	100,000
			OHS: • Provide required PPE and close critical electrical, housekeeping, hazardous-material, sharps and biological-exposure gaps. • Improve designated storage areas and general Housekeeping.	Hospital Administration	HSE Focal Person/ PMIU Safeguards Unit	• Electrical distribution, internal wiring and power-supply improvements are Included in the approved scope of work for the current project. • PPE, routine housekeeping and operational OHS measures in Health Department Budget.	**OHS:** Monthly OHS inspections conducted and documented; PPE availability records maintained; incidents, near misses, first-aid cases, and corrective actions recorded and report.	After completion of rehabilitation works Within 3 months from commencement of the project.	Included in the approved scope of work for the current project. 6,000,000
			Fire/Life Safety: • Conduct fire-risk assessment for hospital and update emergency response procedures accordingly. • Service/replace overdue extinguishers; • Provide fire detection/alarm in Critical areas; mark and maintain unobstructed emergency escape routes/exits; • Establish documented emergency procedures; conduct fire/emergency drill and record corrective actions.	Hospital Administration	HSE Focal Person/ PMIU Safeguards Unit	Included in the approved scope of work for the current project.	**Fire/Life Safety:** • All identified overdue/defective extinguishers serviced or replaced. • Fire detection/alarm provided and operational in identified critical areas. • Emergency exits/routes clearly marked and unobstructed. • Emergency procedure documented and at least one drill completed, with attendance and corrective-action record.	After completion of rehabilitation works	Included in the approved scope of work for the current project.
			Monitoring: • Designate hospital environmental/HSE focal person and establish monthly environmental/OHS inspection records.	Hospital Administration	PMIU Safeguards Unit	Hospital Administration Budget	**Monitoring:** • Environmental/HSE Focal Person designated and monthly inspection records maintained.	Within 3 months from commencement of the project.	2,400,000
								Total	8,500,000

Sr. No.	Hospital	Existing Environmental Liability	Corrective Action	Responsibility			Indicator	Timeline	Indicative Cost (PKR) Annual Basis
				Implementation	Monitoring	Funding Source			
2	**Maulvi Jee Hospital**	• Healthcare waste segregation practiced and on-site incineration available; limited colour-coded bins and incomplete records • No on-site wastewater treatment; direct discharge to municipal sewer. • Drinking Water quality is not reliable • Gaps in PPE, electrical safety, housekeeping, hazardous materials, signage, sharps and biological exposure controls. • Fire extinguishers unavailable; no fire detection/alarm or fixed firefighting system; inadequate escape routes/signage; no documented emergency procedures, training or drills. • No structured environmental monitoring programme and limited institutional capacity.	**Medical Waste:** • Provide additional colour-coded waste bins and sharps containers at all identified waste-generation points. • Provide waste-segregation signage at waste-generation and temporary storage areas. • Establish daily healthcare-waste generation, collection and disposal records. • Conduct environmental compliance assessment of existing incinerators and ensure operation, maintenance, emissions control, and ash disposal comply with applicable national requirements. • Establish a documented arrangement with an approved healthcare-waste treatment and disposal facility in accordance with national regulations and international good practice. Where feasible, prioritize environmentally sound non-incineration treatment technologies. • Provide/upgrade a secure designated temporary healthcare-waste storage area with washable surfaces, controlled access and protection from weather, patients and unauthorized persons. • Assess the continued use of the existing incinerator against applicable environmental requirements and, where practicable, adopt an environmentally sound and approved healthcare-waste treatment/disposal arrangement. • Maintain waste transfer manifests/receipts or equivalent evidence of treatment and final disposal.	Hospital Administration	HSE Focal Person/ PMIU Safeguards Unit	Funding by ADB under KPHSSP.	**Waste**: • 100% of identified waste-generation points provided with appropriate colour-coded bins and sharps containers. • Waste-segregation signage installed at relevant locations. • Daily waste records • Approved waste treatment/disposal arrangement documented and disposal records maintained. Drinking water quality tested at least annually by an accredited laboratory and meeting national drinking water quality standards.	Within 3 months from commencement of the project.	Cost included in KPHSSP
			Waste water: • Rehabilitate/upgrade the internal sewerage network and discharge connection to eliminate leakage, blockage and uncontrolled discharge. • Rehabilitate existing septic tanks, including structural	Hospital Administration	HSE Focal Person/ PMIU Safeguards Unit	Included in the approved scope of work for the current project.	**Wastewater**: • Rehabilitated sewerage network completed and functional; discharge connection inspected and documented. • Septic tank rehabilitated, leak-free and operational;	After completion of rehabilitation works	Included in the approved scope of work for the current project.

Sr. No.	Hospital	Existing Environmental Liability	Corrective Action	Responsibility			Indicator	Timeline	Indicative Cost (PKR) Annual Basis
				Implementation	Monitoring	Funding Source			
			repairs, inlet/outlet improvements, watertight access covers and appropriate desludging arrangements. • Install screens at appropriate drainage points to prevent solids and debris from entering the wastewater system. • Apply source-specific controls/pre-treatment for wastewater streams requiring additional control, such as grease traps for kitchen wastewater and screens/lint traps for laundry wastewater. • Ensure appropriate management of laboratory chemicals, pharmaceuticals and other hazardous liquid wastes and prevent their discharge into the wastewater system. • Establish routine inspection and maintenance of the wastewater collection system and septic tanks. • Establish scheduled septic-tank inspection and desludging, with records maintained. Conduct periodic wastewater quality monitoring,	Hiring of KP-EPA approved Laboratory	HSE Focal Person	Health Department Budget	inspection/commissioning record available. • Wastewater quality monitoring conducted at least annually through a KP-EPA approved laboratory, with results demonstrating compliance with applicable national environmental quality standards (NEQS) or corrective actions implemented where exceedances are identified. Monitoring Records.	Annual basis after completion of rehabilitation works	100,000
			Drinking water • Provision of Safe and adequate drinking water facilities •	Hospital Administration Hiring of KP-EPA approved Laboratory	HSE Focal Person HSE Focal Person	Health Department Budget Health Department Budget	• Safe drinking water available at all designated drinking-water points. • Required water-storage/backup arrangement provided and functional. • Drinking-water quality testing completed and results documented. • Water coolers/filtration units operational and maintained. • Water-storage tanks cleaned/disinfected and records maintained. • Monitoring Records.	3 months Annual basis after completion of rehabilitation works	1,000,000 100,000
			OHS: • Provide required PPE and close critical electrical, housekeeping, hazardous-material, sharps and biological-exposure gaps. • Improve designated storage areas and general housekeeping.	Hospital Administration	HSE Focal Person/PMIU Safeguards Unit	• Electrical distribution, internal wiring and power-supply improvements are Included in the approved scope of	**OHS:** • Monthly OHS inspections conducted and documented; PPE availability records maintained; incidents, near misses, first-aid cases, and corrective actions recorded and reported •	After completion of rehabilitation works	Included in the approved scope of work for the current project.

Sr. No.	Hospital	Existing Environmental Liability	Corrective Action	Responsibility			Indicator	Timeline	Indicative Cost (PKR) Annual Basis
				Implementation	Monitoring	Funding Source			
						work for the current project. • PPE, routine housekeeping and operational OHS measures in Health Department Budget		**3 months**	**5,000,000**
			Fire/Life Safety: • Conduct fire-risk assessment for hospital and update emergency response procedures accordingly. • Provide and properly locate fire extinguishers based on fire-risk assessment. • Provide fire detection/alarm in critical areas. • Mark and maintain unobstructed emergency escape routes/exits. • Establish documented emergency procedures. • Conduct fire/emergency drill and record corrective actions.	Hospital Administration	HSE Focal Person/PMIU Safeguards Unit	Included in the approved scope of work for the current project.	**Fire/Life Safety:** • All identified overdue/defective extinguishers serviced or replaced. • Fire detection/alarm provided and operational in identified critical areas. • Emergency exits/routes clearly marked and unobstructed. • Emergency procedure documented and at least one drill completed, with attendance and corrective-action record.	After completion of rehabilitation works	Included in the approved scope of work for the current project. .
			Environmental Monitoring: • Designate hospital Environmental/HSE Focal Person and establish monthly environmental/OHS inspection records.	Hospital Administration	PMIU Safeguards Unit	Hospital Administration Budget	**Monitoring:** • Environmental/HSE Focal Person designated and monthly inspection records maintained.	Within 3 months from commencement of the project.	2,400,000
								Total	8,600,000
3	**DHQ Charsadda**	• Limited healthcare waste segregation; incinerator temporarily non-operational; incomplete records. • No on-site wastewater treatment; direct discharge to municipal sewer. • Gaps in PPE, electrical safety, housekeeping, hazardous materials, signage, sharps and biological exposure controls. • Limited/overdue fire extinguishers; no fire detection/alarm or fixed firefighting system; inadequate escape routes/signage; no documented emergency procedures, training or drills. • No structured environmental monitoring programme and limited institutional capacity.	**Medical Waste:** • Provide colour-coded bins and sharps containers; • Provide waste-segregation signage at waste-generation and temporary storage areas. • Establish daily waste-generation and disposal records; • Establish a documented arrangement with an approved healthcare-waste treatment and disposal facility in accordance with national regulations and international good practice. Where feasible, prioritize environmentally sound non-incineration treatment technologies. • Provide/upgrade a secure designated temporary healthcare-waste storage area with washable surfaces,	Hospital Administration	HSE Focal Person/PMIU Safeguards Unit	Funding by ADB under KPHSSP.	**Waste**: • 100% of identified waste-generation points provided with appropriate colour-coded bins and sharps containers. • Waste-segregation signage installed at relevant locations. • Daily waste records • Approved waste treatment/disposal arrangement documented and disposal records maintained.	Within 3 months from commencement of the project.	Cost included in KPHSSP

Sr. No.	Hospital	Existing Environmental Liability	Corrective Action	Responsibility			Indicator	Timeline	Indicative Cost (PKR) Annual Basis
				Implementation	Monitoring	Funding Source			
			controlled access and protection from weather, patients and unauthorized persons. • Maintain waste transfer manifests/receipts or equivalent evidence of treatment and final disposal.						
			Wastewater: • Rehabilitate/upgrade the internal sewerage network and discharge connection to eliminate leakage, blockage and uncontrolled discharge. • Rehabilitate existing septic tanks, including structural repairs, inlet/outlet improvements, watertight access covers and appropriate desludging arrangements. • Install screens at appropriate drainage points to prevent solids and debris from entering the wastewater system. • Apply source-specific controls/pre-treatment for wastewater streams requiring additional control, such as grease traps for kitchen wastewater and screens/lint traps for laundry wastewater. • Ensure appropriate management of laboratory chemicals, pharmaceuticals and other hazardous liquid wastes and prevent their discharge into the wastewater system. • Establish routine inspection and maintenance of the wastewater collection system and septic tanks. • Establish scheduled septic-tank inspection and desludging, with records maintained. • Conduct periodic wastewater quality monitoring,	Hospital Administration Hiring of KP-EPA approved Laboratory	HSE Focal Person/PMIU Safeguards Unit HSE Focal Person	Included in the approved scope of work for the current project. Health Department	**Wastewater**: • Rehabilitated sewerage network completed and functional; discharge connection inspected and documented. • Septic tank rehabilitated, leak-free and operational; inspection/commissioning record available. • Wastewater quality monitoring conducted at least annually through a KP-EPA approved laboratory, with results demonstrating compliance with applicable national environmental quality standards (NEQS) or corrective actions implemented where exceedances are identified. Monitoring Records.	After completion of rehabilitation works Annual basis after completion of rehabilitation works	Included in the approved scope of work for the current project. 100,000
			OHS: • Provide required PPE and close critical electrical, housekeeping, hazardous-material, sharps and biological-exposure gaps.	Hospital Administration	HSE Focal Person/PMIU Safeguards Unit	• Electrical distribution, internal wiring and power-supply improvements are Included in the approved scope of	**OHS:** Monthly OHS inspections conducted and documented; PPE availability records maintained; incidents, near misses, first-aid cases, and corrective actions recorded and reported.	After completion of rehabilitation works	Included in the approved scope of work for the current project.

Sr. No.	Hospital	Existing Environmental Liability	Corrective Action	Responsibility			Indicator	Timeline	Indicative Cost (PKR) Annual Basis
				Implementation	Monitoring	Funding Source			
			• Improve designated storage areas and general Housekeeping.			work for the current project. • PPE, routine housekeeping and operational OHS measures in Health Department Budget.		Within 3 months from commencement of the project.	12,000,000
			Fire/Life Safety: • Conduct fire-risk assessment for hospital and update emergency response procedures accordingly. • Service/replace overdue extinguishers; • Provide fire detection/alarm in Critical areas; mark and maintain unobstructed emergency escape routes/exits; • Establish documented emergency procedures; conduct fire/emergency drill and record corrective actions.	Hospital Administration	HSE Focal Person/PMIU Safeguards Unit	Included in the approved scope of work for the current project.	**Fire/Life Safety:** • All identified overdue/defective extinguishers serviced or replaced. • Fire detection/alarm provided and operational in identified critical areas. • Emergency exits/routes clearly marked and unobstructed. • Emergency procedure documented and at least one drill completed, with attendance and corrective-action record.	After completion of rehabilitation works	Included in the approved scope of work for the current project.
			Monitoring: • Designate hospital environmental/HSE focal person and establish monthly environmental/OHS inspection records.	Hospital Administration	PMIU Safeguards Unit	Hospital Administration Budget	**Monitoring:** • Environmental/HSE Focal Person designated and monthly inspection records maintained.	Within 3 months from commencement of the project.	2,400,000
								Total	**14,500,000**
4	**DHQ Karak**	• Limited healthcare waste segregation; no on-site treatment; incomplete records. • No on-site wastewater treatment; direct discharge to municipal sewer. • Drinking Water quality is not reliable • Gaps in PPE, electrical safety, housekeeping, hazardous materials, signage, sharps and biological exposure controls. • Fire extinguishers unavailable; no fire detection/alarm or fixed firefighting system; inadequate escape routes/signage; no documented emergency procedures, training or drills. • No structured environmental monitoring programme and limited institutional capacity.	**Medical Waste:** • Provide colour-coded bins and sharps containers; • Provide waste-segregation signage at waste-generation and temporary storage areas. • Establish daily waste-generation and disposal records; • Establish a documented arrangement with an approved healthcare-waste treatment and disposal facility in accordance with national regulations and international good practice. Where feasible, prioritize environmentally sound non-incineration treatment technologies. • Provide/upgrade a secure designated temporary healthcare-waste storage area with washable surfaces, controlled access and protection from weather, patients and unauthorized persons.	Hospital Administration	HSE Focal Person/ PMIU Safeguards Unit	Funding by ADB under KPHSSP.	**Waste**: • 100% of identified waste-generation points provided with appropriate colour-coded bins and sharps containers. • Waste-segregation signage installed at relevant locations. • Daily waste records • Approved waste treatment/disposal arrangement documented and disposal records maintained.	Within 3 months from commencement of the project.	Cost included in KPHSSP

Sr. No.	Hospital	Existing Environmental Liability	Corrective Action	Responsibility			Indicator	Timeline	Indicative Cost (PKR) Annual Basis
				Implementation	Monitoring	Funding Source			
			• Maintain waste transfer manifests/receipts or equivalent evidence of treatment and final disposal.						
			Wastewater: • Rehabilitate/upgrade the internal sewerage network and discharge connection to eliminate leakage, blockage and uncontrolled discharge. • Rehabilitate existing septic tanks, including structural repairs, inlet/outlet improvements, watertight access covers and appropriate desludging arrangements. • Install screens at appropriate drainage points to prevent solids and debris from entering the wastewater system. • Apply source-specific controls/pre-treatment for wastewater streams requiring additional control, such as grease traps for kitchen wastewater and screens/lint traps for laundry wastewater. • Ensure appropriate management of laboratory chemicals, pharmaceuticals and other hazardous liquid wastes and prevent their discharge into the wastewater system. • Establish routine inspection and maintenance of the wastewater collection system and septic tanks. • Establish scheduled septic-tank inspection and desludging, with records maintained. • Conduct periodic wastewater quality monitoring,	Hospital Administration Hiring of KP-EPA approved Laboratory	HSE Focal Person/PMIU Safeguards Unit HSE Focal Person	Included in the approved scope of work for the current project. Health Department	**Wastewater**: • Rehabilitated sewerage network completed and functional; discharge connection inspected and documented. • Septic tank rehabilitated, leak-free and operational; inspection/commissioning record available. • Wastewater quality monitoring conducted at least annually through a KP-EPA approved laboratory, with results demonstrating compliance with applicable national environmental quality standards (NEQS) or corrective actions implemented where exceedances are identified. Monitoring Records.	After completion of rehabilitation works Annual basis after completion of rehabilitation works	Included in the approved scope of work for the current project. 100,000
			Drinking water • Provision of Safe and adequate drinking water facilities	Hospital Administration	HSE Focal Person	Health Department Budget	• Safe drinking water available at all designated drinking-water points. • Required water-storage/backup arrangement provided and functional. • Drinking-water quality testing completed and results documented. • Water coolers/filtration units operational and maintained. • Water-storage tanks cleaned/disinfected and records maintained.	3 months	1,000,000

Sr. No.	Hospital	Existing Environmental Liability	Corrective Action	Responsibility			Indicator	Timeline	Indicative Cost (PKR) Annual Basis
				Implementation	Monitoring	Funding Source			
			•	Hiring of KP-EPA approved Laboratory	HSE Focal Person	Health Department Budget	• Monitoring Records.	Annual basis after completion of rehabilitation works	100,000
			OHS: • Provide required PPE and close critical electrical, housekeeping, hazardous-material, sharps and biological-exposure gaps. • Improve designated storage areas and general Housekeeping.	Hospital Administration	HSE Focal Person/ PMIU Safeguards Unit	• Electrical distribution, internal wiring and power-supply improvements are Included in the approved scope of work for the current project. • PPE, routine housekeeping and operational OHS measures in Health Department Budget.	**OHS:** Monthly OHS inspections conducted and documented; PPE availability records maintained; incidents, near misses, first-aid cases, and corrective actions recorded and reported.	After completion of rehabilitation works	Included in the approved scope of work for the current project..
								Within 3 months from commencement of the project.	10,000,000
			Fire/Life Safety: • Conduct fire-risk assessment for hospital and update emergency response procedures accordingly. • Service/replace overdue extinguishers; • Provide fire detection/alarm in Critical areas; mark and maintain unobstructed emergency escape routes/exits; • Establish documented emergency procedures; conduct fire/emergency drill and record corrective actions.	Hospital Administration	HSE Focal Person/ PMIU Safeguards Unit	Included in the approved scope of work for the current project.	**Fire/Life Safety:** • All identified overdue/defective extinguishers serviced or replaced. • Fire detection/alarm provided and operational in identified critical areas. • Emergency exits/routes clearly marked and unobstructed. • Emergency procedure documented and at least one drill completed, with attendance and corrective-action record.	After completion of rehabilitation works	Included in the approved scope of work for the current project.
			Monitoring: • Designate hospital environmental/HSE focal person and establish monthly environmental/OHS inspection records.	Hospital Administration	PMIU Safeguards Unit	Hospital Administration Budget	**Monitoring:** • Environmental/HSE Focal Person designated and monthly inspection records maintained.	Within 3 months from commencement of the project.	2,400,000
								Total	**13,600,000**
5	**DHQ Haripur**	• Healthcare waste segregation and on-site incineration practiced; limited colour-coded bins and incomplete records. • Septic-tank-available • Gaps in PPE, electrical safety, housekeeping, hazardous materials, signage, sharps and biological exposure controls • Fire extinguishers unavailable; no fire detection/alarm or fixed firefighting system;	**Medical Waste:** • Provide colour-coded bins and sharps containers; • Provide waste-segregation signage at waste-generation and temporary storage areas. • Establish daily waste-generation and disposal records; • Establish a documented arrangement with an approved healthcare-waste treatment and disposal facility in accordance with national regulations and international good practice.	Hospital Administration	HSE Focal Person/ PMIU Safeguards Unit	Funding by ADB under KPHSSP.	**Waste**: • 100% of identified waste-generation points provided with appropriate colour-coded bins and sharps containers. • Waste-segregation signage installed at relevant locations. • Daily waste records • Approved waste treatment/disposal arrangement documented and disposal records maintained.	Within 3 months from commencement of the project.	Cost included in KPHSSP

Sr. No.	Hospital	Existing Environmental Liability	Corrective Action	Responsibility			Indicator	Timeline	Indicative Cost (PKR) Annual Basis
				Implementation	Monitoring	Funding Source			
		inadequate escape routes/signage; no documented emergency procedures, training or drills • No structured environmental monitoring programme and limited institutional capacity.	Where feasible, prioritize environmentally sound non-incineration treatment technologies. • Conduct environmental compliance assessment of existing incinerators and ensure operation, maintenance, emissions control, and ash disposal comply with applicable national requirements. • Provide/upgrade a secure designated temporary healthcare-waste storage area with washable surfaces, controlled access and protection from weather, patients and unauthorized persons. • Maintain waste transfer manifests/receipts or equivalent evidence of treatment and final disposal.						
			Wastewater: • Rehabilitate/upgrade the internal sewerage network and discharge connection to eliminate leakage, blockage and uncontrolled discharge. • Rehabilitate existing septic tanks, including structural repairs, inlet/outlet improvements, watertight access covers and appropriate desludging arrangements. • Install screens at appropriate drainage points to prevent solids and debris from entering the wastewater system. • Apply source-specific controls/pre-treatment for wastewater streams requiring additional control, such as grease traps for kitchen wastewater and screens/lint traps for laundry wastewater. • Ensure appropriate management of laboratory chemicals, pharmaceuticals and other hazardous liquid wastes and prevent their discharge into the wastewater system. • Establish routine inspection and maintenance of the wastewater collection system and septic tanks.	Hospital Administration	HSE Focal Person/PMIU Safeguards Unit	Included in the approved scope of work for the current project.	**Wastewater**: • Rehabilitated sewerage network completed and functional; discharge connection inspected and documented. • Septic tank rehabilitated, leak-free and operational; inspection/commissioning record available. • Wastewater quality monitoring conducted at least annually through a KP-EPA approved laboratory, with results demonstrating compliance with applicable national environmental quality standards (NEQS) or corrective actions implemented where exceedances are identified. •	After completion of rehabilitation works	Included in the approved scope of work for the current project.

Sr. No.	Hospital	Existing Environmental Liability	Corrective Action	Responsibility			Indicator	Timeline	Indicative Cost (PKR) Annual Basis
				Implementation	Monitoring	Funding Source			
			• Establish scheduled septic-tank inspection and desludging, with records maintained. • Conduct periodic wastewater quality monitoring,	Hiring of KP-EPA approved Laboratory	HSE Focal Person	Health Department	• Monitoring Records.	Annual basis after completion of rehabilitation works	100,000
			OHS: • Provide required PPE and close critical electrical, housekeeping, hazardous-material, sharps and biological-exposure gaps. • Improve designated storage areas and general Housekeeping.	Hospital Administration	HSE Focal Person/ PMIU Safeguards Unit	• Electrical distribution, internal wiring and power-supply improvements are Included in the approved scope of work for the current project. • PPE, routine housekeeping and operational OHS measures in Health Department Budget.	**OHS:** Monthly OHS inspections conducted and documented; PPE availability records maintained; incidents, near misses, first-aid cases, and corrective actions recorded and reported	After completion of rehabilitation works	Included in the approved scope of work for the current project..
								Within 3 months from commencement of the project.	5,000,000
			Fire/Life Safety: • Conduct fire-risk assessment for hospital and update emergency response procedures accordingly. • Service/replace overdue extinguishers; • Provide fire detection/alarm in Critical areas; mark and maintain unobstructed emergency escape routes/exits; • Establish documented emergency procedures; conduct fire/emergency drill and record corrective actions.	Hospital Administration	HSE Focal Person/ PMIU Safeguards Unit	Included in the approved scope of work for the current project.	**Fire/Life Safety:** • All identified overdue/defective extinguishers serviced or replaced. • Fire detection/alarm provided and operational in identified critical areas. • Emergency exits/routes clearly marked and unobstructed. • Emergency procedure documented and at least one drill completed, with attendance and corrective-action record.	After completion of rehabilitation works	Included in the approved scope of work for the current project.
			Monitoring: • Designate hospital environmental/HSE focal person and establish monthly environmental/OHS inspection records.	Hospital Administration	PMIU Safeguards Unit	Hospital Administration Budget	**Monitoring:** • Environmental/HSE Focal Person designated and monthly inspection records maintained.	Within 3 months from commencement of the project.	2,400,000
								Table	**7,500,000**
6	**DHQ Abbottabad (Women & Children Block)**	• Healthcare waste segregation practiced; waste transported to the main block for incineration; limited colour-coded bins and incomplete records • No on-site wastewater treatment; direct discharge to municipal sewer. • Drinking Water quality is not reliable	**Medical Waste:** • Provide colour-coded bins and sharps containers; • Provide waste-segregation signage at waste-generation and temporary storage areas. • Establish daily waste-generation and disposal records; • Establish a documented arrangement with an approved healthcare-waste treatment and	Hospital Administration	HSE Focal Person / PMIU Safeguards Unit	Funding by ADB under KPHSSP.	**Waste**: • 100% of identified waste-generation points provided with appropriate colour-coded bins and sharps containers. • Waste-segregation signage installed at relevant locations. • Daily waste records. • Approved waste treatment/disposal arrangement documented and disposal records maintained.	Within 3 months from commencement of the project.	Cost included in KPHSSP

Sr. No.	Hospital	Existing Environmental Liability	Corrective Action	Responsibility			Indicator	Timeline	Indicative Cost (PKR) Annual Basis
				Implementation	Monitoring	Funding Source			
		• Gaps in PPE, electrical safety, housekeeping, hazardous materials, signage, sharps and biological exposure controls. • Limited/overdue fire extinguishers; fire hose system available but with limited operational coverage; no fire detection/alarm; inadequate escape routes/signage; no documented emergency procedures, training or drills. • No structured environmental monitoring programme and limited institutional capacity.	disposal facility in accordance with national regulations and international good practice. Where feasible, prioritize environmentally sound non-incineration treatment technologies. • Provide/upgrade a secure designated temporary healthcare-waste storage area with washable surfaces, controlled access and protection from weather, patients and unauthorized persons. • Maintain waste transfer manifests/receipts or equivalent evidence of treatment and final disposal.					
			Wastewater: • Rehabilitate/upgrade the internal sewerage network and discharge connection to eliminate leakage, blockage and uncontrolled discharge. • Rehabilitate existing septic tanks, including structural repairs, inlet/outlet improvements, watertight access covers and appropriate desludging arrangements. • Install screens at appropriate drainage points to prevent solids and debris from entering the wastewater system. • Apply source-specific controls/pre-treatment for wastewater streams requiring additional control, such as grease traps for kitchen wastewater and screens/lint traps for laundry wastewater. • Ensure appropriate management of laboratory chemicals, pharmaceuticals and other hazardous liquid wastes and prevent their discharge into the wastewater system. • Establish routine inspection and maintenance of the wastewater collection system and septic tanks. • Establish scheduled septic-tank inspection and desludging, with records maintained.	Hospital Administration	HSE Focal Person/ PMIU Safeguards Unit	Included in the approved scope of work for the current project.	**Wastewater**: • Rehabilitated sewerage network completed and functional; discharge connection inspected and documented. • Septic tank rehabilitated, leak-free and operational; inspection/commissioning record available. • Wastewater quality monitoring conducted at least annually through a KP-EPA approved laboratory, with results demonstrating compliance with applicable national environmental quality standards (NEQS) or corrective actions implemented where exceedances are identified.	After completion of rehabilitation works	Included in the approved scope of work for the current project.

Sr. No.	Hospital	Existing Environmental Liability	Corrective Action	Responsibility			Indicator	Timeline	Indicative Cost (PKR) Annual Basis
				Implementation	Monitoring	Funding Source			
			• Conduct periodic wastewater quality monitoring,	Hiring of KP-EPA approved Laboratory	HSE Focal Person	Health Department	Monitoring Records.	Annual basis after completion of rehabilitation works	100,000
			Drinking Water • Provision of Safe and adequate drinking water facilities	Hospital Administration	HSE Focal Person	Health Department Budget	• Safe drinking water available at all designated drinking-water points. • Required water-storage/backup arrangement provided and functional. • Drinking-water quality testing completed and results documented. • Water coolers/filtration units operational and maintained. • Water-storage tanks cleaned/disinfected and records maintained.	3 months	1,000,000
			•	Hiring of KP-EPA approved Laboratory	HSE Focal Person	Health Department Budget	• Monitoring Records.	Annual basis after completion of rehabilitation works	100,000
			OHS: • Provide required PPE and close critical electrical, housekeeping, hazardous-material, sharps and biological-exposure gaps. • Improve designated storage areas and general Housekeeping.	Hospital Administration	HSE Focal Person/PMIU Safeguards Unit	• Electrical distribution, internal wiring and power-supply improvements are Included in the approved scope of work for the current project. • PPE, routine housekeeping and operational OHS measures in Health Department Budget.	**OHS:** Monthly OHS inspections conducted and documented; PPE availability records maintained; incidents, near misses, first-aid cases, and corrective actions recorded and reported.	After completion of rehabilitation works Within 3 months from commencement of the project.	Included in the approved scope of work for the current project. 5,000,000
			Fire/Life Safety: • Conduct fire-risk assessment for hospital and update emergency response procedures accordingly. • Service/replace overdue extinguishers; • Provide fire detection/alarm in Critical areas; mark and maintain unobstructed emergency escape routes/exits; • Establish documented emergency procedures; conduct fire/emergency drill and record corrective actions.	Hospital Administration	HSE Focal Person/PMIU Safeguards Unit	Included in the approved scope of work for the current project.	**Fire/Life Safety:** • All identified overdue/defective extinguishers serviced or replaced. • Fire detection/alarm provided and operational in identified critical areas. • Emergency exits/routes clearly marked and unobstructed. • Emergency procedure documented and at least one drill completed, with attendance and corrective-action record.	After completion of rehabilitation works	Included in the approved scope of work for the current project.
			Monitoring: • Designate hospital environmental/HSE focal person and establish monthly environmental/OHS inspection records.	Hospital Administration	PMIU Safeguards Unit	Hospital Administration Budget	**Monitoring:** • Environmental/HSE Focal Person designated and monthly inspection records maintained.	Within 3 months from commencement of the project.	2,400,000

Sr. No.	Hospital	Existing Environmental Liability	Corrective Action	Responsibility			Indicator	Timeline	Indicative Cost (PKR) Annual Basis
				Implementation	Monitoring	Funding Source			
								Total	8,600,000

10 CONCLUSION AND RECOMMENDATIONS

10.1 CONCLUSION

642. This report presents IEE of the project entitled as; KPHSSP, Revamping of Non-Teaching (DHQs) Hospitals across KP, Phase-I. The report has been prepared in accordance with the requirements of the ADB SPS, 2009.

643. The project encompasses comprehensive upgrades and service improvements in secondary healthcare hospitals across KP which includes; internal upgrades such as renovation and improvement of washrooms, flooring, lighting, HVAC systems, burn units, isolation wards, and counselling areas to enhance functionality and patient comfort. It also covers external service improvements, including rehabilitation of sewerage and drainage networks, upgrading electrification systems, installation of water filtration units, and integration of solar energy solutions to ensure reliable and sustainable utility services. In addition, specialized units will be established, including emergency stabilization rooms and pandemic response infrastructure, to strengthen emergency preparedness and rapid response capacity.

644. The project with an estimated cost of Rs. 3,952.451 Million, will be implemented over a period of twenty-four (24) months and focuses on the rehabilitation and upgrading of existing hospital facilities in Peshawar, Charsadda, Karak, Haripur, and Abbottabad

645. The IEE findings indicate that the project will deliver substantial environmental, social, and operational benefits through the rehabilitation of existing healthcare facilities, enhancing infrastructure reliability and extending asset life without additional land requirements. Upgrades to HVAC systems, internal layouts, and specialized units will strengthen infection prevention and control, improving indoor air quality, thermal comfort, and reducing hospital-acquired infection risks. Improvements in sewerage, drainage, and stormwater systems will minimize leakages and flooding, while enhanced healthcare waste management will ensure safe and compliant disposal.

646. The integration of energy-efficient systems and solar power will reduce grid dependency, emissions, and operational costs. Strengthened emergency preparedness, along with reliable fire-fighting, medical gas, and electrical systems, will enhance resilience and service continuity. Overall, the project will improve accessibility, patient comfort, operational efficiency, and occupational health and safety, while generating short-term employment and supporting local economic activity.

647. However, following negative impacts are also anticipated during implementation of the project

648. During the pre-construction and design phase, potential impacts are limited to inefficient operational considerations and possible utility disruptions. No land acquisition, major impacts on flora or fauna, or disturbance to physical cultural resources are expected.

649. Construction may cause site-specific, temporary impacts, including soil disturbance, dust, noise, vibration, and interruptions to utilities. Sensitive hospital areas such as ICUs, operating theaters, and emergency routes may be affected. Additional impacts include generation of construction and hazardous waste, restricted access for vehicles and ambulances, occupational health and safety risks, and potential social concerns such as child labor and gender-based issues. Temporary relocation or operational adjustments may also be required.

650. During operation, the hospital may experience high water and energy demand, generation of biomedical and municipal waste, noise, traffic congestion, occupational and public health risks, potential healthcare-associated infections, and localized odor or noise from waste treatment. Emergency scenarios, including fires and natural disasters, present high-risk impacts that could disrupt hospital services.

10.2 RECOMMENDATIONS

651. Mitigation of these impacts will be achieved through careful planning, design, and operational controls. During the design phase, operational efficiencies will be optimized, utility layouts coordinated, and resource conservation measures incorporated.

652. Construction-phase impacts will be managed through site-specific measures such as dust and noise control, phased and off-peak work, proper handling and disposal of construction and hazardous waste, protection of sensitive hospital areas and continued availability of hospital services and operations, safe access for vehicles and ambulances, and strict adherence to occupational health, safety, and labor standards.

653. During operation, water- and energy-efficient systems, proper biomedical and municipal waste segregation and disposal, noise and odor control, traffic and access management, infection prevention, and emergency preparedness plans including fire safety and natural disaster response will ensure minimal disruption, protection of patients, staff, and visitors, and compliance with environmental and public health standards. Continuous monitoring and staff training will support the effective implementation of these measures across all phases.

654. An EMP has been prepared as an integral component of this report, providing a comprehensive mitigation matrix that outlines potential impacts, corresponding mitigation measures, assigned roles and responsibilities, and institutional requirements for both the construction and operational phases. The EMP is designed to avoid, minimize, or mitigate adverse environmental and social impacts associated with the project. During the construction phase, the contractor will be required to strictly implement all mitigation measures specified in the EMP and develop a site-specific EMP to address location-specific conditions and ensure full compliance with environmental, health, and safety standards. the estimated EMP cost for Phase 1 is **Rs. 55,592,400.**

Initial Environmental Examination

Date: April 2026

Pakistan: Khyber Pakhtunkhwa Health Systems Strengthening Program (KPHSSP)

Revamping of Non-Teaching District Head Quarters (DHQs) Hospitals across KP, Phase-I

Volume-II

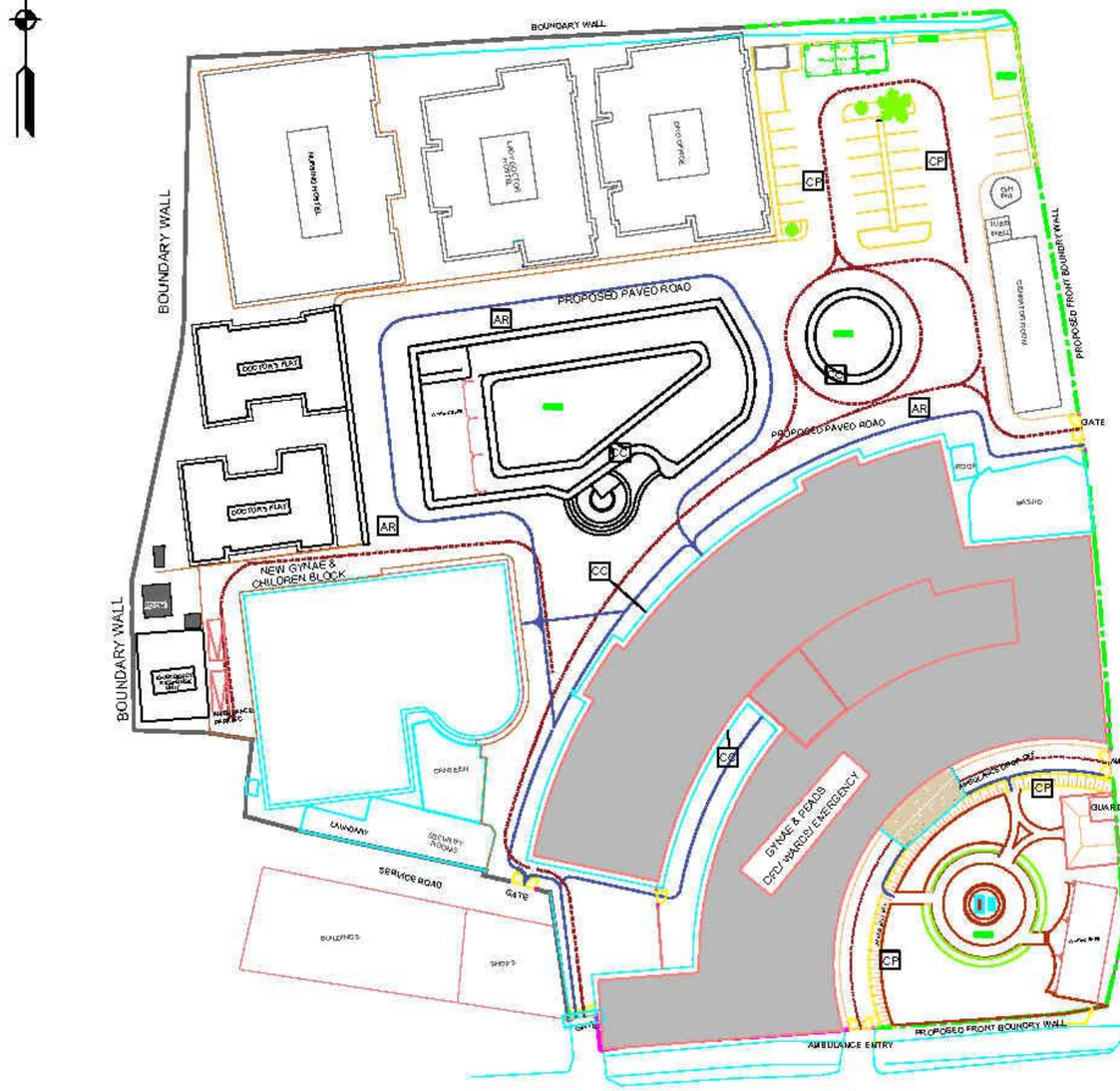
Prepared by Project Management Implementation Unit (PMIU), Communication and Works (C & W) Department, Government of Khyber Pakhtunkhwa, Pakistan for the Asian Development Bank.

ANNEXURES

LIST OF ANNEXURES

Annexure-I	Scope of Work
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Annexure-IV	Land use and Sensitive receptors
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Annexure-VI	Impact Evaluation Matrix
Annexure-VII	Resource Conservation Plan
Annexure-VIII	Traffic Management Plan
Annexure-IX	Sanitation Plan
Annexure-X	Waste Management Plan
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Annexure-XIII	Chance-Find Procedure
Annexure-XIV	Tree Plantation Plan
Annexure-XV	Guideline HSE Plan

ANNXEURE-I: SCOPE OF WORK



LEGEND

BUILDINGS IN SCOPE	
NOT IN SCOPE	
CONCRETE PAVERS	CP
CHEQUERED TILES	CC
ASPHALT ROAD	AR
GREEN AREA	GREEN

- PLINTH RPOTECTION 3'-0" WIDE ALL AROUND THE BUILDINGS
- ALL GREEN AREAS TO BE FINISHED 0'-6" BELOW THE ROAD LEVEL
- ALL COVERED CORRIDORS TO BE FINISHED IN TERRAZO TILE
- ALL PAVEMENTS TO BE FINISHED IN CONCRETE PAVERS

PROJECT MANAGMENT IMPLEMENTATION UNIT
COMMUNICATION & WORKS DEPARTMENT KHYBER PAKHTUNKHWA PROJECT PESHAWAR

MAULVI JEE WOMEN AND CHILDREN HOSPITAL, PESHAWAR
SCOPE OF WORK

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

DESIGN	RECOMMENDED	VERIFIED	APPROVED
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CHD	DATE	DRAWING NO	REV
SUBM	OCT 2020	43181/021/TD/MJH/00B002	0



INFRASTRUCTURE DEVELOPMENT AUTHORITY OF THE PUNJAB

MAULVI JEE WOMEN AND CHILDREN HOSPITAL, PESHAWAR

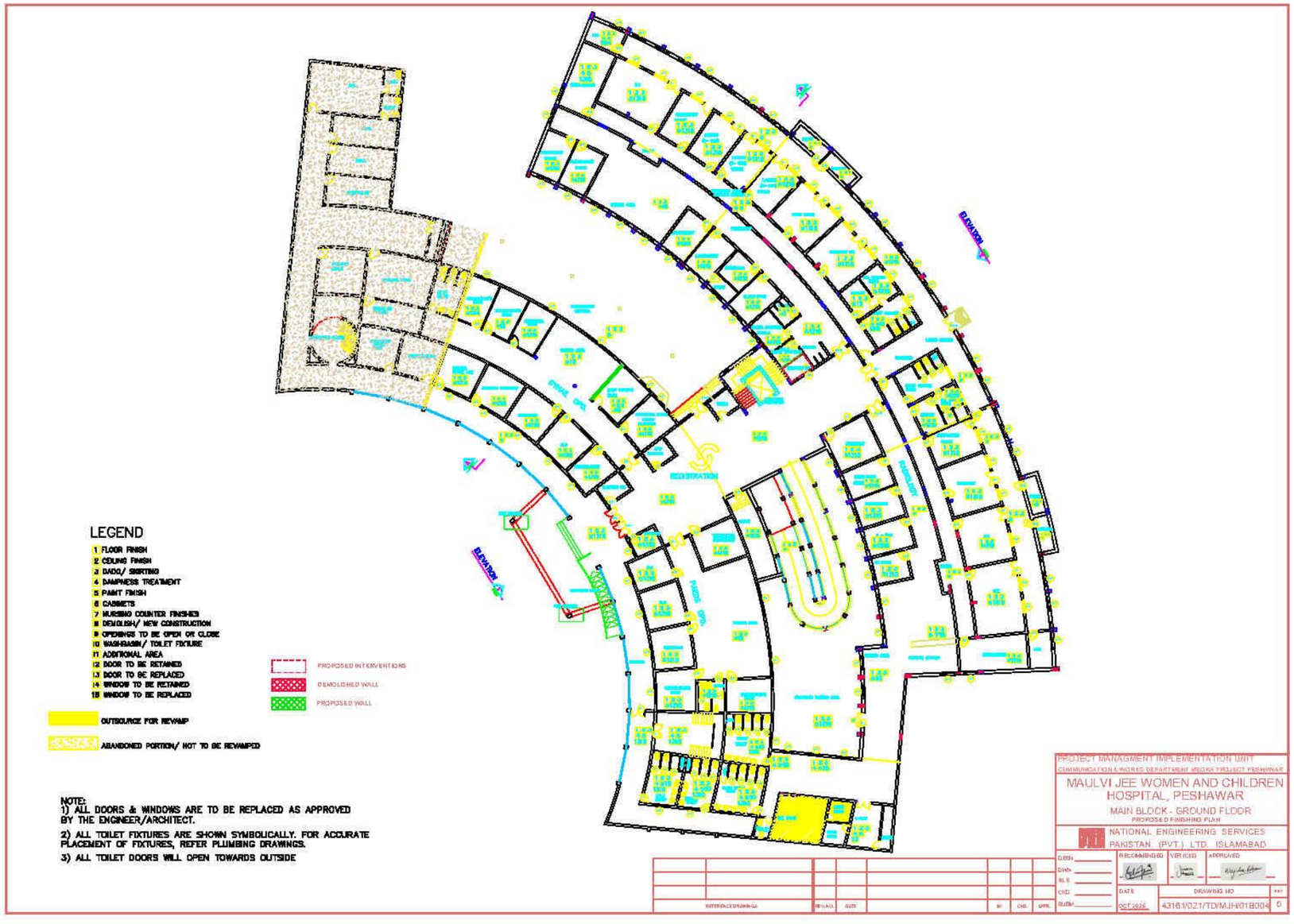
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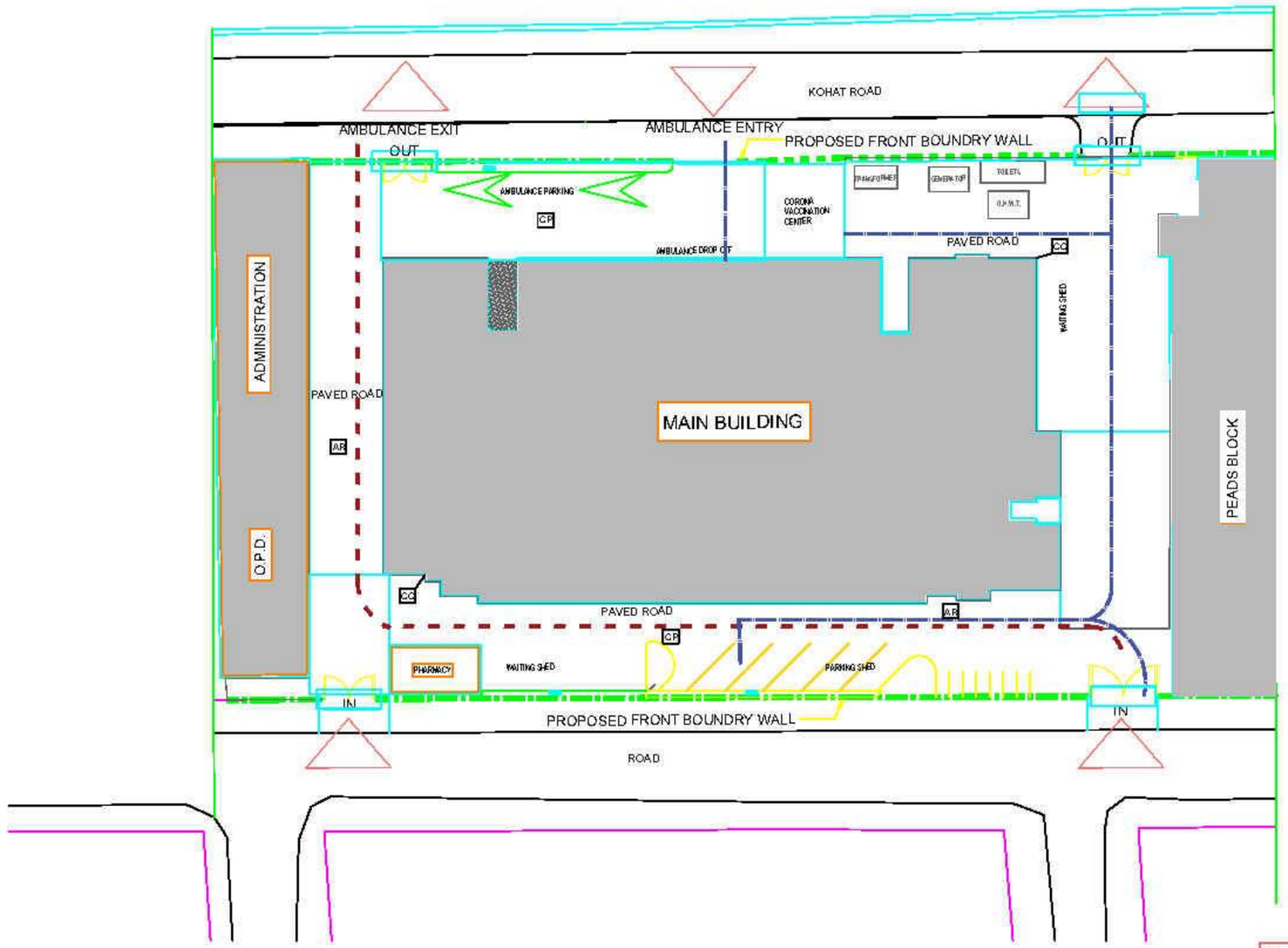
MAIN BLOCK - GROUND FLOOR PLAN

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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SUBM	DATE	DRAWING NO	REV
	OCT 2020	43161/021/AB/M.HP01B001	0

REFERENCE DRAWING NO	REVISION NO	DATE		BY	CHD.	APPR.


LEGEND
1 FLOOR FINISH
2 CEILING FINISH
3 DADO/ SKIRTING
4 DAMPNESS TREATMENT
5 PAINT FINISH
6 CABINETS
7 NURSING COUNTER FINISHES
8 DEMOLISH/ NEW CONSTRUCTION
9 OPENINGS TO BE OPEN OR CLOSE
10 WASHBASIN/ TOILET FIXTURE
11 ADDITIONAL AREA
12 DOOR TO BE RETAINED
13 DOOR TO BE REPLACED
14 WINDOW TO BE RETAINED
15 WINDOW TO BE REPLACED
PROPOSED INTERVENTIONS
DEMOLISHED WALL
PROPOSED WALL
OUTSOURCE FOR REVAMP
ABANDONED PORTION/ NOT TO BE REVAMPED
NOTE:
1) ALL DOORS & WINDOWS ARE TO BE REPLACED AS APPROVED BY THE ENGINEER/ARCHITECT.
2) ALL TOILET FIXTURES ARE SHOWN SYMBOLICALLY. FOR ACCURATE PLACEMENT OF FIXTURES, REFER PLUMBING DRAWINGS.
3) ALL TOILET DOORS WILL OPEN TOWARDS OUTSIDE
PROJECT MANAGMENT IMPLEMENTATION UNIT
COMMUNICATIONS & WORKS DEPARTMENT MEGA PROJECT PESHAWAR
MAULVI JEE WOMEN AND CHILDREN HOSPITAL, PESHAWAR
MAIN BLOCK - GROUND FLOOR
PROPOSED FINISHING PLAN
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD
RECOMMENDED
VERIFIED
APPROVED
DATE
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LEGEND

- BUILDINGS IN SCOPE
- NOT IN SCOPE
- CONCRETE PAVERS (CP)
- CHEQUERED TILES (CC)
- ASPHALT ROAD (A.R)
- GREEN AREA (GREEN)

- PLINTH RPOTECTION 3'-0" WIDE ALL AROUND THE BUILDINGS
- ALL GREEN AREAS TO BE FINISHED 0'-6" BELOW THE ROAD LEVEL
- ALL COVERED CORRIDORS TO BE FINISHED IN TERRAZO TILE
- ALL PAVEMENTS TO BE FINISHED IN CONCRETE PAVERS

PROJECT MANAGMENT IMPLEMENTATION UNIT
CUMMUNICATION & WORKS DEPARTMENT MEGA PROJECT PESHAWAR

NASEERULLAH BABAR MEMORIAL HOSPITAL, PESHAWAR

SCOPE OF WORK

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

DESN	RECOMMENDED	VERIFIED	APPROVED
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PROJECT MANAGMENT IMPLEMENTATION UNIT
CUMMUNICATION & WORKS DEPARTMENT MEGA PROJECT PESHAWAR

NASEERULLAH BABAR MEMORIAL HOSPITAL, PESHAWAR

FURNITURE LAYOUT
GROUND FLOOR PLAN

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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NOTE:
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2) ALL TOILET FIXTURES ARE SHOWN SYMBOLICALLY. FOR ACCURATE PLACEMENT OF FIXTURES, REFER PLUMBING DRAWINGS.

3) ALL TOILET DOORS WILL BE OPEN TOWARDS OUTSIDE

LEGEND

1. FLOOR FINISH
2. CEILING FINISH
3. DADO/ SKIRTING
4. DAMPNESS TREATMENT
5. PAINT FINISH
6. CABINETS
7. NURSING COUNTER FINISHES
8. DEMOLISH/ NEW CONSTRUCTION
9. OPENINGS TO BE OPEN OR CLOSE
10. WASHBASIN/ TOILET FIXTURE
11. ADDITIONAL AREA
12. DOOR TO BE RETAINED
13. DOOR TO BE REPLACED
14. WINDOW TO BE RETAINED
15. WINDOW TO BE REPLACED

PROPOSED INTERVENTIONS
DEMOLISHED WALL
PROPOSED WALL

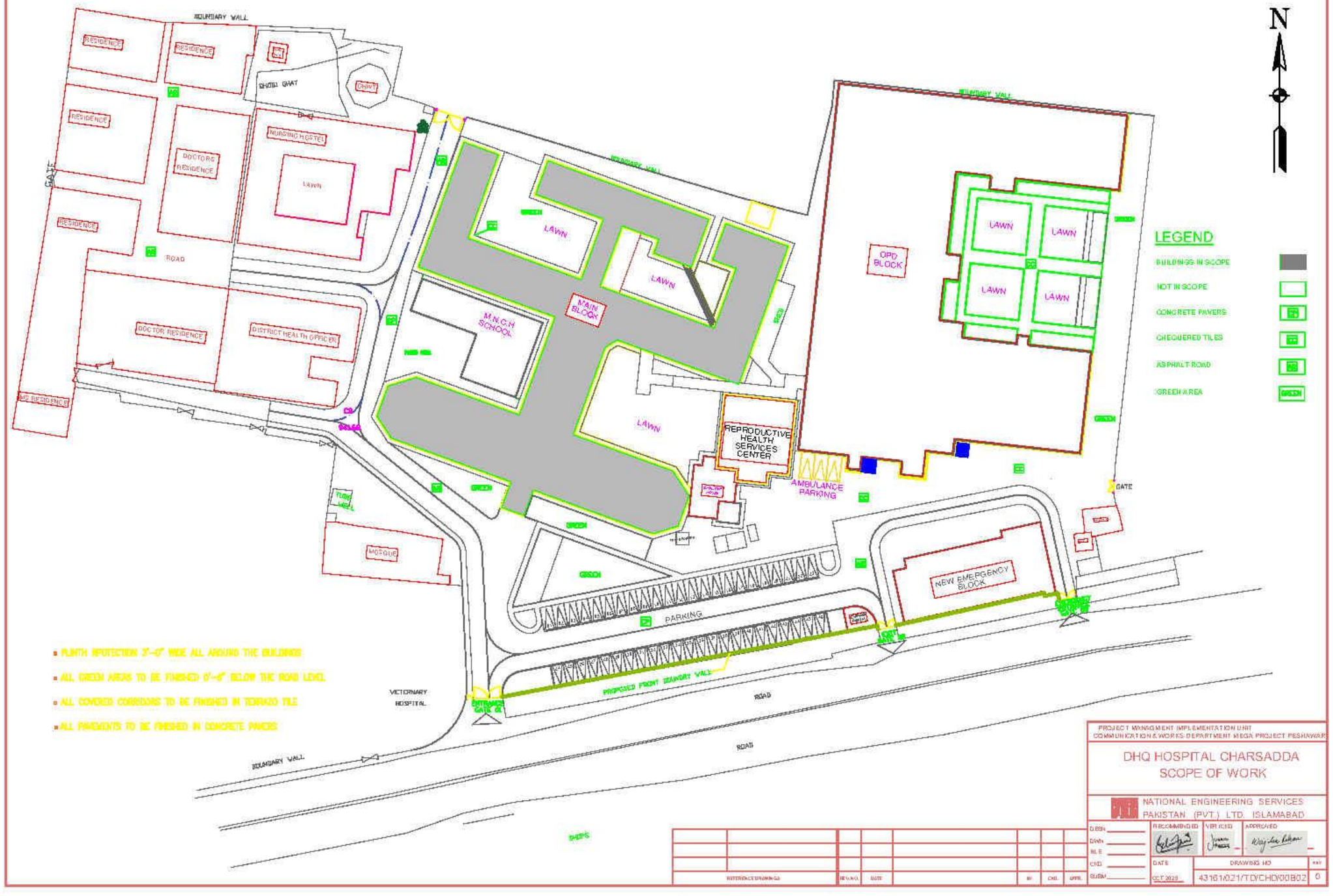
PROJECT MANAGMENT IMPLEMENTATION UNIT
COMMUNICATION & WORKS DEPARTMENT MEGA PROJECT PESHAWAR

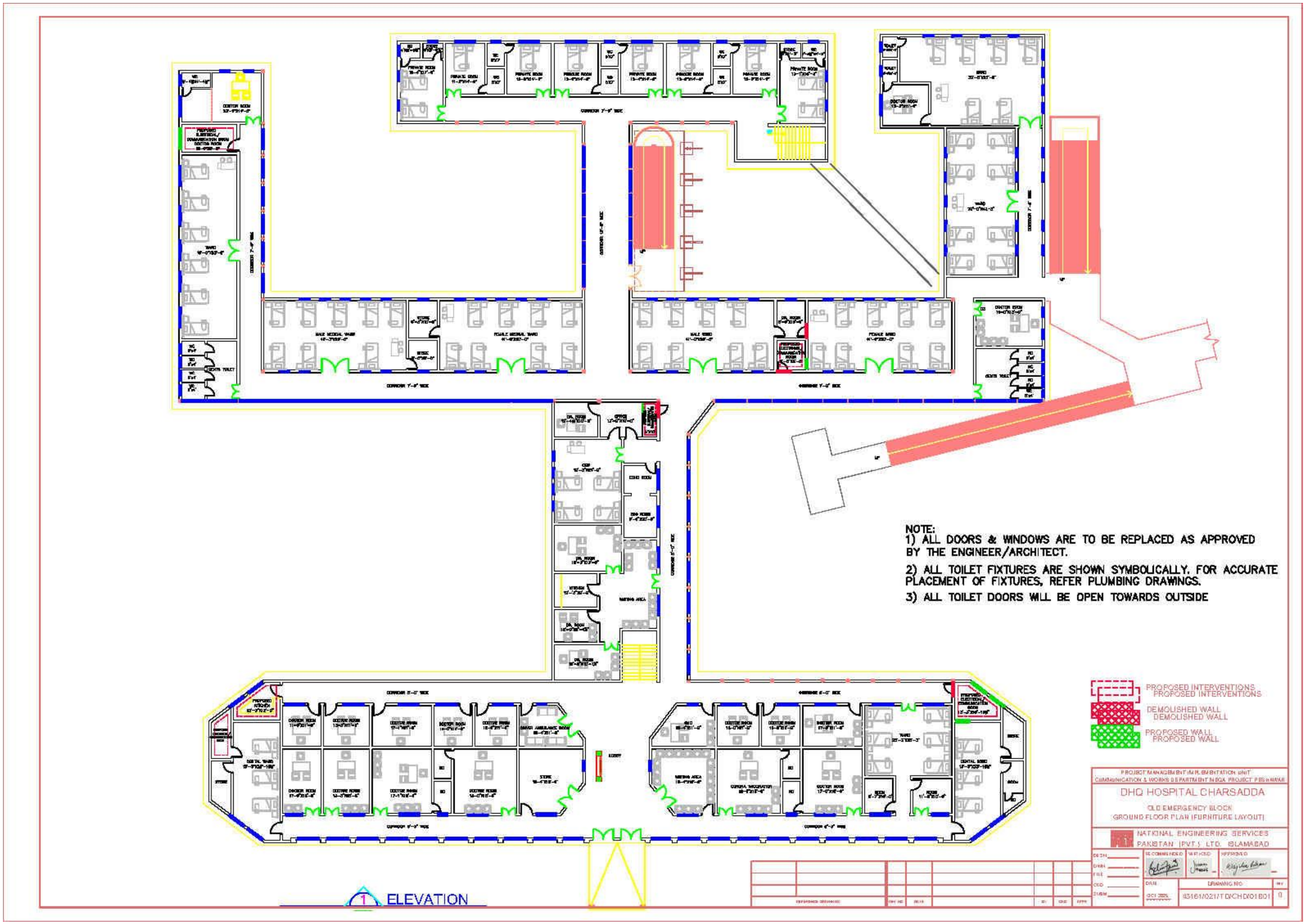
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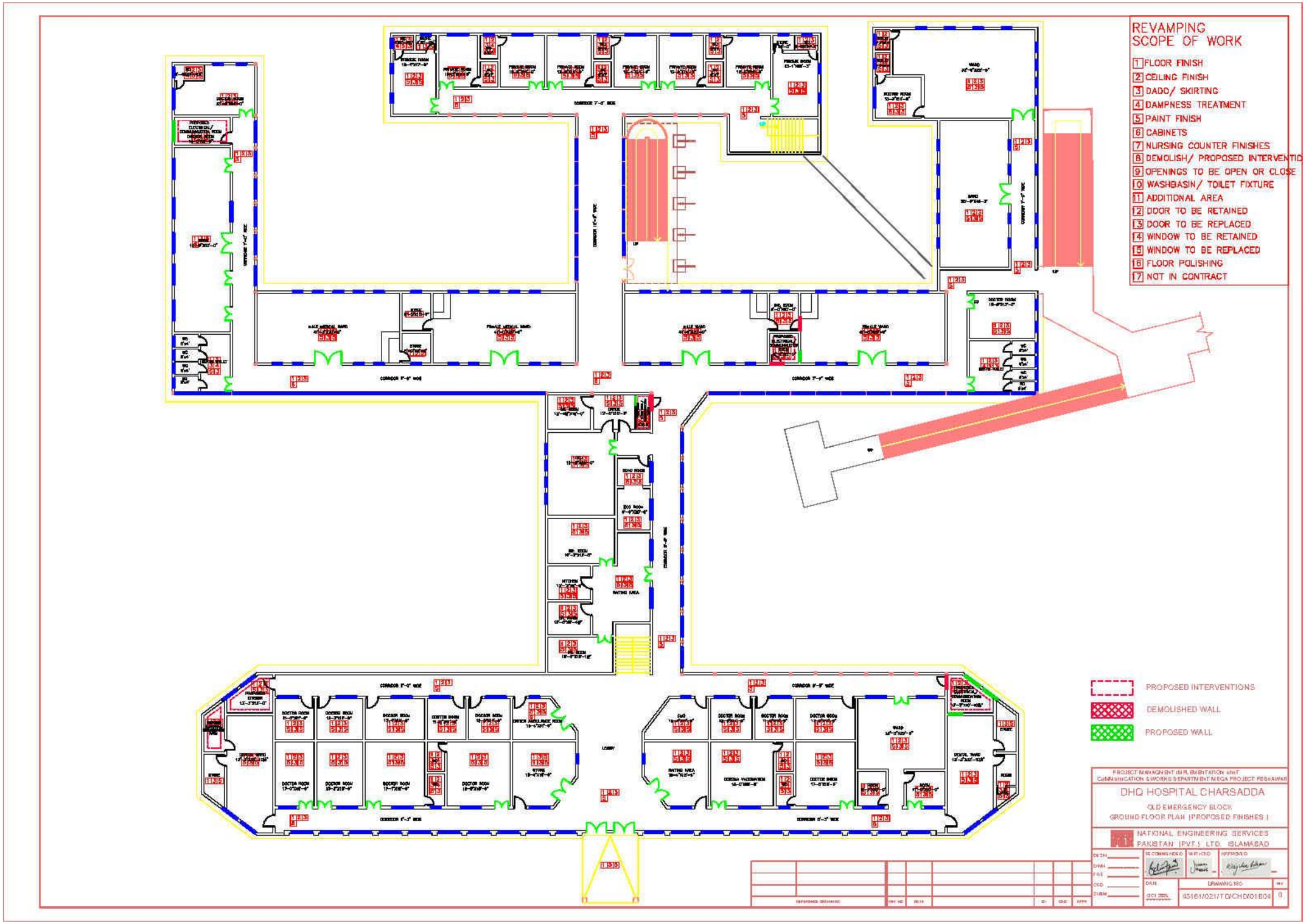
PROPOSED FINISHES LAYOUT
GROUND FLOOR PLAN

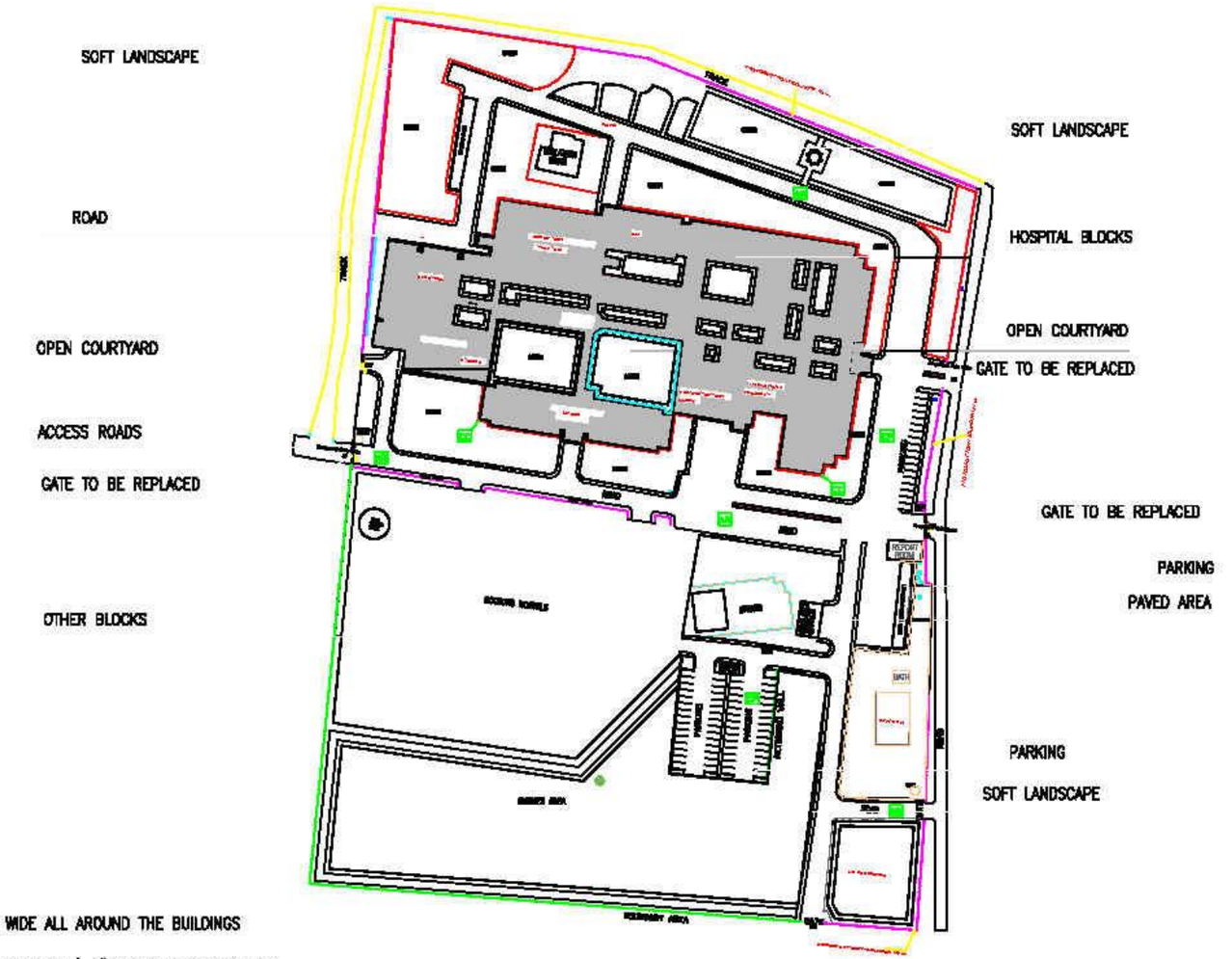
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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FILE			
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BBM	OCT 2025	43161/021/TD/NUB/01B002	0


BOUNDARY WALL
RESIDENCE
RESIDENCE
RESIDENCE
RESIDENCE
GHUSL GHAT
CHAI
NURSING HOSTEL
DOCTORS RESIDENCE
LAWN
GATE
ROAD
DOCTOR RESIDENCE
DISTRICT HEALTH OFFICER
MC RESIDENCE
M.N.C.H SCHOOL
MAIN BLOCK
LAWN
LAWN
LAWN
LAWN
LAWN
OPD BLOCK
LAWN
LAWN
LAWN
REPRODUCTIVE HEALTH SERVICES CENTER
AMBULANCE PARKING
GATE
TUBE WELL
MOSQUE
GREEN
PARKING
NEW EMERGENCY BLOCK
EMERGENCY GATE
PROPOSED FRONT BOUNDARY WALL
VETERNARY HOSPITAL
ROAD
ROAD
BOUNDARY WALL
SHEDS
N
LEGEND
BUILDINGS IN SCOPE
NOT IN SCOPE
CONCRETE PAVERS
CHEQUERED TILES
ASPHALT ROAD
GREEN AREA
PLINTH PROTECTION 3'-0" WIDE ALL AROUND THE BUILDINGS
ALL GREEN AREAS TO BE FINISHED 0'-6" BELOW THE ROAD LEVEL
ALL COVERED CORRIDORS TO BE FINISHED IN TERRAZO TILE
ALL PAVEMENTS TO BE FINISHED IN CONCRETE PAVERS
PROJECT MANAGMENT IMPLEMENTATION UNIT
COMMUNICATION & WORKS DEPARTMENT MEGA PROJECT PESHAWAR
DHQ HOSPITAL CHARSADDA
SCOPE OF WORK
NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LTD. ISLAMABAD
DESN
DWN
RLE
CHD
SUBM
RECOMMENDED
VERIFIED
APPROVED
DATE
OCT 2020
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NOTE:
1) ALL DOORS & WINDOWS ARE TO BE REPLACED AS APPROVED BY THE ENGINEER/ARCHITECT.
2) ALL TOILET FIXTURES ARE SHOWN SYMBOLICALLY, FOR ACCURATE PLACEMENT OF FIXTURES, REFER PLUMBING DRAWINGS.
3) ALL TOILET DOORS WILL BE OPEN TOWARDS OUTSIDE
PROPOSED INTERVENTIONS
PROPOSED INTERVENTIONS
DEMOLISHED WALL
DEMOLISHED WALL
PROPOSED WALL
PROPOSED WALL
PROJECT MANAGEMENT IMPLEMENTATION UNIT
COMMUNICATION & WORKS DEPARTMENT KPK PROJECT PESHAWAR
DHQ HOSPITAL CHARSADDA
OLD EMERGENCY BLOCK
GROUND FLOOR PLAN (FURNITURE LAYOUT)
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD
DRAWING NO
43161/021/T/DCHD/01B01
1 ELEVATION


REVAMPING
SCOPE OF WORK
1 FLOOR FINISH
2 CEILING FINISH
3 DADO/ SKIRTING
4 DAMPNESS TREATMENT
5 PAINT FINISH
6 CABINETS
7 NURSING COUNTER FINISHES
8 DEMOLISH/ PROPOSED INTERVENTIO
9 OPENINGS TO BE OPEN OR CLOSE
10 WASHBASIN/ TOILET FIXTURE
11 ADDITIONAL AREA
12 DOOR TO BE RETAINED
13 DOOR TO BE REPLACED
14 WINDOW TO BE RETAINED
15 WINDOW TO BE REPLACED
16 FLOOR POLISHING
17 NOT IN CONTRACT
PROPOSED INTERVENTIONS
DEMOLISHED WALL
PROPOSED WALL
PROJECT MANAGEMENT IMPLEMENTATION UNIT
COMMUNICATION & WORKS DEPARTMENT MEGA PROJECT PESHAWAR
DHQ HOSPITAL CHARSADDA
OLD EMERGENCY BLOCK
GROUND FLOOR PLAN (PROPOSED FINISHES)
NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LTD. ISLAMABAD
DESIGN
DRAWN
FILE
CHD
CHKD
DATE
OCT 2020
DRAWING NO.
43161/021/T/D/CH/D/01/B00
REV
0



- PLINTH RPOTECTION 3'-0" WIDE ALL AROUND THE BUILDINGS
- ALL GREEN AREAS TO BE FINISHED 0'-6" BELOW THE ROAD LEVEL
- ALL COVERED CORRIDORS TO BE FINISHED IN TERRAZO TILE
- ALL PAVEMENTS TO BE FINISHED IN CONCRETE PAVERS

PROJECT MANAGMENT IMPLEMENTATION UNIT

DISTRICT HEADQUARTER, HOSPITAL, KARAK

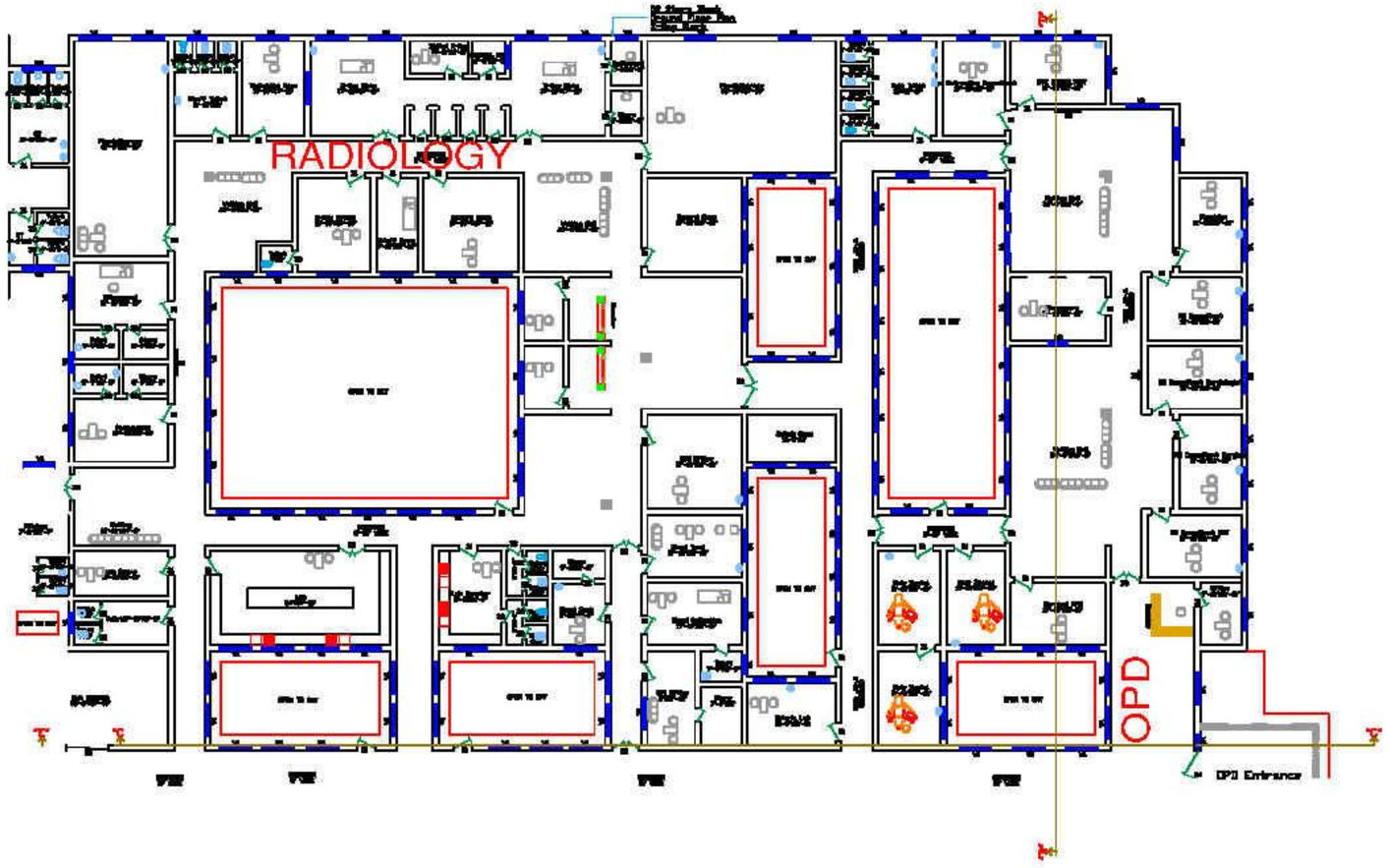
PROPOSED MASTER PLAN

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

DESN	RECOMMENDED	VERIFIED	APPROVED
DWN			
RLE			
CKD			
SUBM			

DATE	DRAWING NO	REV.
OCT 2025	43161/021/TD/KRK/00B001	0

REFERENCE DRAWINGS	REV. NO.	DATE		BY	CKD.	APPD.



KEY PLAN



PROJECT MANAGMENT IMPLEMENTATION UNIT
COMMUNICATION & WORKS DEPARTMENT MEGA PROJECT PESHAWAR

DHQ HOSPITAL KARAK
OPD
PROPOSED FURNITURE LAYOUT PLAN
GROUND FLOOR

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LTD. ISLAMABAD

DESIGN		RECOMMENDED	VERIFIED	APPROVED
DWN	RK			
FILE				
CKD	AA	DATE	DRAWING NO	REV.
SCALE		OCT 2025	43161/021/TD/KRK/01B01C	0

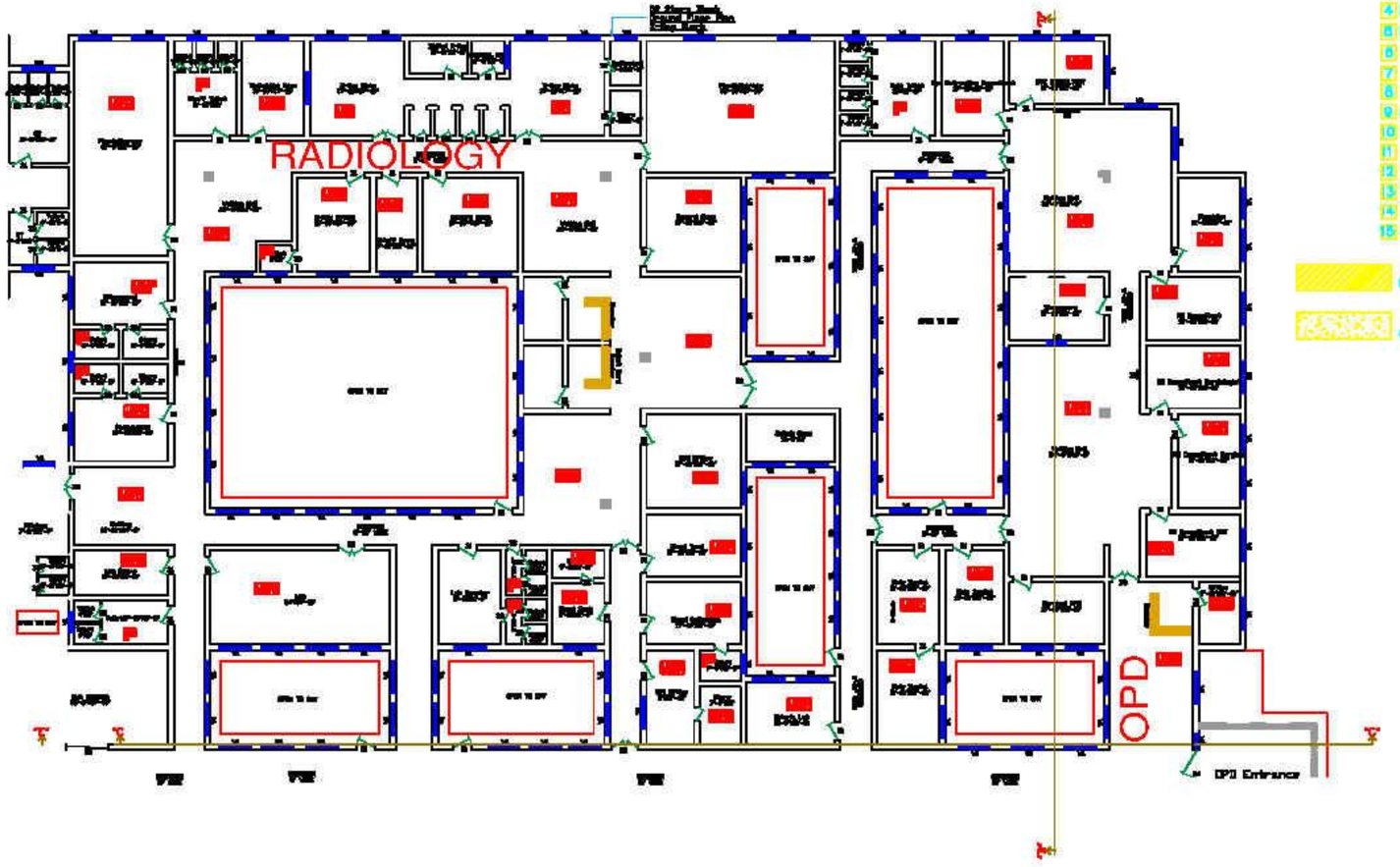
REFERENCE DRAWINGS	REV. NO.	DATE		BY	CKD.	APPD.

REVAMPING SCOPE OF WORK

1. FLOOR FINISH
2. CEILING FINISH
3. DADO/ SKIRTING
4. DAMPNESS TREATMENT
5. PAINT FINISH
6. CABINETS
7. NURSING COUNTER FINISHES
8. DEMOLISH/ NEW CONSTRUCTION
9. OPENINGS TO BE OPEN OR CLOSE
10. WASHBASIN/ TOILET FIXTURE
11. ADDITIONAL AREA
12. DOOR TO BE RETAINED
13. DOOR TO BE REPLACED
14. WINDOW TO BE RETAINED
15. WINDOW TO BE REPLACED

OUTSOURCE FOR REVAMP

ABANDONED PORTION/ NOT TO BE REVAMPED



KEY PLAN



NOTE:
1) ALL DOORS & WINDOWS ARE TO BE REPLACED AS APPROVED BY THE ENGINEER/ARCHITECT.
2) ALL TOILET FIXTURES ARE SHOWN SYMBOLICALLY. FOR ACCURATE PLACEMENT OF FIXTURES, REFER PLUMBING DRAWINGS.
3) ALL TOILET DOORS WILL BE OPEN TOWARDS OUTSIDE

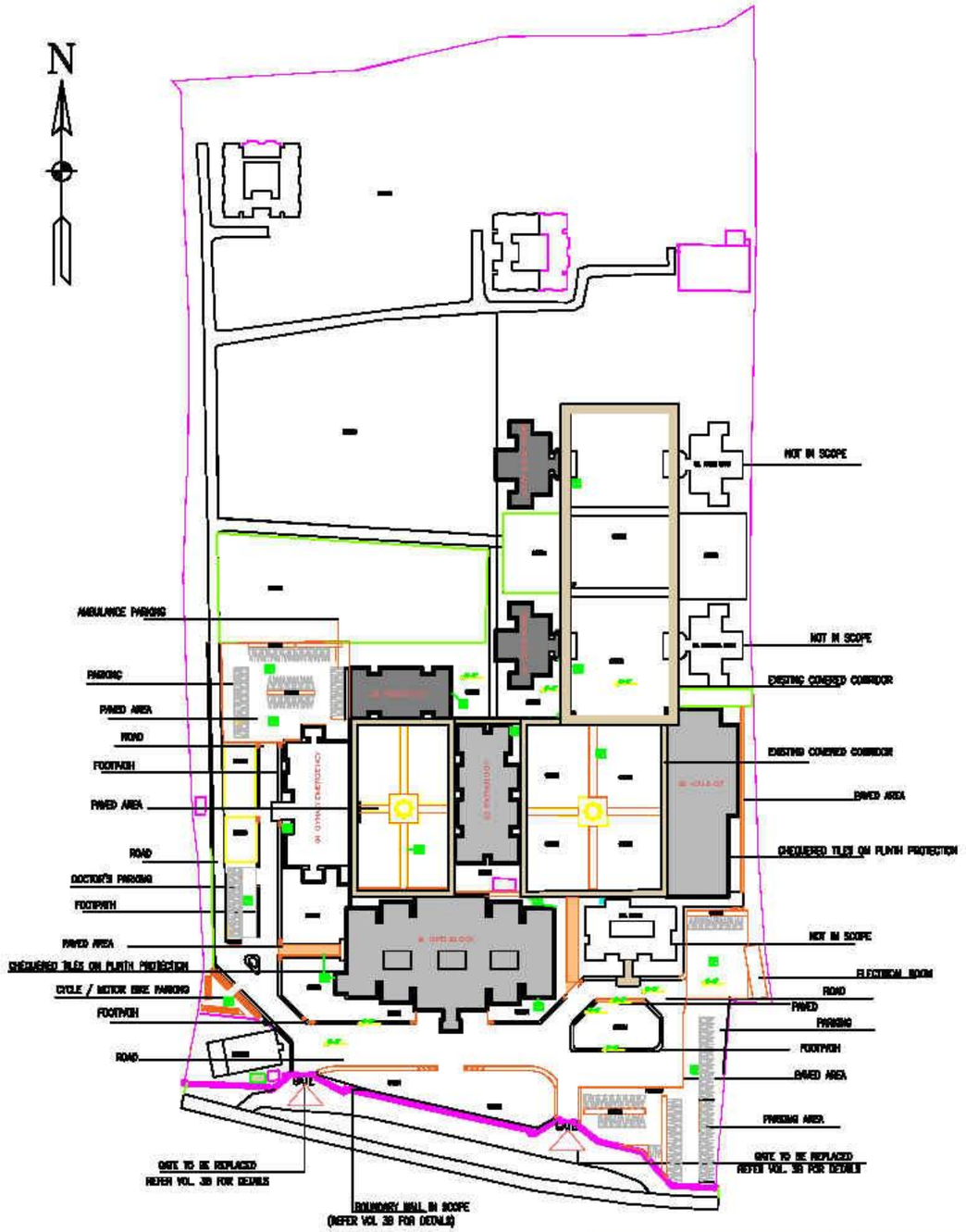
PROJECT MANAGMENT IMPLEMENTATION UNIT
CUMMUNICATION & WORKS DEPARTMENT MEGA PROJECT PESHAWAR

DHQ HOSPITAL KARAK
OPD
PROPOSED FINISHES PLAN
GROUND FLOOR

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

DESN		RECOMMENDED	VERIFIED	APPROVED
DWN	RK			
RLE				
CKD	AA			
SDBM		DATE	DRAWING NO	REV.
		OCT 2025	43161/021/TD/KRK/01B001	0

REFERENCE DRAWINGS	REV. NO.	DATE		BY	CKD.	APPD.



LEGEND

BUILDINGS IN SCOPE	
NOT IN SCOPE	
CONCRETE PAVERS	CP
CHEQUERED TILES	CC
ASPHALT ROAD	AR
GREEN AREA	

- PLINTH INPROTECTION 3'-0" WIDE ALL AROUND THE BUILDINGS
- ALL GREEN AREAS TO BE FINISHED 0"-6" BELOW THE ROAD LEVEL
- ALL COVERED CORRIDORS TO BE FINISHED IN TEXTURED TILE
- ALL PAVEMENTS TO BE FINISHED IN CONCRETE PAVERS

PROJECT MANAGMENT IMPLEMENTATION UNIT
CUMMUNICATION & WORKS DEPARTMENT MEGA PROJECT PESHAWAR

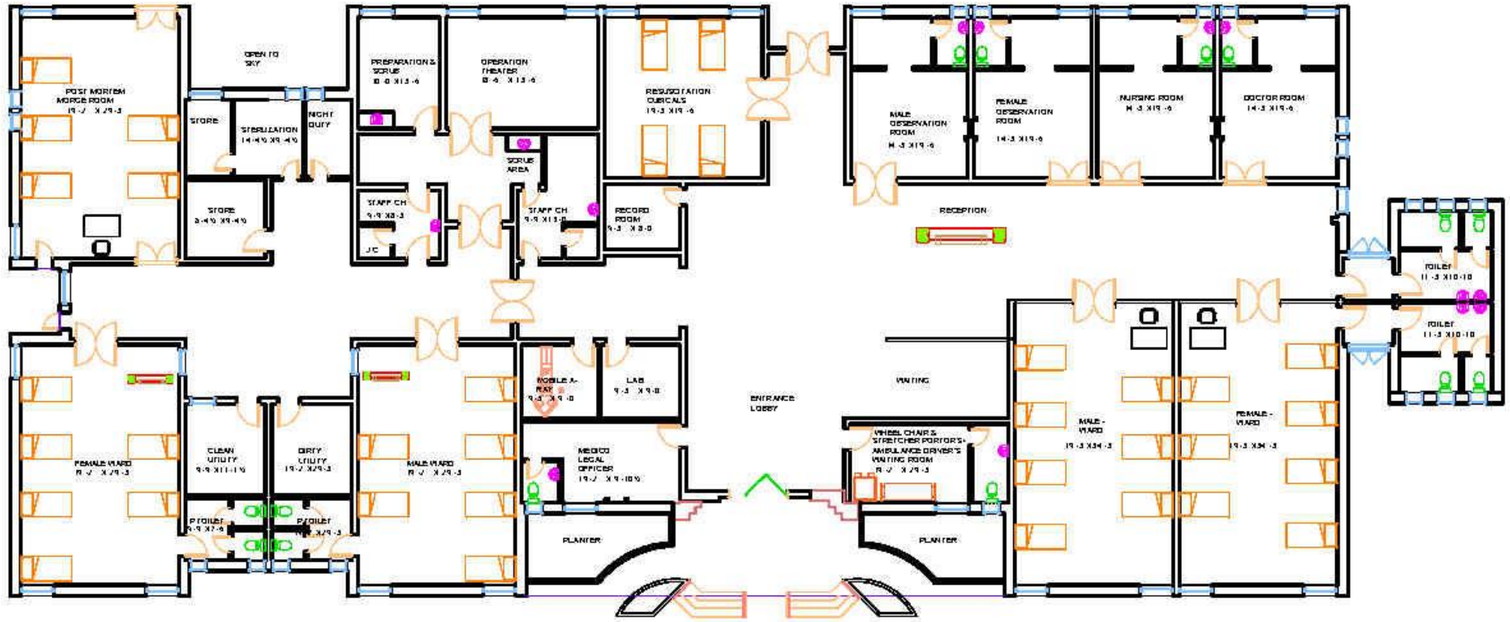
DISTRICT HEAD QUARTER HOSPITAL HARIPUR

PROPOSED MASTER PLAN

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

REFERENCE DRAWINGS	REV. NO.	DATE	APPR.

DESH	RECOMMENDED	VERIFIED	APPROVED
DWN			
FILE			
CKD	DATE	DRAWING NO	REV.
SUBM	OCT 2025	43161/021/TD/HRP/00B00A	0



NOTE:

1) ALL DOORS & WINDOWS ARE TO BE REPLACED AS APPROVED BY THE ENGINEER/ARCHITECT.

2) ALL TOILET FIXTURES ARE SHOWN SYMBOLICALLY. FOR ACCURATE PLACEMENT OF FIXTURES, REFER PLUMBING DRAWINGS.

3) ALL TOILET DOORS WILL BE OPEN TOWARDS OUTSIDE

PROJECT MANAGMENT IMPLEMENTATION UNIT
Communication & Works Department Mega Project Peshawar

DISTRICT HEADQUARTER HOSPITAL HARIPUR

EMERGENCY/ GYNAE WARD

GROUND FLOOR PLAN (FURNITURE LAYOUT)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

DESIGN	RECOMMENDED	VERIFIED	APPROVED
DRAWN			
TRACE			
CHKD	DATE	DRAWING NO	REV
SUBMD	OCT 2025	4316/1/021/TD/HRP/01B01	0



- PLINTH RPOTECTION 3'-0" WIDE ALL AROUND THE BUILDINGS
- ALL GREEN AREAS TO BE FINISHED 0'-6" BELOW THE ROAD LEVEL
- ALL COVERED CORRIDORS TO BE FINISHED IN TERRAZO TILE
- ALL PAVEMENTS TO BE FINISHED IN CONCRETE PAVERS

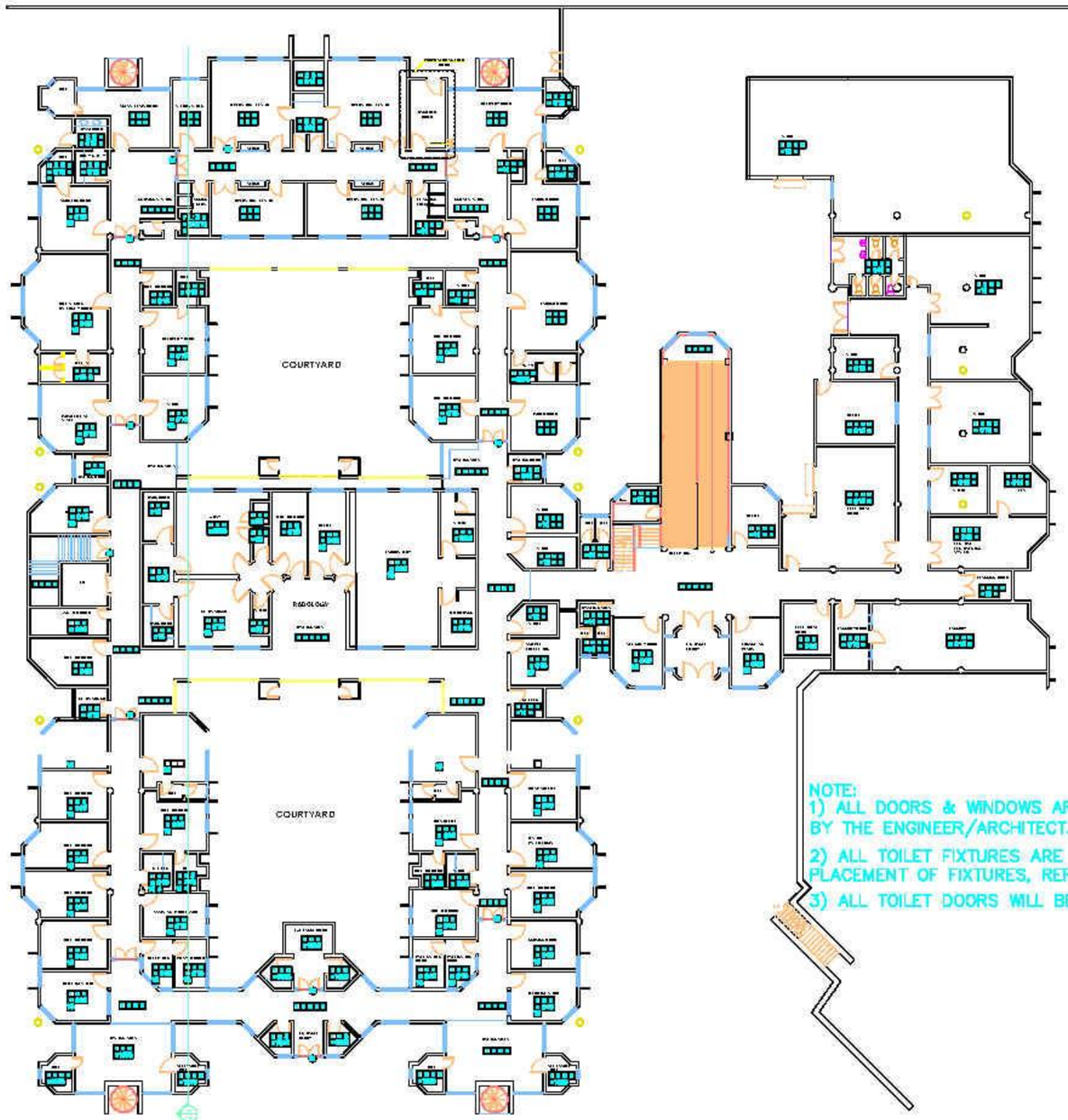
CLIENT :- PROJECT MANAGEMENT & IMPLEMENTATION UNIT COMMUNICATION & WORKS DEPARTMENT MEGA PROJECT DIVISION PESHAWAR	CONSULTANT :- NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LIMITED.	04				DRAWN		PROJECT TITLE :- DHQ ABBOTTABAD (WOMEN & CHILDEREN HOSPITAL)	DRAWING TITLE :- PROPOSED MASTER PLAN	SCALE 3/16"=1'-0"
		03				SUBMITTED				
		02				RECOMMENDED				
		01				CHD/VER.			DATE OCT.2025 / DWG. NO. P43181/021/CM/ABOB	REV. 0
		REV.	DATE	DESCRIPTION	APPROVED	APPROVED				



CLIENT :- PROJECT MANAGEMENT & IMPLEMENTATION UNIT CUMMUNICATION & WORKS DEPARTMENT MEGA PROJECT DIVISION PESHAWAR	CONSULTANT :- NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LIMITED.	04	DRAWN	PROJECT TITLE :- DHQ ABBOTTABAD (WOMEN & CHILDEREN HOSPITAL)	DRAWING TITLE :- MAIN BUILDING GROUND FLOOR PLAN PROPOSED FURNITURE LAYOUT
		03	SUBMITTED		
		02	RECOMMENDED		
		01	CHD/VER.		
		REV. DATE DESCRIPTION	APPROVED APPROVED		DATE OCT.2025 / DWG. NO. 43161/021/C/018003 / REV. 0 / SCALE 3/16"=1'-0"

REVAMPING SCOPE OF WORK

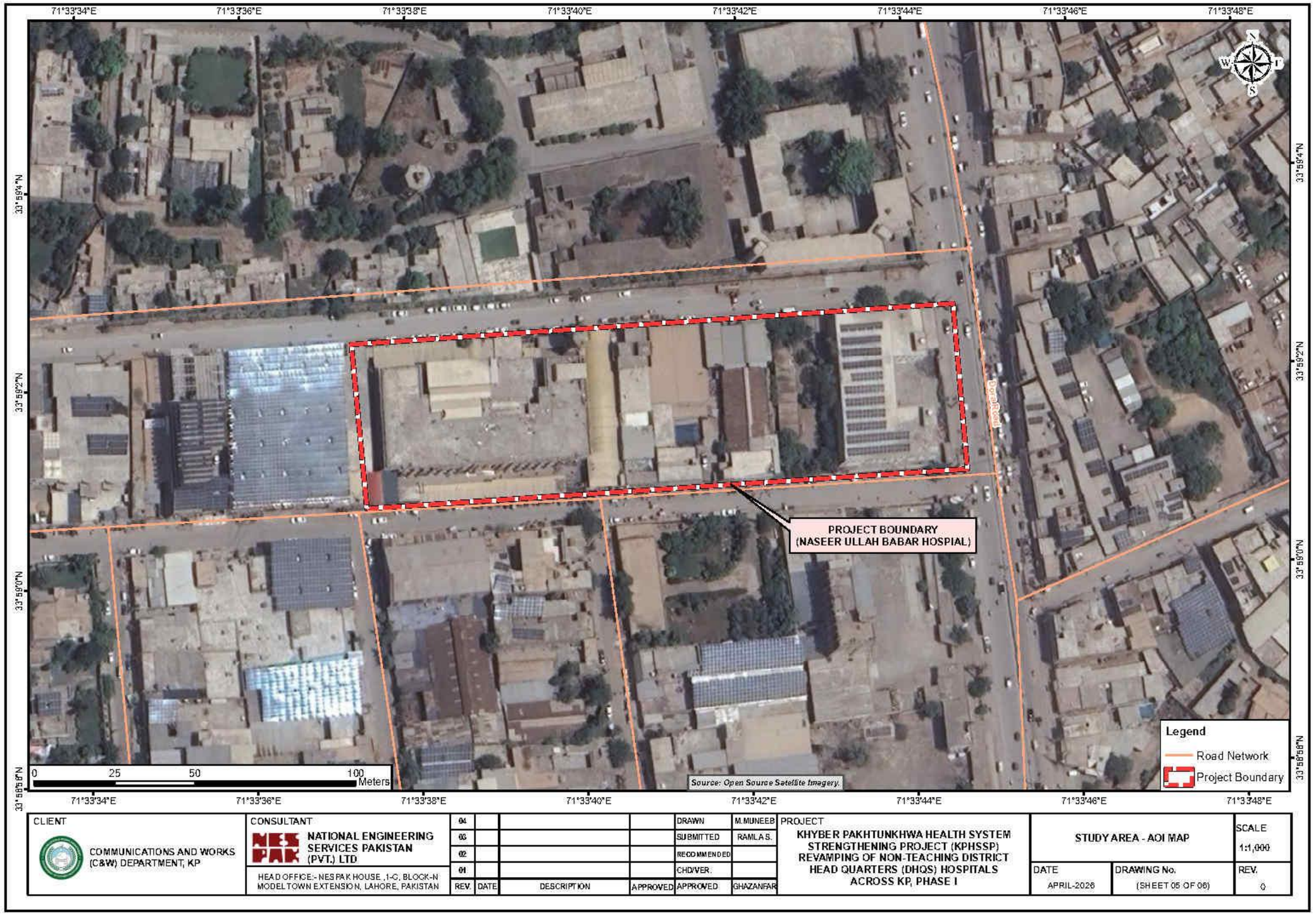
F	FLOOR FINISH
C	CEILING FINISH
D	DADO/ SKIRTING
W	DAMPNESS TREATMENT
P	PAINT FINISH
K	CABINETS
N	NURSING COUNTER FINISHES
R	DEMOLISH/ NEW CONSTRUCTION
O	OPENINGS TO BE OPEN OR CLOSE
B	BASIN/SINK/ TOILET FIXTURE
A	ADDITIONAL AREA
E	DOOR TO BE RETAINED
S	DOOR TO BE REPLACED
G	WINDOW TO BE RETAINED
H	WINDOW TO BE REPLACED



NOTE:
1) ALL DOORS & WINDOWS ARE TO BE REPLACED AS APPROVED BY THE ENGINEER/ARCHITECT.
2) ALL TOILET FIXTURES ARE SHOWN SYMBOLICALLY. FOR ACCURATE PLACEMENT OF FIXTURES, REFER PLUMBING DRAWINGS.
3) ALL TOILET DOORS WILL BE OPEN TOWARDS OUTSIDE

CLIENT :- PROJECT MANAGEMENT & IMPLEMENTATION UNIT COMMUNICATION & WORKS DEPARTMENT MEGA PROJECT DIVISION PESHAWAR.	CONSULTANT :- NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LIMITED.	04				DRAWN		PROJECT TITLE :- DHQ ABBOTTABAD (WOMEN & CHILDEREN HOSPITAL)	DRAWING TITLE :- MAIN BUILDING GROUND FLOOR PLAN PROPOSED FINISHING LAYOUT	SCALE 3/16"=1'-0"
		03				SUBMITTED				
		02				RECOMMENDED				
		01				CHD/VER.			DATE OCT.2025 / DWG. NO. 43161/021/C/018001	REV. 0
		REV.	DATE	DESCRIPTION	APPROVED	APPROVED				

ANNXURE-II: AOI MAPS



CLIENT: COMMUNICATIONS AND WORKS (C&W) DEPARTMENT, KP	CONSULTANT: NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. HEAD OFFICE:- NESPAK HOUSE ,1-C, BLOCK-N MODEL TOWN EXTENSION, LAHORE, PAKISTAN	04				DRAWN	M.MUNEEB
		03				SUBMITTED	RAMLA S.
		02				RECOMMENDED	
		01				CHD/VER.	
		REV.	DATE	DESCRIPTION	APPROVED	APPROVED	GHAZANFAR

PROJECT: KHYBER PAKHTUNKHWA HEALTH SYSTEM STRENGTHENING PROJECT (KPHSSP) REVAMPING OF NON-TEACHING DISTRICT HEAD QUARTERS (DHQS) HOSPITALS ACROSS KP, PHASE I

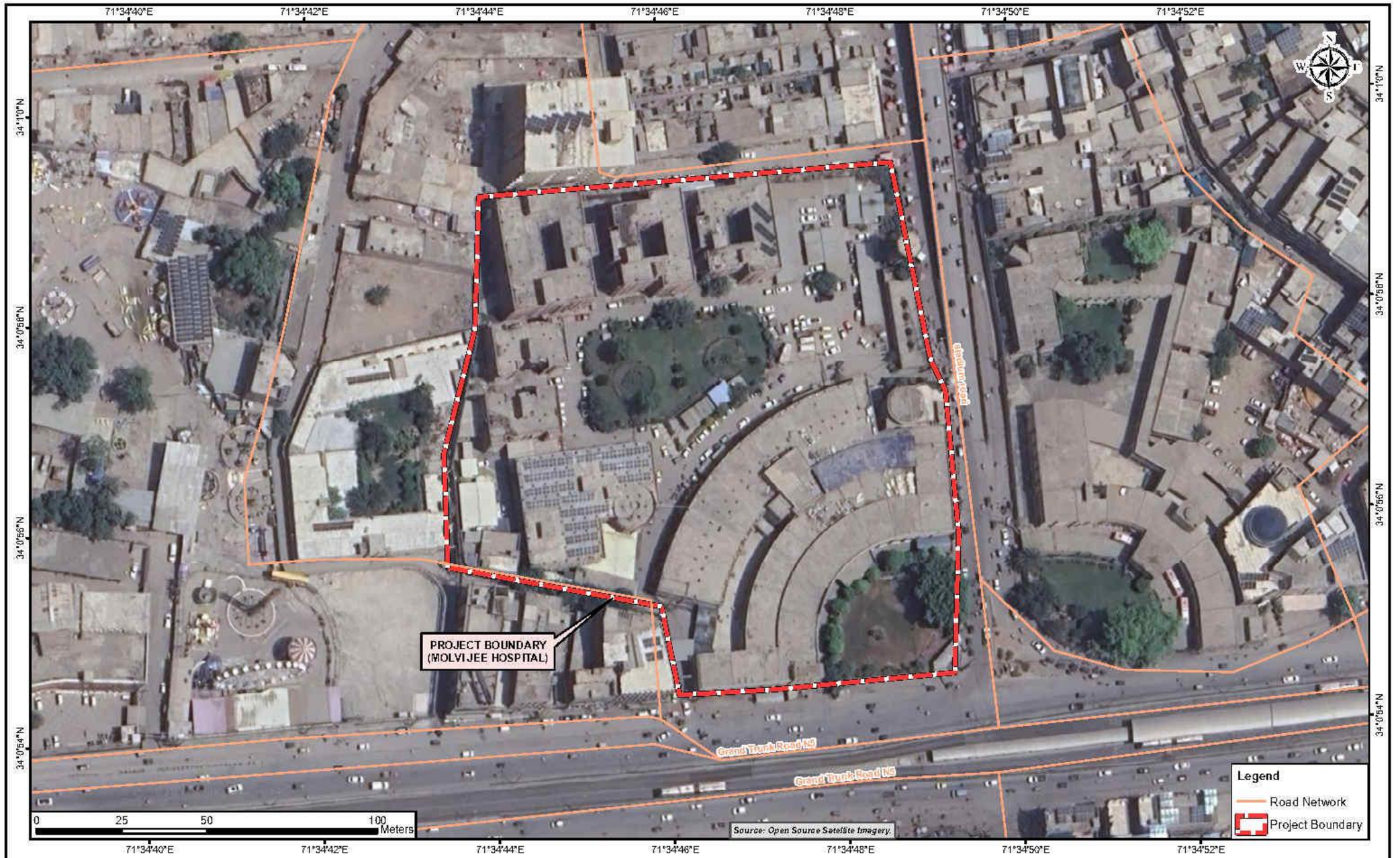
STUDY AREA - AOI MAP

SCALE: 1:1,000

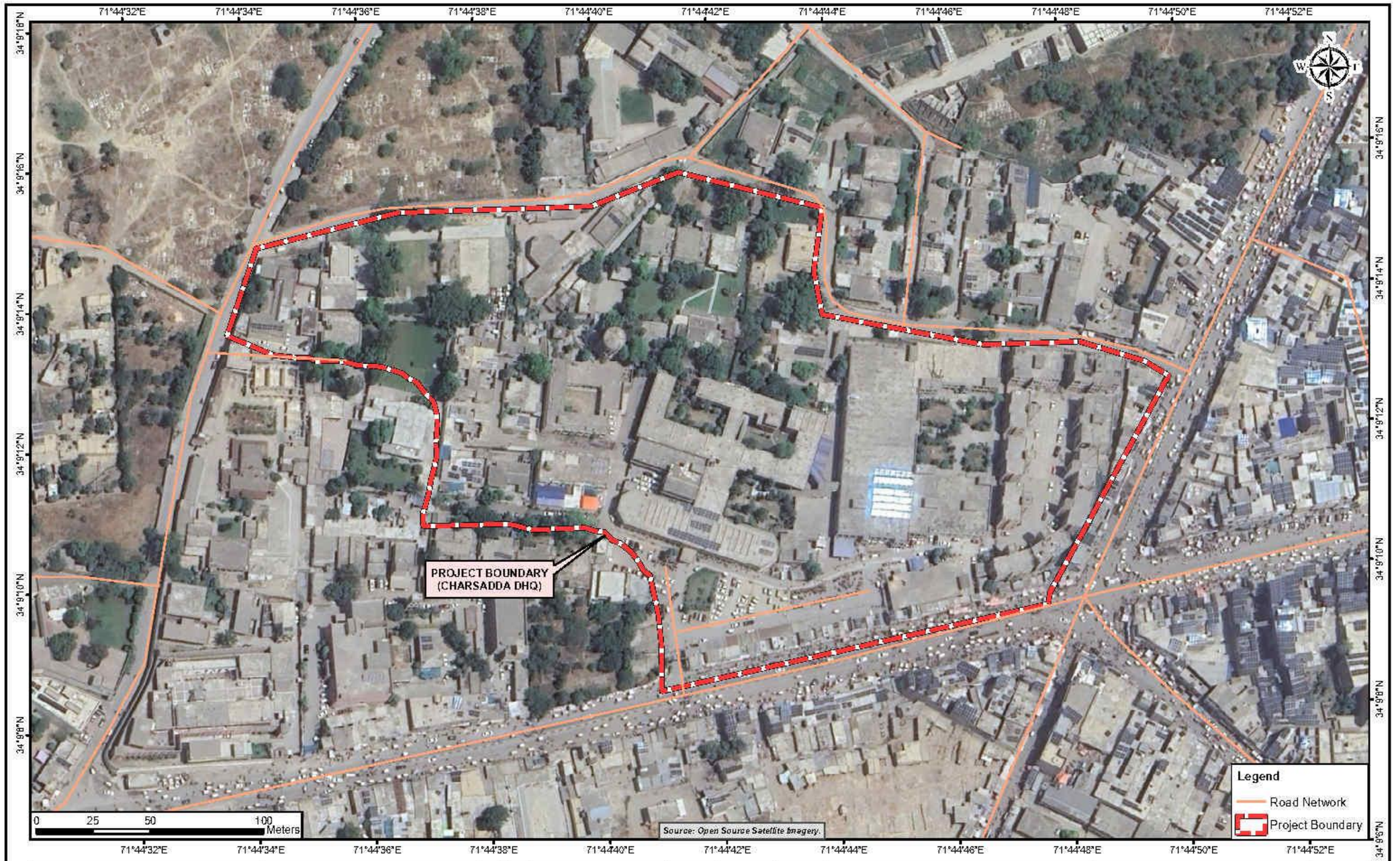
DATE: APRIL-2026

DRAWING No.: (SHEET 05 OF 06)

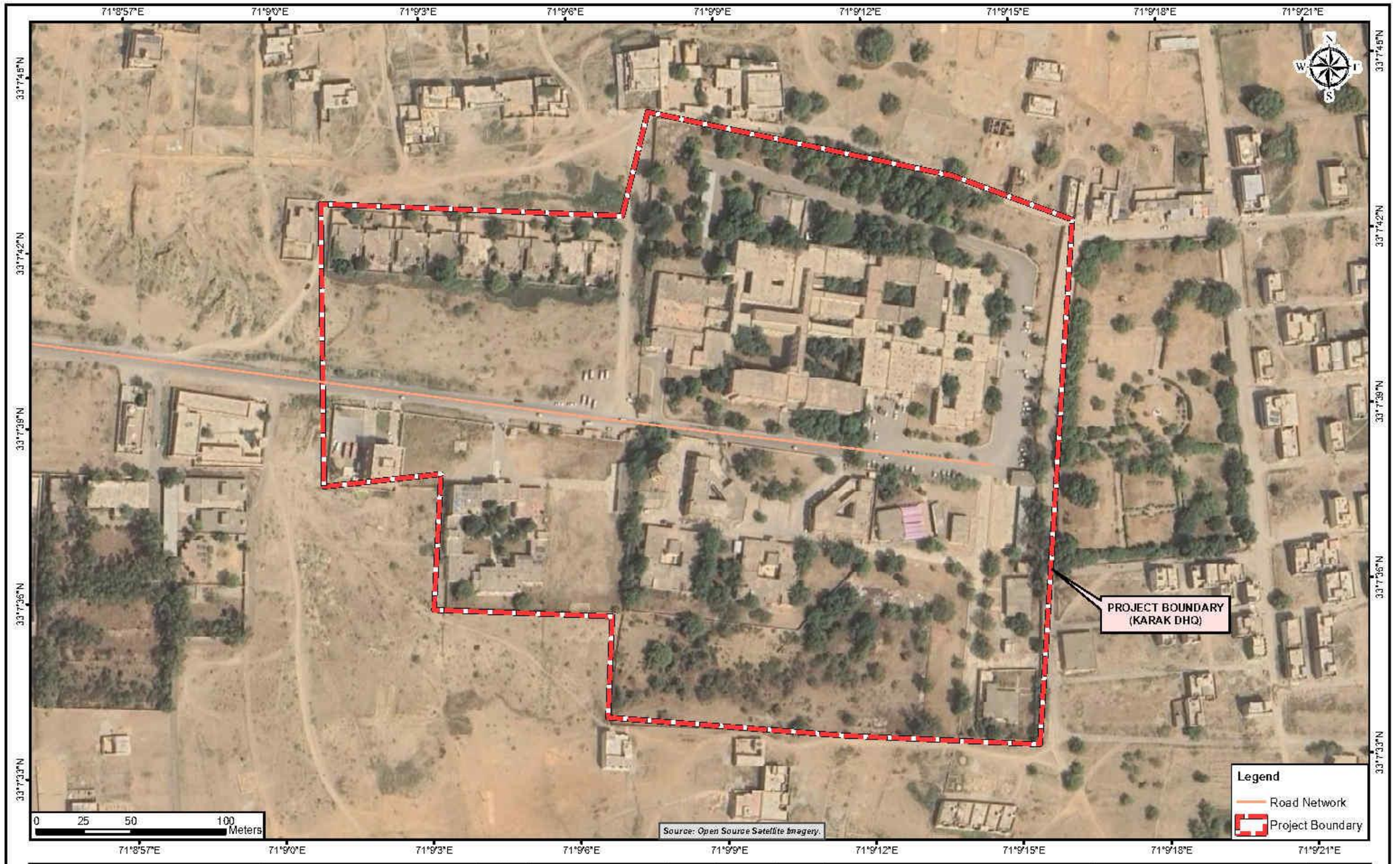
REV.: 0



CLIENT: COMMUNICATIONS AND WORKS (C&W) DEPARTMENT, KP	CONSULTANT: NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD HEAD OFFICE:- NESPAK HOUSE ,1-C, BLOCK-N MODEL TOWN EXTENSION, LAHORE, PAKISTAN	04				DRAWN	M.MUNEEB	PROJECT: KHYBER PAKHTUNKHWA HEALTH SYSTEM STRENGTHENING PROJECT (KPHSSP) REVAMPING OF NON-TEACHING DISTRICT HEAD QUARTERS (DHQS) HOSPITALS ACROSS KP, PHASE I	STUDY AREA - AOI MAP	SCALE: 1:1,000
		03				SUBMITTED	RAMLA S.			
		02				RECOMMENDED				
		01				CHD/VER.			DATE: APRIL-2026	DRAWING No.: (SHEET 06 OF 06)
		REV.	DATE	DESCRIPTION	APPROVED	APPROVED	GHAZANFAR			REV.: 0

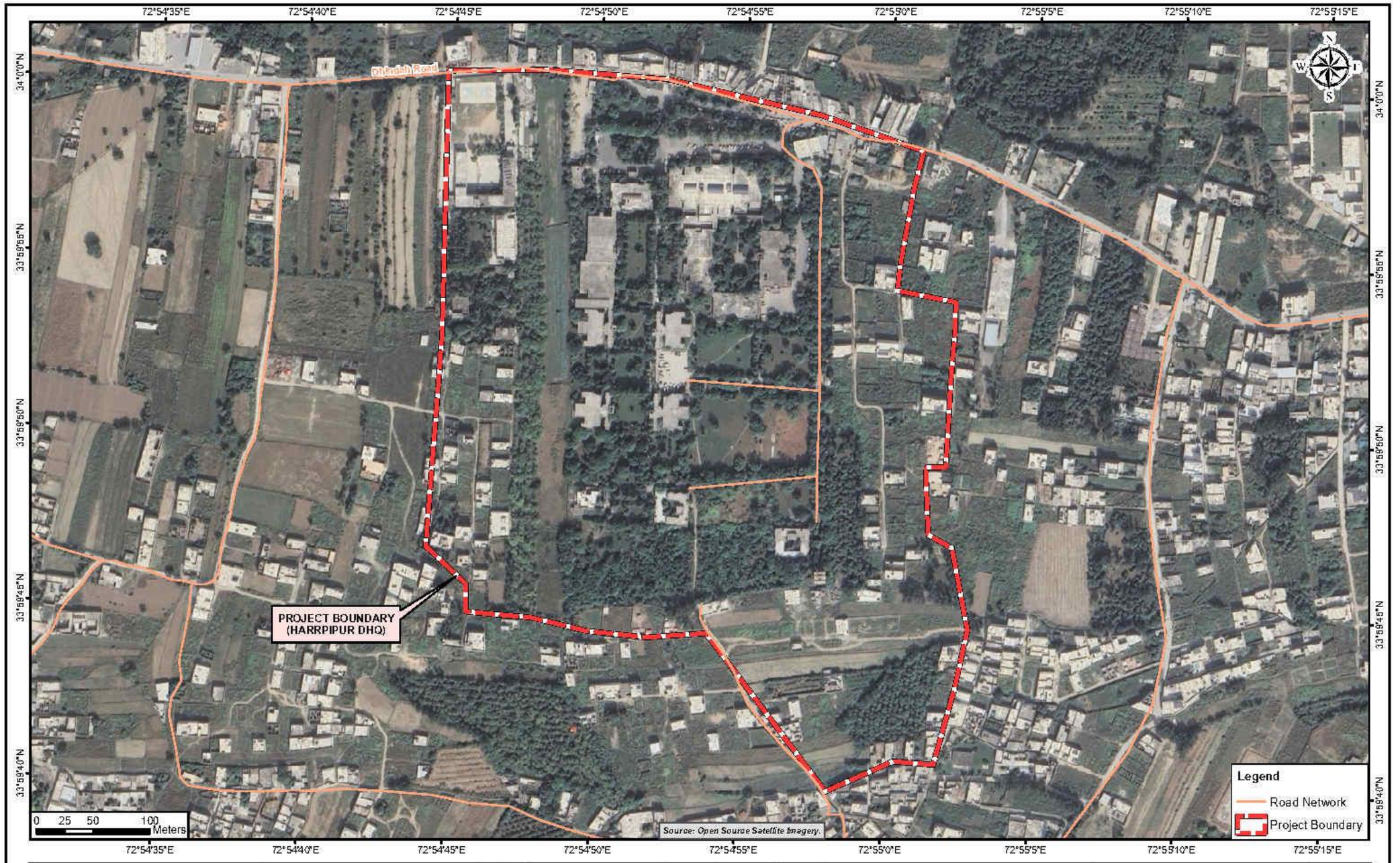


CLIENT: COMMUNICATIONS AND WORKS (C&W) DEPARTMENT, KP	CONSULTANT: NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. HEAD OFFICE:- NESPAK HOUSE, 1-C, BLOCK-N MODEL TOWN EXTENSION, LAHORE, PAKISTAN	04				DRAWN	M.MUNEEB	PROJECT: KHYBER PAKHTUNKHWA HEALTH SYSTEM STRENGTHENING PROJECT (KPHSSP) REVAMPING OF NON-TEACHING DISTRICT HEAD QUARTERS (DHQS) HOSPITALS ACROSS KP, PHASE I	STUDY AREA - AOI MAP	SCALE 1:1,500
		03				SUBMITTED	RAMLA S.			
		02				RECOMMENDED				
		01				CHD/VER.			DATE: APRIL-2026	DRAWING No.: (SHEET 02 OF 06)
		REV.	DATE	DESCRIPTION	APPROVED	APPROVED	GHAZANFAR			REV. 0



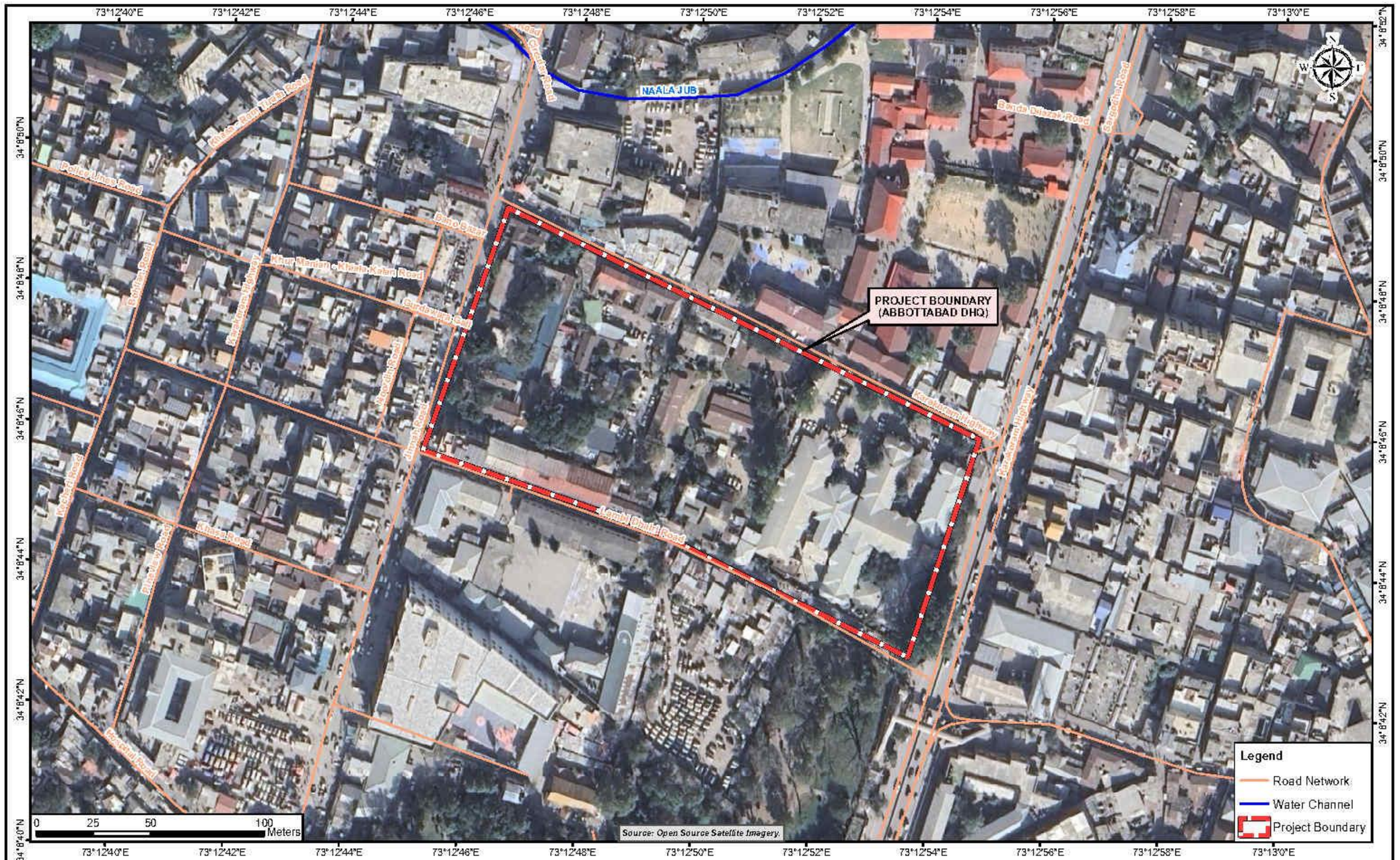
CLIENT: COMMUNICATIONS AND WORKS (C&W) DEPARTMENT, KP	CONSULTANT: NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD HEAD OFFICE:- NESPAK HOUSE ,1-C, BLOCK-N MODEL TOWN EXTENSION, LAHORE, PAKISTAN	04				DRAWN	M.MUNEEB	PROJECT: KHYBER PAKHTUNKHWA HEALTH SYSTEM STRENGTHENING PROJECT (KPHSSP) REVAMPING OF NON-TEACHING DISTRICT HEAD QUARTERS (DHQS) HOSPITALS ACROSS KP, PHASE I
		03				SUBMITTED	RAMLA S.	
		02				RECOMMENDED		
		01				CHD/VER.		
		REV.	DATE	DESCRIPTION	APPROVED	APPROVED	GHAZANFAR	

STUDY AREA - AOI MAP		SCALE
		1:1,800
DATE	DRAWING No.	REV.
APRIL-2026	(SHEET 04 OF 06)	0



CLIENT: COMMUNICATIONS AND WORKS (C&W) DEPARTMENT, KP	CONSULTANT: NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. HEAD OFFICE:- NESPAK HOUSE ,1-C, BLOCK-N MODEL TOWN EXTENSION, LAHORE, PAKISTAN	04				DRAWN	M.MUNEEB	PROJECT: KHYBER PAKHTUNKHWA HEALTH SYSTEM STRENGTHENING PROJECT (KPHSSP) REVAMPING OF NON-TEACHING DISTRICT HEAD QUARTERS (DHQS) HOSPITALS ACROSS KP, PHASE I
		03				SUBMITTED	RAMLA S.	
		02				RECOMMENDED		
		01				CHD/VER.		
		REV.	DATE	DESCRIPTION	APPROVED	APPROVED	GHAZANFAR	

STUDY AREA - AOI MAP		SCALE: 1:3,000
DATE: APRIL-2026	DRAWING No.: (SHEET 03 OF 06)	REV.: 0



CLIENT: COMMUNICATIONS AND WORKS (C&W) DEPARTMENT, KP	CONSULTANT: NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. HEAD OFFICE:- NESPAK HOUSE ,1-C, BLOCK-N MODEL TOWN EXTENSION, LAHORE, PAKISTAN	04				DRAWN	M.MUNEEB	PROJECT: KHYBER PAKHTUNKHWA HEALTH SYSTEM STRENGTHENING PROJECT (KPHSSP) REVAMPING OF NON-TEACHING DISTRICT HEAD QUARTERS (DHQS) HOSPITALS ACROSS KP, PHASE I	STUDY AREA - AOI MAP	SCALE 1:1,500
		03				SUBMITTED	RAMLA S.			
		02				RECOMMENDED				
		01				CHD/VER.			DATE: APRIL-2026	DRAWING No.: (SHEET 01 OF 06)
		REV.	DATE	DESCRIPTION	APPROVED	APPROVED	GHAZANFAR			REV. 0

ANNEXURE-III: ENVIRONMENTAL MONITORING REPORT

PAK GREEN ENVIRO-ENGINEERING (Pvt.) Ltd.
(Environmental Laboratories Division)
ISO/IEC 17025:2017 Accredited Testing Lab, ISO 9001:2015, ISO 14001:2015, ISO 45001:2018
Head Office: 46-M, Gulberg III, Lahore-Pakistan. Ph: +92-42-35441444 Cell: 0303-4442334
Peshawar Office: H. #. 4B, Railway Road, University Town, Peshawar - Pakistan. Ph: +92-91-5710744 Cell: 0308-4440895
EPA Certified

TEST REPORT

Ref. #: KPGL/LAB/2026-600/AA

Issue date: 03-Apr-26

Name of Client:	NESPAK JV TES
Project Name:	Phase-I: 200049-REVAMPING OF NON-TEACHING DHQ HOSPITALS ACROSS KHYBER PAKHTUNKHWA (ADP NO. 513)
Sampling Location:	DHQ Abbottabad
Coordinates:	34.1468083°N 73.221695°E
Name of Sampling Person:	Arsalan Haider
Nature of Monitoring:	Ambient Air
Monitoring By:	Pak Green Laboratories
Monitoring Instrument:	AQMS
Monitoring Duration:	24 hours
Monitoring Date:	09-Mar-26 to 10-Mar-26

Results:

Sr. No.	Time	CO	NO	NO_2	SO_2	O_3	PM_{10}	$PM_{2.5}$	Lead (Pb)
		mg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m3
1.	9:00 AM	1.82	10.92	37.76	44.72				
2.	10:00 AM	1.88	11.71	34.63	46.41				
3.	11:00 AM	1.73	11.58	32.53	44.94				
4.	12:00 PM	1.67	10.92	29.09	43.98				
5.	1:00 PM	1.78	9.67	34.76	43.82				
6.	2:00 PM	1.67	11.39	30.57	40.35				
7.	3:00 PM	1.71	12.48	32.00	40.94				
8.	4:00 PM	1.69	12.09	32.03	35.15				
9.	5:00 PM	1.80	11.96	31.62	40.95				
10.	6:00 PM	1.75	12.14	30.81	40.33				
11.	7:00 PM	1.61	10.99	28.98	40.98				
12.	8:00 PM	3.06	9.71	31.17	40.44				
13.	9:00 PM	2.12	11.65	31.11	38.55	56.9	146.7	38.5*	0.01
14.	10:00 PM	2.26	9.54	29.56	39.50				
15.	11:00 PM	2.21	15.01	27.85	39.98				
16.	12:00 AM	1.67	14.69	41.24	42.52				
17.	1:00 AM	1.71	10.99	39.80	43.14				
18.	2:00 AM	1.73	12.57	40.23	44.72				
19.	3:00 AM	2.03	9.94	38.15	41.53				
20.	4:00 AM	1.75	12.71	42.68	41.39				
21.	5:00 AM	2.04	12.97	40.85	43.70				
22.	6:00 AM	1.51	11.39	39.48	43.62				
23.	7:00 AM	1.77	14.03	41.51	40.60				
24.	8:00 AM	2.26	7.92	44.64	41.46				
Average (24 Hours)		1.88	11.65	35.12	41.82				
NEQS		5 8hours	40 24hours	80 24hours	120 24hours	130 1 hour	150 24hours	35 24hours	1.5 24 hour

End of Report

Ref. #: KPGL/LAB/2026-600/AA

Issue date: 03-Apr-26

NEQS: National Environmental Quality Standards
Remarks: Parameters with * are not in compliance with NEQS Limits.
Note: $PM_{2.5}$ results are not in compliance with the NEQS standard due to background air pollution, mostly due to natural surroundings and regional influences, such as dust carried by wind from open areas, dry weather conditions, traffic emissions from nearby roads

Terms & Conditions:

- Analysis was conducted on the request of project proponent for his own use or NEQS compliance.
- This report should be reproduced as a whole and not in parts.
- The responsibility of the ethical use of the results reported in this report lies with the client. Consequently, the laboratory is absolved of its responsibility for any claim that may result through the use by the client or others of the results appearing in this report.
- The report is not valid for any negotiations.
- Dually calibrated instrument was used during monitoring.

Field Analyst	Chief Analyst	Laboratory Incharge

Pak Green Enviro-Engineering (Pvt.) Ltd. Peshawar Pakistan

TEST REPORT

Ref. #: KPGL/LAB/2026-601/NL

Issue date: 03-Apr-26

Name of Client:	NESPAK JV TES
Project Name:	Phase-I: 200049-REVAMPING OF NON-TEACHING DHQ HOSPITALS ACROSS KHYBER PAKHTUNKHWA (ADP NO. 513)
Nature of Monitoring:	Noise Level (24 Hours)
Sampling Location:	DHQ Abbottabad
Monitoring By:	Pak Green Laboratories
Coordinates:	34.1468083°N 73.221695°E
Name of Sampling Person:	Arsalan Haider
Monitoring Time:	Real Time
Monitoring Instrument:	Smart Sensor
Monitoring Date:	10-Mar-26 to 11-Mar-26

Results:

Sr. No.	Day Time	Equivalent Noise dB (A)
1.	6:00 – 7:00 AM	42.5
2.	7:00 -8:00 AM	43.3
3.	8:00- 9:00 AM	43.6
4.	9:00- 10:00 AM	44.8
5.	10:00 -11:00 AM	45.3
6.	11:00- 12:00 AM	50.9
7.	12:00 -1:00 PM	50.0
8.	1:00- 2:00 PM	51.5
9.	2:00- 3:00 PM	48.4
10.	3:00 4:00 PM	51.0
11.	4:00 5:00 PM	47.2
12.	5:00 6:00 PM	44.5
13.	6:00 7:00 PM	42.2
14.	7:00 8:00 PM	46.9
15.	8:00 9:00 PM	43.6
16.	9:00 10:00 PM	43.9
Average		46.2

Sr. No.	Night Time	Equivalent Noise dB (A)
17.	10:00 PM - 11:00 PM	44.4
18.	11:00 -12:00 AM	40.5
19.	12:00 -1:00 AM	39.4
20.	1:00 -2:00 AM	38.5
21.	2:00 -3:00 AM	37.7
22.	3:00 -4:00 AM	33.6
23.	4:00- 5:00 AM	36.4
24.	5:00-6:00 AM	42.2
Average		39.0

.....End of Report.....

Ref. #: KPGL/LAB/2026-601/NL

Issue date: 03-Apr-26

NEQS: National Environmental Quality Standards

Sr. No.	Category of area/Zone	Units	Day Time	Night Time
1.	Silence Zone (D)	dB (A) Leq	50	45

Remarks: All Parameters are in compliance with the NEQS limit.
Terms & Conditions:

- Analysis was conducted on the request of project proponent for his own use/NEQS Compliance.
- Report cannot be used regarding compliance of any complaint, EPO or any other court case.
- This report should be reproduced as a whole and not in parts.
- The responsibility of the ethical use of the results reported in this report lies with the client. Consequently, the laboratory is absolved of its responsibility for any claim that may result through the use by the client or others of the results appearing in this report.
- The report is not valid for any negotiations.
- Dually calibrated instruments were used during monitoring.

Field Analyst	Chief Analyst	Laboratory Incharge

Pak Green Enviro-Engineering (Pvt) Ltd. Peshawar Pakistan

TEST REPORT

Ref #: KPGL/LAB/2026-602/GW

Issue date: 03-Apr-26

Name of Client:	NESPAK JV TES
Executing Agency:	C&W Department, Govt. of Khyber Pakhtunkhwa
Project Name:	Phase-I: 200049-REVAMPING OF NON-TEACHING DHQ HOSPITALS ACROSS KHYBER PAKHTUNKHWA (ADP NO. 513)

Sample Description:

Nature of sample:	Ground water	
Sampling By:	Pak Green Laboratories	
Sampling Location:	DHQ Abbottabad	
Coordinates:	34.84385° N 73.131023° E	
Sample source:	Tap Water	
Sample Code:	K-GW-078	
Date of sampling:	09-Mar-26	
Sample Receiving Date:	09-Mar-26	
Testing Facility:	Pak Green Laboratories	
Date of Completion of Analysis:	09-Mar-26 to 17-Mar-26	
Env. Conditions during Analysis:	Temp=22.4-23.9°C	RH=55.4-60.4%

Summary of Test Result:

Remarks:
Parameters with * are not in compliance with the NEQS Limit.
Note: The Presence of microbes contaimination may be due to poor sanitation practices in surrounding areas, cross contaimation within the distribution system.

Terms & Conditions:

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- The Sampling was done as per the sampling and preservation protocol method APHA 1060-B&C
- The responsibility of the ethical use of the results reported in this report lies with the client.
- The leftover sample (if so available) shall be retained for fifteen days after the issuance of the report unless otherwise negotiated between the client and the laboratory.
- The report is not valid for any negotiations.
- Dually calibrated instruments were used during monitoring and testing activities.

Lab Analyst	Chief Analyst	Laboratory Incharge
	Muhammad Raza Ullah	Mian Iftikhar Ahmed

Pak Green Enviro-Engineering (Pvt) Ltd. Peshawar Pakistan

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Ref #: KPGL/LAB/2026-602/GW

Issue date: 03-Apr-26

Biological Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
1.	*E. coli*	-	Must not be detectable in any 100 ml sample	Nil	40.4*	APHA-9221 F
2.	*Total Coli-form*	-	Must not be detectable in any 100 ml sample	Nil	114.4*	APHA-9221 D
3.	*Fecal Coliform*	-	-	Nil	113.4*	APHA-9221 E

Physical Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
4.	pH ^	-	6.5-8.5	0.001	7.735 at 24.2°C	APHA-4500-H^+ B
5.	Taste	-	Non-Objectionable	-	Non-Objectionable	APHA-2160 C
6.	Color	TCU	≤ 15	0.001	0.000	APHA-2120 C
7.	Odor	-	Non-Objectionable	-	Non-Objectionable	APHA-2150 B
8.	Turbidity	NTU	<5	0.01	0.28	APHA-2130 B
9.	Total dissolved Solids (TDS) ^	mg/L	< 1000	10	630	APHA-2540 C

Chemical Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
10.	Total Hardness ^	mg/L	<500	0.1	410	APHA-2340 C
11.	Aluminum (Al)	mg/L	≤ 0.2	0.0010	BDL	APHA-3111 D
12.	Antimony (Sb)	mg/L	≤0.005	0.0010	BDL	APHA-3111 B
13.	Arsenic (As)	mg/L	≤ 0.05	0.0001	BDL	APHA-3114 B
14.	Barium (Ba)	mg/L	0.7	0.0500	BDL	APHA-3111 D
15.	Boron (B)	mg/L	0.3	0.0100	BDL	APHA-3111 D
16.	Cadmium (Cd) ^	mg/L	0.01	0.0010	BDL	APHA-3111 B
17.	Chloride (Cl^-) ^	mg/L	< 250	0.1	55	APHA-4500-Cl^- B
18.	Chromium (Cr) ^	mg/L	≤ 0.05	0.0010	BDL	APHA-3111-Cr B
19.	Copper (Cu) ^	mg/L	2	0.0001	BDL	APHA-3111 B
20.	Fluoride (F)	mg/L	≤ 1.5	0.1	0.6	APHA-4500-F D
21.	Lead (Pb) ^	mg/L	≤ 0.05	0.0010	BDL	APHA-3111 B
22.	Manganese (Mn^{2+}) ^	mg/L	≤ 0.5	0.0010	BDL	APHA-3111 B
23.	Mercury (Hg)	mg/L	≤ 0.001	0.0001	BDL	APHA-3112 B
24.	Nickle	mg/L	≤ 0.02	0.0010	BDL	APHA-3111 B
25.	Nitrate^	mg/L	≤ 50	0.001	BDL	APHA-4500-NO_3^--E

Ref #: KPGL/LAB/2026-602/GW **Issue date:** 03-Apr-26

Chemical Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
26.	Nitrite^	mg/L	≤ 3	0.001	BDL	APHA-4500-NO_2^--B
27.	Selenium	mg/L	0.01	0.0001	BDL	APHA-3114 C
28.	Residual Chlorine	mg/L	0.2-0.5 at consumer end 0.5-1.5 at source	0.01	BDL	APHA-4500-Cl B
29.	Zinc (Zn^{+2}) ^	mg/L	5.0	0.0001	0.0104	APHA-3111 B
30.	Phenolic Compound (As Phenol)	mg/L	-	0.0005	BDL	APHA-5530 D
31.	Iron (Fe)^	mg/L	-	0.0010	BDL	APHA-3111 B
32.	Cyanide (as CN^-) Total	mg/L	≤ 0.05	0.001	BDL	APHA-4500-CN E
33.	Pesticides	mg/L	NGVS	0.001	DL	APHA-6630 B

End of Report

NEQS: National Environmental Quality Standard With ^PNAC Accredited
BDL: Below Detection Limits LDL: Lowest Detection limit

Green Enviro-Engineering (Pvt) Ltd. Peshawar. Pakistan

EPA Certified

PAK GREEN ENVIRO-ENGINEERING (Pvt.) Ltd.
(Environmental Laboratories Division)
ISO/IEC 17025:2017 Accredited Testing Lab, ISO 9001:2015, ISO 14001:2015, ISO 45001:2018
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TEST REPORT

Ref #: KPGL/LAB/2026-603/WW

Issue date: 03-Apr-26

Name of Client:	NESPAK JV TES
Executing Agency:	C&W Department, Govt. of Khyber Pakhtunkhwa
Project Name:	Phase-I: 200049-REVAMPING OF NON-TEACHING DHQ HOSPITALS ACROSS KHYBER PAKHTUNKHWA (ADP NO. 513)

Sample Description:

Nature of sample:	Waste water	
Sampling By:	Pak Green Laboratories	
Sampling Location:	DHQ Abbottabad	
Coordinates:	34.84760 N 73.131728° E	
Sample source:	Main Drain	
Sample Code:	K-WW-077	
Date of sampling:	09-Mar-26	
Sample Receiving Date:	09-Mar-26	
Testing Facility:	Pak Green Laboratories	
Date of Completion of Analysis:	09-Mar-26 to 17-Mar-26	
Env. Conditions during Analysis:	Temp=22.4-23.9°C	RH=55.4-60.4%

Summary of Test Result:

Remarks:
Parameters with * are not in compliance with the NEQS Limit
Note: High BOD and COD Values likely resulting from the discharge of untreated domestic wastewater, Hospital effluents containing organic and chemical constituents.

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- The leftover sample (if so available) shall be retained for fifteen days after the issuance of the report unless otherwise negotiated between the client and the laboratory.
- The report is not valid for any negotiations.
- Dually calibrated instruments were used during testing activities and monitoring.

Lab Analyst	Chief Analyst	Laboratory Incharge
	Muhammad Raza Ullah	Mian Iftikhar Ahmad

Peshawar Pakistan

Ref #: KPGL/LAB/2026-603/WW

Issue date: 03-Apr-26

Physical Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
1.	Temperature	°C	-	0.1	24.2	APHA-2550 B
2.	pH^	-	6-9	0.001	7.700 at 24.2°C	APHA-4500-H^+ B

Chemical Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
3.	Biological Oxygen Demand (BOD_5 at 20 °C) ^	mg/L	80	1	158*	APHA-5210 D
4.	Chemical Oxygen Demand (COD) ^	mg/L	150	0.4	256*	APHA-5220 B
5.	Total Suspended Solids (TSS) ^	mg/L	200	1	90	APHA-2540 D
6.	Total Dissolved Solids (TDS) ^	mg/L	3500	10	1080	APHA-2540 C
7.	Greases & Oil	mg/L	10	0.1	BDL	APHA-5520 B
8.	Phenolic Compound (As Phenol)	mg/L	0.1	0.005	BDL	APHA-5530 D
9.	Chloride (as Cl^{1-}) ^	mg/L	1000	0.1	130	APHA-4500-Cl^{1-} B
10.	Fluoride (F^{1-})	mg/L	10	0.1	1.0	APHA-4500-F-D
11.	An Ionic detergent as MBAs	mg/L	20	0.001	0.105	APHA 5540 C
12.	Sulphate (SO_4^{2-}) ^	mg/L	600	1	105	APHA-4500-SO_4 C
13.	Sulphide (S^{2-})	mg/L	1.0	0.1	BDL	APHA-4500-S^{2-} F
14.	Ammonia (NH_3) ^	mg/L	40	0.1	38.4	APHA-4500NH_3 C
15.	Cadmium (Cd)^	mg/L	0.1	0.0010	BDL	APHA-3111 B
16.	Chromium^ (Trivalent & Hexavalent)	mg/L	1.0	0.0010	0.0321	APHA-3111 B
17.	Copper (Cu)^	mg/L	1.0	0.0001	0.0488	APHA-3111 B
18.	Lead (Pb)^	mg/L	0.5	0.0010	BDL	APHA-3111 B
19.	Mercury (Hg)	mg/L	0.01	0.0001	BDL	APHA-3112 B
20.	Selenium (Se)	mg/L	0.5	0.0001	BDL	APHA-3114 C
21.	Nickel (Ni)	mg/L	1.0	0.0010	BDL	APHA-3111 B
22.	Silver (Ag)	mg/L	1.0	0.0100	0.0394	APHA-3111 B
23.	Zinc (Zn)^	mg/L	5.0	0.0001	0.1826	APHA-3111 B
24.	Arsenic (As)	mg/L	1.0	0.0001	BDL	APHA-3114 B
25.	Barium (Ba)	mg/L	1.5	0.0001	BDL	APHA-3111 D
26.	Iron (Fe)^	mg/L	8.0	0.0010	2.7616	APHA-3111 B
27.	Manganese (Mn)^	mg/L	1.5	0.0010	0.2445	APHA-3111 B
28.	Boron (B)	mg/L	6.0	0.0001	BDL	APHA-3111 D
29.	Chlorine (Cl_2)	mg/L	1.0	0.0001	BDL	APHA-4500 Cl B
30.	Total Toxic Metals (Cd, Cr, Cu, Pb, Hg, Se, Ni, Ag, As, Ba, B)	mg/L	2.0	0.0001	0.1203	APHA-3111
31.	Cyanide (as CN^{1-}) Total	mg/L	1.0	0.001	BDL	APHA-4500-CN E
32.	Pesticide	mg/L	0.15	0.001	BDL	APHA-6630 B

Pak Green Enviro-Engineering (Pvt) Ltd. Peshawar Pakistan

Ref #: KPGL/LAB/2026-603/WW

Issue date: 03-Apr-26

Biological Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method/ Technique
33.	*E. coli*	-	-	Nil	Nil	APHA-9221 F
34.	*Total Coli-form*	-	-	Nil	124.2	APHA-9221 D
35.	*Fecal Coliform*	-	-	Nil	35.9	APHA-9221 E

End of Report

NEQS: National Environmental Quality Standard
BDL: Below Detection Limits

With ^PNAC Accredited
LDL: Lowest Detection limit

Pak Green Enviro-Engineering (Pvt) Ltd. Peshawar Pakistan

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TEST REPORT

Ref. #: KPGL/LAB/2026-588/AA

Issue date: 03-Apr-26

Name of Client:	NESPAK JV TES
Project Name:	Phase-I: 200049-REVAMPING OF NON-TEACHING DHQ HOSPITALS ACROSS KHYBER PAKHTUNKHWA (ADP NO. 513)
Nature of Monitoring:	Ambient Air
Monitoring By:	Pak Green Laboratories
Sampling Location:	DHQ Charsadda
Coordinates:	34.15258°N 71.74499°E
Name of Sampling Person:	Farman Ullah
Monitoring Instrument:	AQMS
Monitoring Duration:	24 hours
Monitoring Date:	11-Mar-26 to 12-Mar-26

Results:

Sr. No.	Time	CO	NO	NO_2	SO_2	O_3	PM_{10}	$PM_{2.5}$	Lead (Pb)
		mg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m3
1.	9:00 AM	1.16	7.97	26.29	37.01				
2.	10:00 AM	1.22	8.76	23.16	38.70				
3.	11:00 AM	1.07	8.63	21.06	37.23				
4.	12:00 PM	1.01	7.97	17.62	36.27				
5.	1:00 PM	1.12	6.72	23.29	36.11				
6.	2:00 PM	1.01	8.44	19.10	32.64				
7.	3:00 PM	1.05	9.53	20.53	33.23				
8.	4:00 PM	1.03	9.14	20.56	27.44				
9.	5:00 PM	1.14	9.01	20.15	33.24				
10.	6:00 PM	1.09	9.19	19.34	32.62				
11.	7:00 PM	0.95	8.04	17.51	33.27				
12.	8:00 PM	2.40	6.76	19.70	32.73				
13.	9:00 PM	1.46	8.70	19.64	30.84	41.2	105.7	23.8	0.02
14.	10:00 PM	1.60	6.59	18.09	31.79				
15.	11:00 PM	1.55	12.06	16.38	32.27				
16.	12:00 AM	1.01	11.74	29.77	34.81				
17.	1:00 AM	1.05	8.04	28.33	35.43				
18.	2:00 AM	1.07	9.62	28.76	37.01				
19.	3:00 AM	1.37	6.99	26.68	33.82				
20.	4:00 AM	1.09	9.76	31.21	33.68				
21.	5:00 AM	1.38	10.02	29.38	35.99				
22.	6:00 AM	0.85	8.44	28.01	35.91				
23.	7:00 AM	1.11	11.08	30.04	32.89				
24.	8:00 AM	1.60	4.97	33.17	34.75				
Average (24 Hours)		1.22	8.67	23.66	34.15				
NEQS		5 8hours	40 24hours	80 24hours	120 24hours	130 1 hour	150 24hours	35 24hours	1.5 24 hours

End of Report

Ref. #: KPGL/LAB/2026-588/AA

Issue date: 03-Apr-26

NEQS: National Environmental Quality Standards
Remarks: All Parameters are in compliance with NEQS Limits.
Terms & Conditions:

- Analysis was conducted on the request of project proponent for his own use or NEQS compliance.
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- The report is not valid for any negotiations.
- Dually calibrated instrument was used during monitoring.

Field Analyst	Chief Analyst	Laboratory Incharge

Pak Green Enviro-Engineering (Pvt) Ltd. Peshawar Pakistan

PAK GREEN ENVIRO-ENGINEERING (Pvt.) Ltd.
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TEST REPORT

Ref. #: KPGL/LAB/2026-589/NL **Issue date:** 03-Apr-26

Name of Client:	NESPAK JV TES
Project Name:	Phase-I: 200049-REVAMPING OF NON-TEACHING DHQ HOSPITALS ACROSS KHYBER PAKHTUNKHWA (ADP NO. 513)
Nature of Monitoring:	Noise Level (24 Hours)
Sampling Location:	DHQ Charsadda
Coordinates:	34.15258°N 71.74499°E
Name of Sampling Person:	Farman Ullah
Monitoring By:	Pak Green Laboratories
Monitoring Time:	Real Time
Monitoring Instrument:	Smart Sensor
Monitoring Date:	11-Mar-26 to 12-Mar-26

Results:

Sr. No.	Day Time	Equivalent Noise dB (A)
1.	6:00 – 7:00 AM	45.5
2.	7:00 -8:00 AM	47.1
3.	8:00- 9:00 AM	46.7
4.	9:00- 10:00 AM	47.8
5.	10:00 -11:00 AM	48.7
6.	11:00- 12:00 AM	49.1
7.	12:00 -1:00 PM	50.2
8.	1:00- 2:00 PM	50.7
9.	2:00- 3:00 PM	52.1
10.	3:00 4:00 PM	52.9
11.	4:00 5:00 PM	52.5
12.	5:00 6:00 PM	45.9
13.	6:00 7:00 PM	46.6
14.	7:00 8:00 PM	47.3
15.	8:00 9:00 PM	46.4
16.	9:00 10:00 PM	41.4
Average		48.2

Sr. No.	Night Time	Equivalent Noise dB (A)
17.	10:00 PM - 11:00 PM	42.3
18.	11:00 -12:00 AM	42.1
19.	12:00 -1:00 AM	41.5
20.	1:00 -2:00 AM	40.4
21.	2:00 -3:00 AM	39.6
22.	3:00 -4:00 AM	35.5
23.	4:00- 5:00 AM	37.9
24.	5:00-6:00 AM	45.4
Average		40.6

End of Report

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Ref. #: KPGL/LAB/2026-589/NL

Issue date: 03-Apr-26

NEQS: National Environmental Quality Standards

Sr. No.	Category of area/Zone	Units	Day Time	Night Time
1.	Silence Zone (D)	dB (A) Leq	50	45

Remarks: All Parameters are in compliance with the NEQS limit.
Terms & Conditions:

- Analysis was conducted on the request of project proponent for his own use/NEQS Compliance.
- Report cannot be used regarding compliance of any complaint, EPO or any other court case.
- This report should be reproduced as a whole and not in parts.
- The responsibility of the ethical use of the results reported in this report lies with the client. Consequently, the laboratory is absolved of its responsibility for any claim that may result through the use by the client or others of the results appearing in this report.
- The report is not valid for any negotiations.
- Dually calibrated instruments were used during monitoring.

Field Analyst	Chief Analyst	Laboratory Incharge

Pak Green Enviro-Engineering (Pvt) Ltd. Railway Road, University Town, Peshawar. Peshawar, Pakistan

TEST REPORT

Ref #: KPGL/LAB/2026-590/DW

Issue date: 03-Apr-26

Name of Client:	NESPAK JV TES
Executing Agency:	C&W Department, Govt. of Khyber Pakhtunkhwa
Project Name:	Phase-I: 200049-REVAMPING OF NON-TEACHING DHQ HOSPITALS ACROSS KHYBER PAKHTUNKHWA (ADP NO. 513)

Sample Description:

Nature of sample:	Drinking water	
Sampling By:	Pak Green Laboratories	
Sampling Location:	DHQ Charsada	
Coordinates:	34.152443°N 71.74519°E	
Sample source:	Tap Water	
Sample Code:	K-DW-086	
Date of sampling:	11-Mar-26	
Sample Receiving Date:	11-Mar-26	
Testing Facility:	Pak Green Laboratories	
Date of Completion of Analysis:	11-Mar-26 to 25-Mar-26	
Env. Conditions during Analysis:	Temp=23.0-24.5°C	RH=52.4-57.4%

Summary of Test Result:

Remarks:
All Parameters are in compliance with the NEQS Limit.

Terms & Conditions:

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- The Sampling was done as per the sampling and preservation protocol method APHA 1060-B&C.
- The responsibility of the ethical use of the results reported in this report lies with the client.
- The leftover sample (if so available) shall be retained for fifteen days after the issuance of the report unless otherwise negotiated between the client and the laboratory.
- The report is not valid for any negotiations.
- Dually calibrated instruments were used during testing activities and monitoring.

Lab Analyst	Chief Analyst	Laboratory Incharge
	Muhammad Raza Ullah	Mian Iftikhar Ahmed

Pak Green Enviro-Engineering (Pvt) Ltd. Peshawar Pakistan

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PAK GREEN ENVIRO-ENGINEERING (Pvt.) Ltd.
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Ref #: KPGL/LAB/2026-590/DW **Issue date:** 03-Apr-26

Biological Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
1.	*E. coli*	-	Must not be detectable in any 100 ml sample	Nil	Nil	APHA-9221 F
2.	*Total Coli-form*	-	Must not be detectable in any 100 ml sample	Nil	Nil	APHA-9221 D
3.	*Fecal Coliform*	-	-	Nil	Nil	APHA-9221 E

Physical Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
4.	pH ^	-	6.5-8.5	0.001	8.209 at 23.9°C	APHA-4500-H^+ B
5.	Taste	-	Non-Objectionable	-	Non-Objectionable	APHA-2160 C
6.	Color	TCU	≤ 15	0.001	0.000	APHA-2120 C
7.	Odor	-	Non-Objectionable	-	Non-Objectionable	APHA-2150 B
8.	Turbidity	NTU	<5	0.01	0.20	APHA-2130 B
9.	Total dissolved Solids (TDS) ^	mg/L	< 1000	10	225	APHA-2540 C

Chemical Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
10.	Total Hardness ^	mg/L	<500	0.1	90	APHA-2340 C
11.	Aluminum (Al)	mg/L	≤ 0.2	0.0010	BDL	APHA-3111 D
12.	Antimony (Sb)	mg/L	≤0.005	0.0010	BDL	APHA-3111 B
13.	Arsenic (As)	mg/L	≤ 0.05	0.0001	BDL	APHA-3114 B
14.	Barium (Ba)	mg/L	0.7	0.0500	BDL	APHA-3111 D
15.	Boron (B)	mg/L	0.3	0.0100	BDL	APHA-3111 D
16.	Cadmium (Cd) ^	mg/L	0.01	0.0010	BDL	APHA-3111 B
17.	Chloride (Cl^{-1}) ^	mg/L	< 250	0.1	05	APHA-4500-Cl^{-1} B
18.	Chromium (Cr) ^	mg/L	≤ 0.05	0.0010	BDL	APHA-3111-Cr B
19.	Copper (Cu) ^	mg/L	2	0.0001	BDL	APHA-3111 B
20.	Fluoride (F)	mg/L	≤ 1.5	0.1	0.2	APHA-4500-F D
21.	Lead (Pb) ^	mg/L	≤ 0.05	0.0010	BDL	APHA-3111 B
22.	Manganese (Mn^{2+}) ^	mg/L	≤ 0.5	0.0010	BDL	APHA-3111 B
23.	Mercury (Hg)	mg/L	≤ 0.001	0.0001	BDL	APHA-3112 B
24.	Nickle	mg/L	≤ 0.02	0.0010	BDL	APHA-3111 B
25.	Nitrate^	mg/L	≤ 50	0.001	BDL	APHA-4500-NO_3^{-1}-E

Pak Green Enviro-Engineering (Pvt) Ltd. Peshawar, Pakistan

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Ref #: KPGL/LAB/2026-590/DW

Issue date: 03-Apr-26

Chemical Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
26.	Nitrite^	mg/L	≤ 3	0.001	BDL	APHA-4500-NO_2^--B
27.	Selenium	mg/L	0.01	0.0001	BDL	APHA-3114 C
28.	Residual Chlorine	mg/L	0.2-0.5 at consumer end 0.5-1.5 at source	0.01	BDL	APHA-4500-Cl B
29.	Zinc (Zn^{+2}) ^	mg/L	5.0	0.0001	BDL	APHA-3111 B
30.	Phenolic Compound (As Phenol)	mg/L	-	0.0005	BDL	APHA-5530 D
31.	Iron (Fe)^	mg/L	-	0.0010	0.0315	APHA-3111 B
32.	Cyanide (as CN^-) Total	mg/L	≤ 0.05	0.001	BDL	APHA-4500-CN E
33.	Pesticides	mg/L	NGVS	0.001	BDL	APHA-6630 B

End of Report

NEQS: National Environmental Quality Standard
BDL: Below Detection Limits

With ^PNAC Accredited
LDL: Lowest Detection limit

Pak Green Enviro-Engineering (Pvt) Ltd. Peshawar, Pakistan

TEST REPORT

Ref #: KPGL/LAB/2026-591/WW

Issue date: 03-Apr-26

Name of Client:	NESPAK JV TES
Executing Agency:	C&W Department, Govt. of Khyber Pakhtunkhwa
Project Name:	Phase-I: 200049-REVAMPING OF NON-TEACHING DHQ HOSPITALS ACROSS KHYBER PAKHTUNKHWA (ADP NO. 513)

Sample Description:

Nature of sample:	Waste water	
Sampling By:	Pak Green Laboratories	
Sampling Location:	DHQ Charsadda	
Coordinates:	34.152992°N 71. 744545°E	
Sample source:	Main Drain	
Sample Code:	K-WW-085	
Date of sampling:	11-Mar-26	
Sample Receiving Date:	11-Mar-26	
Testing Facility:	Pak Green Laboratories	
Date of Completion of Analysis:	11-Mar-26 to 25-Mar-26	
Env. Conditions during Analysis:	Temperature: 23.0-24.5°C	Humidity: 52.7-57.4%

Summary of Test Result:

Remarks:
All Parameters are in compliance with the NEQS Limit

Terms & Conditions:

- This report should be reproduced as a whole and not in parts.
- The Sampling was done as per the sampling and preservation protocol method APHA 1060-B&C.
- The responsibility of the ethical use of the results reported in this report lies with the client.
- The leftover sample (if so available) shall be retained for fifteen days after the issuance of the report unless otherwise negotiated between the client and the laboratory.
- The report is not valid for any negotiations.
- Dually calibrated instruments were used during testing activities and monitoring.

Lab Analyst	Chief Analyst	Laboratory Incharge
	Muhammad Raza Ullah	Mian Iftikhar Ahmed

Green Enviro-Engineering (Pvt) Ltd. Peshawar, Pakistan

Ref #: KPGL/LAB/2026-591/WW

Issue date: 03-Apr-26

Physical Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
1.	Temperature	°C	-	0.1	23.8	APHA-2550 B
2.	pH^	-	6-9	0.001	7.919 at 23.8	APHA-4500-H⁺ B

Chemical Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
3.	Biological Oxygen Demand (BOD_5 at 20 °C) ^	mg/L	80	1	68	APHA-5210 D
4.	Chemical Oxygen Demand (COD) ^	mg/L	150	0.4	104	APHA-5220 B
5.	Total Suspended Solids (TSS) ^	mg/L	200	1	50	APHA-2540 D
6.	Total Dissolved Solids (TDS) ^	mg/L	3500	10	830	APHA-2540 C
7.	Greases & Oil	mg/L	10	0.1	BDL	APHA-5520 B
8.	Phenolic Compound (As Phenol)	mg/L	0.1	0.005	BDL	APHA-5530 D
9.	Chloride (as Cl^-) ^	mg/L	1000	0.1	75	APHA-4500-Cl^- B
10.	Fluoride (F^-)	mg/L	10	0.1	0.8	APHA-4500-F-D
11.	An Ionic detergent as MBAs	mg/L	20	0.001	0.085	APHA 5540 C
12.	Sulphate (SO_4^{2-}) ^	mg/L	600	1	90	APHA-4500-SO_4 C
13.	Sulphide (S^{2-})	mg/L	1.0	0.1	BDL	APHA-4500-S^{2-} F
14.	Ammonia (NH_3) ^	mg/L	40	0.1	7.3	APHA-4500NH_3 C
15.	Cadmium (Cd)^	mg/L	0.1	0.0010	BDL	APHA-3111 B
16.	Chromium^ (Trivalent & Hexavalent)	mg/L	1.0	0.0010	0.2035	APHA-3111 B
17.	Copper (Cu)^	mg/L	1.0	0.0001	0.0277	APHA-3111 B
18.	Lead (Pb)^	mg/L	0.5	0.0010	BDL	APHA-3111 B
19.	Mercury (Hg)	mg/L	0.01	0.0001	BDL	APHA-3112 B
20.	Selenium (Se)	mg/L	0.5	0.0001	BDL	APHA-3114 C
21.	Nickel (Ni)	mg/L	1.0	0.0010	BDL	APHA-3111 B
22.	Silver (Ag)	mg/L	1.0	0.0100	BDL	APHA-3111 B
23.	Zinc (Zn)^	mg/L	5.0	0.0001	0.0458	APHA-3111 B
24.	Arsenic (As)	mg/L	1.0	0.0001	BDL	APHA-3114 B
25.	Barium (Ba)	mg/L	1.5	0.0001	BDL	APHA-3111 D
26.	Iron (Fe)^	mg/L	8.0	0.0010	2.0292	APHA-3111 B
27.	Manganese (Mn)^	mg/L	1.5	0.0010	0.1530	APHA-3111 B
28.	Boron (B)	mg/L	6.0	0.0001	BDL	APHA-3111 D
29.	Chlorine (Cl_2)	mg/L	1.0	0.0001	BDL	APHA-4500 Cl B
30.	Total Toxic Metals (Cd, Cr, Cu, Pb, Hg, Se, Ni, Ag, As, Ba, B)	mg/L	2.0	0.0001	0.2312	APHA-3111
31.	Cyanide (as CN^-) Total	mg/L	1.0	0.001	BDL	APHA-4500-CN E
32.	Pesticide	mg/L	0.15	0.001	BDL	APHA-6630 B

Peshawar, Pakistan

Ref #: KPGL/LAB/2026-591/WW

Issue date: 03-Apr-26

Biological Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
33.	*E. coli*	-	-	Nil	40.4	APHA-9221 F
34.	*Total Coli-form*	-	-	Nil	225.4	APHA-9221 D
35.	*Fecal Coliform*	-	-	Nil	105.0	APHA-9221 E

End of Report

NEQS: National Environmental Quality Standard
BDL: Below Detection Limits

With ^PNAC Accredited
LDL: Lowest Detection limit

Pak Green Enviro-Engineering (Pvt) Ltd. Peshawar Pakistan

PAK GREEN ENVIRO-ENGINEERING (Pvt.) Ltd.
(Environmental Laboratories Division)
ISO/IEC 17025:2017 Accredited Testing Lab, ISO 9001:2015, ISO 14001:2015, ISO 45001:2018
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EPA Certified

TEST REPORT

Ref. #: KPGL/LAB/2026-596/AA

Issue date: 03-Apr-26

Name of Client:	NESPAK JV TES
Project Name:	Phase-I: 200049-REVAMPING OF NON-TEACHING DHQ HOSPITALS ACROSS KHYBER PAKHTUNKHWA (ADP NO. 513)
Sampling Location:	DHQ Haripur
Nature of Monitoring:	Ambient Air
Monitoring By:	Pak Green Laboratories
Coordinates:	34.000015°N 72.9141517°E
Name of Sampling Person:	Arslan Haider
Monitoring Instrument:	AQMS
Monitoring Duration:	24 hours
Monitoring Date:	10-Mar-26 to 11-Mar-26

Results:

Sr. No.	Time	CO	NO	NO_2	SO_2	O_3	PM_{10}	$PM_{2.5}$	Lead (Pb)
		mg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m3
1.	9:00 AM	1.91	13.80	37.76	44.72				
2.	10:00 AM	1.97	14.59	34.63	46.41				
3.	11:00 AM	1.82	14.46	32.53	44.94				
4.	12:00 PM	1.76	13.80	29.09	43.98				
5.	1:00 PM	1.87	12.55	34.76	43.82				
6.	2:00 PM	1.76	14.27	30.57	40.35				
7.	3:00 PM	1.80	15.36	32.00	40.94				
8.	4:00 PM	1.78	14.97	32.03	35.15				
9.	5:00 PM	1.89	14.84	31.62	40.95				
10.	6:00 PM	1.84	15.02	30.81	40.33				
11.	7:00 PM	1.70	13.87	28.98	40.98				
12.	8:00 PM	3.15	12.59	31.17	40.44				
13.	9:00 PM	2.21	14.53	31.11	38.55	49.3	146.7	43.8*	0.02
14.	10:00 PM	2.35	12.42	29.56	39.50				
15.	11:00 PM	2.30	17.89	27.85	39.98				
16.	12:00 AM	1.76	17.57	41.24	42.52				
17.	1:00 AM	1.80	13.87	39.80	43.14				
18.	2:00 AM	1.82	15.45	40.23	44.72				
19.	3:00 AM	2.12	12.82	38.15	41.53				
20.	4:00 AM	1.84	15.59	42.68	41.39				
21.	5:00 AM	2.13	15.85	40.85	43.70				
22.	6:00 AM	1.60	14.27	39.48	43.62				
23.	7:00 AM	1.86	16.91	41.51	40.60				
24.	8:00 AM	2.35	10.80	44.64	42.46				
Average (24 Hours)		1.97	14.50	35.13	41.86				
NEQS		5 8hours	40 24hours	80 24hours	120 24hours	130 1 hour	150 24hours	35 24hours	1.5 24 hour

End of Report

Ref. #: KPGL/LAB/2026-596/AA

Issue date: 03-Apr-26

NEQS: National Environmental Quality Standards
Remarks: Parameters with * are not in compliance with NEQS Limits.
Note: $PM_{2.5}$ results are not in compliance with the NEQS standard due to background air pollution, mostly due to natural surroundings and regional influences, such as dust carried by wind from open areas, dry weather conditions, traffic emissions from nearby roads.
Terms & Conditions:

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- The report is not valid for any negotiations.
- Dually calibrated instrument was used during monitoring.

Field Analyst	Chief Analyst	Laboratory Incharge

Pak Green Enviro-Engineering (Pvt) Ltd. Peshawar, Pakistan

PAK GREEN ENVIRO-ENGINEERING (Pvt.) Ltd.
(Environmental Laboratories Division)
ISO/IEC 17025:2017 Accredited Testing Lab, ISO 9001:2015, ISO 14001:2015, ISO 45001:2018
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TEST REPORT

EPA Certified KPGL/LAB/2026-597/NL

Issue date: 03-Apr-26

Name of Client:	NESPAK JV TES
Project Name:	Phase-I: 200049-REVAMPING OF NON-TEACHING DHQ HOSPITALS ACROSS KHYBER PAKHTUNKHWA (ADP NO. 513)
Sampling Location:	DHQ Haripur
Nature of Monitoring:	Noise Level (24 Hours)
Coordinates:	34.000015°N 72.9141517°E
Name of Sampling Person:	Arslan Haider
Monitoring By:	Pak Green Laboratories
Monitoring Time:	Real Time
Monitoring Instrument:	Smart Sensor
Monitoring Date:	09-Mar-26 to 10-Mar-26

Results:

Sr. No.	Day Time	Equivalent Noise dB (A)
1.	6:00 – 7:00 AM	44.6
2.	7:00 -8:00 AM	47.5
3.	8:00- 9:00 AM	48.0
4.	9:00- 10:00 AM	48.9
5.	10:00 -11:00 AM	46.8
6.	11:00- 12:00 AM	49.4
7.	12:00 -1:00 PM	52.2
8.	1:00- 2:00 PM	50.1
9.	2:00- 3:00 PM	51.5
10.	3:00 4:00 PM	48.8
11.	4:00 5:00 PM	47.9
12.	5:00 6:00 PM	47.3
13.	6:00 7:00 PM	42.8
14.	7:00 8:00 PM	44.4
15.	8:00 9:00 PM	41.5
16.	9:00 10:00 PM	40.5
	Average	**47.0**

Sr. No.	Night Time	Equivalent Noise dB (A)
17.	10:00 PM - 11:00 PM	43.9
18.	11:00 -12:00 AM	43.1
19.	12:00 -1:00 AM	41.6
20.	1:00 -2:00 AM	37.7
21.	2:00 -3:00 AM	36.9
22.	3:00 -4:00 AM	32.8
23.	4:00- 5:00 AM	36.2
24.	5:00-6:00 AM	46.5
	Average	**39.8**

End of Report

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Ref: KPGL/LAB/2026-597/NL

NEQS: National Environmental Quality Standards

Issue date: 03-Apr-26

Sr. No.	Category of area/Zone	Units	Day Time	Night Time
1.	Silence Zone (D)	dB (A) Leq	50	45

Remarks: All Parameters are in compliance with the NEQS limit.

Terms & Conditions:

- Analysis was conducted on the request of project proponent for his own use/NEQS Compliance.
- Report cannot be used regarding compliance of any complaint, EPO or any other court case.
- This report should be reproduced as a whole and not in parts.
- The responsibility of the ethical use of the results reported in this report lies with the client. Consequently, the laboratory is absolved of its responsibility for any claim that may result through the use by the client or others of the results appearing in this report.
- The report is not valid for any negotiations.
- Dually calibrated instruments were used during monitoring.

Field Analyst	Chief Analyst	Laboratory Incharge

Pak Green Enviro-Engineering (Pvt) Ltd. Peshawar Pakistan

TEST REPORT

Ref #: KPGL/LAB/2026-598/GW

Issue date: 03-Apr-26

Name of Client:	NESPAK JV TES
Executing Agency:	C&W Department, Govt. of Khyber Pakhtunkhwa
Project Name:	Phase-I: 200049-REVAMPING OF NON-TEACHING DHQ HOSPITALS ACROSS KHYBER PAKHTUNKHWA (ADP NO. 513)

Sample Description:

Nature of sample:	Ground water	
Sampling By:	Pak Green Laboratories	
Sampling Location:	DHQ Haripur	
Coordinates:	34.000015°N 72.9141517°E	
Sample source:	Tap Water	
Sample Code:	K-GW-080	
Date of sampling:	10-Mar-26	
Sample Receiving Date:	10-Mar-26	
Testing Facility:	Pak Green Laboratories	
Date of Completion of Analysis:	10-Mar-26 to 17-Mar-26	
Env. Conditions during Analysis:	Temp=22.4-23.9°C	RH=55.4-60.4%

Summary of Test Result:

Remarks:
All Parameters are in compliance with the NEQS Limit.

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- The report is not valid for any negotiations.
- Dually calibrated instruments were used during testing activities and monitoring.

Lab Analyst	Chief Analyst	Laboratory Incharge
	Muhammad Raza Ullah	Mian Iftikhar Ahmed

Pak Green Enviro-Engineering (Pvt) Ltd. Peshawar. Pakistan

Ref #: KPGL/LAB/2026-598/GW

Issue date: 03-Apr-26

Biological Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
1.	*E. coli*	-	Must not be detectable in any 100 ml sample	Nil	Nil	APHA-9221 F
2.	*Total Coli-form*	-	Must not be detectable in any 100 ml sample	Nil	Nil	APHA-9221 D
3.	*Fecal Coliform*	-	-	Nil	Nil	APHA-9221 E

Physical Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
4.	pH ^	-	6.5-8.5	0.001	8.016 at 23.4°C	APHA-4500-H^+ B
5.	Taste	-	Non-Objectionable	-	Non-Objectionable	APHA-2160 C
6.	Color	TCU	≤ 15	0.001	0.000	APHA-2120 C
7.	Odor	-	Non-Objectionable	-	Non-Objectionable	APHA-2150 B
8.	Turbidity	NTU	<5	0.01	0.20	APHA-2130 B
9.	Total dissolved Solids (TDS) ^	mg/L	< 1000	10	320	APHA-2540 C

Chemical Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
10.	Total Hardness ^	mg/L	<500	0.1	220	APHA-2340 C
11.	Aluminum (Al)	mg/L	≤ 0.2	0.0010	BDL	APHA-3111 D
12.	Antimony (Sb)	mg/L	≤0.005	0.0010	BDL	APHA-3111 B
13.	Arsenic (As)	mg/L	≤ 0.05	0.0001	BDL	APHA-3114 B
14.	Barium (Ba)	mg/L	0.7	0.0500	BDL	APHA-3111 D
15.	Boron (B)	mg/L	0.3	0.0100	BDL	APHA-3111 D
16.	Cadmium (Cd) ^	mg/L	0.01	0.0010	BDL	APHA-3111 B
17.	Chloride (Cl^{-1}) ^	mg/L	< 250	0.1	25	APHA-4500-Cl^{-1} B
18.	Chromium (Cr) ^	mg/L	≤ 0.05	0.0010	BDL	APHA-3111-Cr B
19.	Copper (Cu) ^	mg/L	2	0.0001	BDL	APHA-3111 B
20.	Fluoride (F)	mg/L	≤ 1.5	0.1	0.3	APHA-4500-F D
21.	Lead (Pb) ^	mg/L	≤ 0.05	0.0010	BDL	APHA-3111 B
22.	Manganese (Mn^{2+}) ^	mg/L	≤ 0.5	0.0010	BDL	APHA-3111 B
23.	Mercury (Hg)	mg/L	≤ 0.001	0.0001	BDL	APHA-3112 B
24.	Nickle	mg/L	≤ 0.02	0.0010	BDL	APHA-3111 B
25.	Nitrate^	mg/L	≤ 50	0.001	BDL	APHA-4500-NO_3^{-1}-E

Pak Green Enviro-Engineering (Pvt) Ltd. House No.4B Railway Road, University Town, Peshawar Pakistan

Ref #: KPGL/LAB/2026-598/GW

Issue date: 03-Apr-26

Chemical Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
26.	Nitrite^	mg/L	≤3	0.001	BDL	APHA-4500-NO_2^--B
27.	Selenium	mg/L	0.01	0.0001	BDL	APHA-3114 C
28.	Residual Chlorine	mg/L	0.2-0.5 at consumer end 0.5-1.5 at source	0.01	BDL	APHA-4500-Cl B
29.	Zinc (Zn^{+2}) ^	mg/L	5.0	0.0001	BDL	APHA-3111 B
30.	Phenolic Compound (As Phenol)	mg/L	-	0.0005	BDL	APHA-5530 D
31.	Iron (Fe)^	mg/L	-	0.0010	0.0262	APHA-3111 B
32.	Cyanide (as CN^{-1}) Total	mg/L	≤0.05	0.001	BDL	APHA-4500-CN E
33.	Pesticides	mg/L	NGVS	0.001	BDL	APHA-6630 B

End of Report

NEQS: National Environmental Quality Standard
BDL: Below Detection Limits

With ^PNAC Accredited
LDL: Lowest Detection limit

Pak Green Enviro-Engineering (Pvt) Ltd. Peshawar Pakistan

TEST REPORT

Ref #: KPGL/LAB/2026-599/WW

Issue date: 03-Apr-26

Name of Client:	NESPAK JV TES
Executing Agency:	C&W Department, Govt. of Khyber Pakhtunkhwa
Project Name:	Phase-I: 200049-REVAMPING OF NON-TEACHING DHQ HOSPITALS ACROSS KHYBER PAKHTUNKHWA (ADP NO. 513)

Sample Description:

Nature of sample:	Waste water	
Sampling By:	Pak Green Laboratories	
Sampling Location:	DHQ Haripur	
Coordinates:	34.000015° N 72.9141517° E	
Sample source:	Main Drain	
Sample Code:	K-WW-079	
Date of sampling:	10-Mar-26	
Sample Receiving Date:	10-Mar-26	
Testing Facility:	Pak Green Laboratories	
Date of Completion of Analysis:	10-Mar-26 to 17-Mar-26	
Env. Conditions during Analysis:	Temp=22.4-23.9°C	RH=55.4-60.4%

Summary of Test Result:

Remarks:
Parameters with * are not in compliance with the NEQS Limit
Note: High BOD and COD Values likely resulting from the discharge of untreated domestic wastewater, Hospital effluents containing organic and chemical constituents.

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- The report is not valid for any negotiations.
- Dually calibrated instruments were used during testing activities and monitoring.

Lab Analyst	Chief Analyst	Laboratory Incharge
	Muhammad Raza Ullah	Mian Ihtisham Ahmad

Pak Green Enviro-Engineering (Pvt) Ltd. Peshawar, Pakistan

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EPA Certified

Ref #: KPGL/LAB/2026-599/WW

Issue date: 03-Apr-26

Physical Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
1.	Temperature	°C	-	0.1	23.4	APHA-2550 B
2.	pH^	-	6-9	0.001	7.890 at 23.4°C	APHA-4500-H+ B

Chemical Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
3.	Biological Oxygen Demand (BOD_5 at 20 °C) ^	mg/L	80	1	118*	APHA-5210 D
4.	Chemical Oxygen Demand (COD) ^	mg/L	150	0.4	184*	APHA-5220 B
5.	Total Suspended Solids (TSS) ^	mg/L	200	1	100	APHA-2540 D
6.	Total Dissolved Solids (TDS) ^	mg/L	3500	10	690	APHA-2540 C
7.	Greases & Oil	mg/L	10	0.1	BDL	APHA-5520 B
8.	Phenolic Compound (As Phenol)	mg/L	0.1	0.005	BDL	APHA-5530 D
9.	Chloride (as Cl^{1-}) ^	mg/L	1000	0.1	90	APHA-4500-Cl^{1-} B
10.	Fluoride (F^{1-})	mg/L	10	0.1	0.7	APHA-4500-F-D
11.	An Ionic detergent as MBAs	mg/L	20	0.001	0.246	APHA 5540 C
12.	Sulphate (SO_4^{2-}) ^	mg/L	600	1	80	APHA-4500-SO_4 C
13.	Sulphide (S^{2-})	mg/L	1.0	0.1	BDL	APHA-4500-S^{2-} F
14.	Ammonia (NH_3) ^	mg/L	40	0.1	28.9	APHA-4500NH_3 C
15.	Cadmium (Cd)^	mg/L	0.1	0.0010	BDL	APHA-3111 B
16.	Chromium^ (Trivalent & Hexavalent)	mg/L	1.0	0.0010	0.2097	APHA-3111 B
17.	Copper (Cu)^	mg/L	1.0	0.0001	BDL	APHA-3111 B
18.	Lead (Pb)^	mg/L	0.5	0.0010	BDL	APHA-3111 B
19.	Mercury (Hg)	mg/L	0.01	0.0001	BDL	APHA-3112 B
20.	Selenium (Se)	mg/L	0.5	0.0001	BDL	APHA-3114 C
21.	Nickel (Ni)	mg/L	1.0	0.0010	BDL	APHA-3111 B
22.	Silver (Ag)	mg/L	1.0	0.0100	0.0299	APHA-3111 B
23.	Zinc (Zn)^	mg/L	5.0	0.0001	0.1030	APHA-3111 B
24.	Arsenic (As)	mg/L	1.0	0.0001	BDL	APHA-3114 B
25.	Barium (Ba)	mg/L	1.5	0.0001	BDL	APHA-3111 D
26.	Iron (Fe)^	mg/L	8.0	0.0010	2.2492	APHA-3111 B
27.	Manganese (Mn)^	mg/L	1.5	0.0010	0.1598	APHA-3111 B
28.	Boron (B)	mg/L	6.0	0.0001	BDL	APHA-3111 D
29.	Chlorine (Cl_2)	mg/L	1.0	0.0001	BDL	APHA-4500 Cl B
30.	Total Toxic Metals (Cd, Cr, Cu, Pb, Hg, Se, Ni, Ag, As, Ba, B)	mg/L	2.0	0.0001	0.2396	APHA-3111
31.	Cyanide (as CN^{1-}) Total	mg/L	1.0	0.001	BDL	APHA-4500-CN E
32.	Pesticide	mg/L	0.15	0.001	BDL	APHA-6630 B

Pak Green Enviro-Engineering (Pvt) Ltd. Peshawar Pakistan

Ref #: KPGL/LAB/2026-599/WW

Issue date: 03-Apr-26

Biological Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
33.	*E. coli*	-	-	Nil	Nil	APHA-9221 F
34.	*Total Coli-form*	-	-	Nil	114.6	APHA-9221 D
35.	*Fecal Coliform*	-	-	Nil	40.4	APHA-9221 E

End of Report

NEQS: National Environmental Quality Standard
BDL: Below Detection Limits

With ^PNAC Accredited
LDL: Lowest Detection limit

Pak Green Enviro-Engineering (Pvt) Ltd. Peshawar, Pakistan

PAK GREEN ENVIRO-ENGINEERING (Pvt.) Ltd.
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TEST REPORT

Ref. #: KPGL/LAB/2026-592/AA

Issue date: 03-Apr-26

Name of Client: NESPAK JV TES
Project Name: Phase-I: 200049-REVAMPING OF NON-TEACHING DHQ HOSPITALS ACROSS KHYBER PAKHTUNKHWA (ADP NO. 513)
Sampling Location: DHQ Karak
Nature of Monitoring: Ambient Air
Monitoring By: Pak Green Laboratories
Coordinates: 33.128094°N 71.15231°E
Name of Sampling Person: Imshad Ali
Monitoring Instrument: AQMS
Monitoring Duration: 24 hours
Monitoring Date: 03-Mar-26 to 04-Mar-26

Results:

Sr. No.	Time	CO	NO	NO_2	SO_2	O_3	PM_{10}	$PM_{2.5}$	Lead (Pb)
		mg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m3
1.	9:00 AM	1.83	12.75	39.15	46.71				
2.	10:00 AM	1.89	13.54	36.02	48.40				
3.	11:00 AM	1.74	13.41	33.92	46.93				
4.	12:00 PM	1.68	12.75	30.48	45.97				
5.	1:00 PM	1.79	11.50	36.15	45.81				
6.	2:00 PM	1.68	13.22	31.96	42.34				
7.	3:00 PM	1.72	14.31	33.39	42.93				
8.	4:00 PM	1.70	13.92	33.42	37.14				
9.	5:00 PM	1.81	13.79	33.01	42.94				
10.	6:00 PM	1.76	13.97	32.20	42.32				
11.	7:00 PM	1.62	12.82	30.37	42.97				
12.	8:00 PM	3.07	11.54	32.56	42.43				
13.	9:00 PM	2.13	13.48	32.50	40.54				
14.	10:00 PM	2.27	11.37	30.95	41.49	62.1	146.6	31.8	0.02
15.	11:00 PM	2.22	16.84	29.24	41.97				
16.	12:00 AM	1.68	16.52	42.63	44.51				
17.	1:00 AM	1.72	12.82	41.19	45.13				
18.	2:00 AM	1.74	14.40	41.62	46.71				
19.	3:00 AM	2.04	11.77	39.54	43.52				
20.	4:00 AM	1.76	14.54	44.07	43.38				
21.	5:00 AM	2.05	14.80	42.24	45.69				
22.	6:00 AM	1.52	13.22	40.87	45.61				
23.	7:00 AM	1.78	15.86	42.90	42.59				
24.	8:00 AM	2.27	9.75	46.03	44.45				
Average (24 Hours)		1.89	13.45	36.52	43.85				
NEQS		5 8hours	40 24hours	80 24hours	120 24hours	130 1 hour	150 24hours	35 24hours	1.5 24 hours

End of Report.

Ref. #: KPGL/LAB/2026-592/AA

Issue date: 03-Apr-26

NEQS: National Environmental Quality Standards
Remarks: All Parameters are in compliance with NEQS Limits.
Terms & Conditions:

- Analysis was conducted on the request of project proponent for his own use or NEQS compliance.
- This report should be reproduced as a whole and not in parts.
- The responsibility of the ethical use of the results reported in this report lies with the client. Consequently, the laboratory is absolved of its responsibility for any claim that may result through the use by the client or others of the results appearing in this report.
- The report is not valid for any negotiations.
- Dually calibrated instrument was used during monitoring.

Field Analyst	Chief Analyst	Laboratory Incharge

Pak Green Enviro-Engineering (Pvt) Ltd. Peshawar Pakistan

PAK GREEN ENVIRO-ENGINEERING (Pvt.) Ltd.
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TEST REPORT

Ref. #: KPGL/LAB/2026-593/NL
Issue date: 03-Apr-26

Name of Client:	NESPAK JV TES
Project Name:	Phase-I: 200049-REVAMPING OF NON-TEACHING DHQ HOSPITALS ACROSS KHYBER PAKHTUNKHWA (ADP NO. 513)
Nature of Monitoring:	Noise Level (24 Hours)
Sampling Location:	DHQ Karak
Coordinates:	33.128094°N 71.15231°E
Name of Sampling Person:	Imshad Ali
Monitoring By:	Pak Green Laboratories
Monitoring Time:	Real Time
Monitoring Instrument:	Smart Sensor
Monitoring Date:	03-Mar-26 to 04-Mar-26

Results:

Sr. No.	Day Time	Equivalent Noise dB (A)
1.	6:00 - 7:00 AM	46.0
2.	7:00 -8:00 AM	46.7
3.	8:00- 9:00 AM	47.3
4.	9:00- 10:00 AM	48.9
5.	10:00 -11:00 AM	45.8
6.	11:00- 12:00 AM	49.4
7.	12:00 -1:00 PM	48.1
8.	1:00- 2:00 PM	50.9
9.	2:00- 3:00 PM	49.8
10.	3:00 4:00 PM	48.3
11.	4:00 5:00 PM	49.7
12.	5:00 6:00 PM	46.0
13.	6:00 7:00 PM	42.7
14.	7:00 8:00 PM	41.4
15.	8:00 9:00 PM	45.1
16.	9:00 10:00 PM	43.8
Average		46.9

Sr. No.	Night Time	Equivalent Noise dB (A)
17.	10:00 PM - 11:00 PM	41.7
18.	11:00 -12:00 AM	42.4
19.	12:00 -1:00 AM	37.9
20.	1:00 -2:00 AM	36.0
21.	2:00 -3:00 AM	33.2
22.	3:00 -4:00 AM	35.1
23.	4:00- 5:00 AM	36.5
24.	5:00-6:00 AM	43.3
Average		38.3

.....End of Report.....

Pak Green Enviro-Engineering (Pvt) Ltd. Peshawar, Pakistan

info@pakgreen.pk www.pakgreen.pk

Ref. #: KPGL/LAB/2026-593/NL
Issue date: 03-Apr-26

NEQS: National Environmental Quality Standards

Sr. No.	Category of area/Zone	Units	Day Time	Night Time
1.	Silence Zone (D)	dB (A) Leq	50	45

Remarks: All Parameters are in compliance with the NEQS limit.
Terms & Conditions:

- Analysis was conducted on the request of project proponent for his own use/NEQS Compliance.
- Report cannot be used regarding compliance of any complaint, EPO or any other court case.
- This report should be reproduced as a whole and not in parts.
- The responsibility of the ethical use of the results reported in this report lies with the client. Consequently, the laboratory is absolved of its responsibility for any claim that may result through the use by the client or others of the results appearing in this report.
- The report is not valid for any negotiations.
- Dually calibrated instruments were used during monitoring.

Field Analyst	Chief Analyst	Laboratory Incharge

Pak Green Enviro-Engineering (Pvt) Ltd. Peshawar Pakistan

TEST REPORT

Ref #: KPGL/LAB/2026-594/GW

Issue date: 03-Apr-26

Name of Client:	NESPAK JV TES
Executing Agency:	C&W Department, Govt. of Khyber Pakhtunkhwa
Project Name:	Phase-I: 200049-REVAMPING OF NON-TEACHING DHQ HOSPITALS ACROSS KHYBER PAKHTUNKHWA (ADP NO. 513)

Sample Description:

Nature of sample:	Ground water	
Sampling By:	Pak Green Laboratories	
Sampling Location:	DHQ Karak	
Coordinates:	33.128094°N 71.15231°E	
Sample source:	Pressure Pump	
Sample Code:	K-GW-066	
Date of sampling:	03-Mar-26	
Sample Receiving Date:	03-Mar-26	
Testing Facility:	Pak Green Laboratories	
Date of Completion of Analysis:	03-Mar-26 to 10-Mar-26	
Env. Conditions during Analysis:	Temp=22.8-23.9°C	RH=53.4-58.4%

Summary of Test Result:

Remarks:
Parameters with * are not in compliance with the NEQS Limit.
Note: The Presence of microbes contaimination may be due to poor sanitation practices in surrounding areas, cross contaimation within the distribution system.

Terms & Conditions:

- This report should be reproduced as a whole and not in parts.
- The Sampling was done as per the sampling and preservation protocol method APHA 1060-B&C.
- The responsibility of the ethical use of the results reported in this report lies with the client.
- The leftover sample (if so available) shall be retained for fifteen days after the issuance of the report unless otherwise negotiated between the client and the laboratory.
- The report is not valid for any negotiations.
- Dually calibrated instruments were used during testing activities and monitoring.

Lab Analyst	Chief Analyst	Laboratory Incharge
	Muhammad Raza Ullah	Mian Iftikhar Ahmed

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	Rev. #01	Rev. date: 16-06-25

Ref #: KPGL/LAB/2026-594/GW

Issue date: 03-Apr-26

Biological Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
1.	*E. coli*	-	Must not be detectable in any 100 ml sample	Nil	40.4*	APHA-9221 F
2.	*Total Coli-form*	-	Must not be detectable in any 100 ml sample	Nil	114.4*	APHA-9221 D
3.	*Fecal Coliform*	-	-	Nil	113.4*	APHA-9221 E

Physical Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
4.	pH ^	-	6.5-8.5	0.001	7.283 at 24.0°C	APHA-4500-H+ B
5.	Taste	-	Non-Objectionable	-	Non-Objectionable	APHA-2160 C
6.	Color	TCU	≤ 15	0.001	0.000	APHA-2120 C
7.	Odor	-	Non-Objectionable	-	Non-Objectionable	APHA-2150 B
8.	Turbidity	NTU	<5	0.01	0.35	APHA-2130 B
9.	Total dissolved Solids (TDS) ^	mg/L	< 1000	10	610	APHA-2540 C

Chemical Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
10.	Total Hardness ^	mg/L	<500	0.1	440	APHA-2340 C
11.	Aluminum (Al)	mg/L	≤ 0.2	0.0010	BDL	APHA-3111 D
12.	Antimony (Sb)	mg/L	≤0.005	0.0010	BDL	APHA-3111 B
13.	Arsenic (As)	mg/L	≤ 0.05	0.0001	BDL	APHA-3114 B
14.	Barium (Ba)	mg/L	0.7	0.0500	BDL	APHA-3111 D
15.	Boron (B)	mg/L	0.3	0.0100	BDL	APHA-3111 D
16.	Cadmium (Cd) ^	mg/L	0.01	0.0010	BDL	APHA-3111 B
17.	Chloride (Cl^{-1}) ^	mg/L	< 250	0.1	55	APHA-4500-Cl^{-1} B
18.	Chromium (Cr) ^	mg/L	≤ 0.05	0.0010	BDL	APHA-3111-Cr B
19.	Copper (Cu) ^	mg/L	2	0.0001	BDL	APHA-3111 B
20.	Fluoride (F)	mg/L	≤ 1.5	0.1	0.6	APHA-4500-F D
21.	Lead (Pb) ^	mg/L	≤ 0.05	0.0010	BDL	APHA-3111 B
22.	Manganese (Mn^{2+}) ^	mg/L	≤ 0.5	0.0010	BDL	APHA-3111 B
23.	Mercury (Hg)	mg/L	≤ 0.001	0.0001	BDL	APHA-3112 B
24.	Nickle	mg/L	≤ 0.02	0.0010	BDL	APHA-3111 B
25.	Nitrate^	mg/L	≤ 50	0.001	BDL	APHA-4500-NO_3^{-1}-E

Pak Green Enviro-Engineering (Pvt.) Ltd. Peshawar Pakistan

Ref #: KPGL/LAB/2026-594/GW
Chemical Parameters Analysis Results:

Issue date: 03-Apr-26

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
26.	Nitrite^	mg/L	≤ 3	0.001	0.108	APHA-4500-NO_2^--B
27.	Selenium	mg/L	0.01	0.0001	BDL	APHA-3114 C
28.	Residual Chlorine	mg/L	0.2-0.5 at consumer end 0.5-1.5 at source	0.01	BDL	APHA-4500-Cl B
29.	Zinc (Zn^{+2}) ^	mg/L	5.0	0.0001	0.0031	APHA-3111 B
30.	Phenolic Compound (As Phenol)	mg/L	-	0.0005	BDL	APHA-5530 D
31.	Iron (Fe)^	mg/L	-	0.0010	0.0259	APHA-3111 B
32.	Cyanide (as CN^-) Total	mg/L	≤ 0.05	0.001	BDL	APHA-4500-CN E
33.	Pesticides	mg/L	NGVS	0.001	BDL	APHA-6630 B

End of Report

NEQS: National Environmental Quality Standard
BDL: Below Detection Limits

With ^PNAC Accredited
LDL: Lowest Detection limit

Pak Green Enviro-Engineering (Pvt) Ltd. Peshawar Pakistan

TEST REPORT

Ref #: KPGL/LAB/2026-595/WW

Issue date: 03-Apr-26

Name of Client:	NESPAK JV TES
Executing Agency:	C&W Department, Govt. of Khyber Pakhtunkhwa
Project Name:	Phase-I: 200049-REVAMPING OF NON-TEACHING DHQ HOSPITALS ACROSS KHYBER PAKHTUNKHWA (ADP NO. 513)

Sample Description:

Nature of sample:	Waste water	
Sampling By:	Pak Green Laboratories	
Sampling Location:	DHQ Karak	
Coordinates:	33.128147° N 71.15211° E	
Sample source:	Main Drain	
Sample Code:	K-WW-067	
Date of sampling:	03-Mar-26	
Sample Receiving Date:	03-Mar-26	
Testing Facility:	Pak Green Laboratories	
Date of Completion of Analysis:	03-Mar-26 to 10-Mar-26	
Env. Conditions during Analysis:	Temp=22.8-23.9°C	RH=53.4-58.4%

Summary of Test Result:

Remarks:
All Parameters are in compliance with the NEQS Limit

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- The report is not valid for any negotiations.
- Dually calibrated instruments were used during testing activities and monitoring.

Lab Analyst	Chief Analyst	Laboratory Incharge
	Muhammad Raza Ullah	Mian Iftikhar Ahmed

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Ref #: KPGL/LAB/2026-595/WW

Issue date: 03-Apr-26

Physical Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
1.	Temperature	°C	-	0.1	23.4	APHA-2550 B
2.	pH^	-	6-9	0.001	7.602 at 23.4°C	APHA-4500-H^+ B

Chemical Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
3.	Biological Oxygen Demand (BOD_5 at 20 °C) ^	mg/L	80	1	38	APHA-5210 D
4.	Chemical Oxygen Demand (COD) ^	mg/L	150	0.4	56	APHA-5220 B
5.	Total Suspended Solids (TSS) ^	mg/L	200	1	20	APHA-2540 D
6.	Total Dissolved Solids (TDS) ^	mg/L	3500	10	720	APHA-2540 C
7.	Greases & Oil	mg/L	10	0.1	BDL	APHA-5520 B
8.	Phenolic Compound (As Phenol)	mg/L	0.1	0.005	BDL	APHA-5530 D
9.	Chloride (as Cl^-) ^	mg/L	1000	0.1	195	APHA-4500-Cl^- B
10.	Fluoride (F^-)	mg/L	10	0.1	0.7	APHA-4500-F-D
11.	An Ionic detergent as MBAs	mg/L	20	0.001	0.048	APHA 5540 C
12.	Sulphate (SO_4^{2-}) ^	mg/L	600	1	85	APHA-4500-SO_4 C
13.	Sulphide (S^{2-})	mg/L	1.0	0.1	BDL	APHA-4500-S^{2-} F
14.	Ammonia (NH_3) ^	mg/L	40	0.1	4.6	APHA-4500NH_3 C
15.	Cadmium (Cd)^	mg/L	0.1	0.0010	BDL	APHA-3111 B
16.	Chromium^ (Trivalent & Hexavalent)	mg/L	1.0	0.0010	BDL	APHA-3111 B
17.	Copper (Cu)^	mg/L	1.0	0.0001	BDL	APHA-3111 B
18.	Lead (Pb)^	mg/L	0.5	0.0010	BDL	APHA-3111 B
19.	Mercury (Hg)	mg/L	0.01	0.0001	BDL	APHA-3112 B
20.	Selenium (Se)	mg/L	0.5	0.0001	BDL	APHA-3114 C
21.	Nickel (Ni)	mg/L	1.0	0.0010	BDL	APHA-3111 B
22.	Silver (Ag)	mg/L	1.0	0.0100	BDL	APHA-3111 B
23.	Zinc (Zn)^	mg/L	5.0	0.0001	0.0846	APHA-3111 B
24.	Arsenic (As)	mg/L	1.0	0.0001	BDL	APHA-3114 B
25.	Barium (Ba)	mg/L	1.5	0.0001	BDL	APHA-3111 D
26.	Iron (Fe)^	mg/L	8.0	0.0010	1.7047	APHA-3111 B
27.	Manganese (Mn)^	mg/L	1.5	0.0010	0.1004	APHA-3111 B
28.	Boron (B)	mg/L	6.0	0.0001	BDL	APHA-3111 D
29.	Chlorine (Cl_2)	mg/L	1.0	0.0001	BDL	APHA-4500 Cl B
30.	Total Toxic Metals (Cd, Cr, Cu, Pb, Hg, Se, Ni, Ag, As, Ba, B)	mg/L	2.0	0.0001	BDL	APHA-3111
31.	Cyanide (as CN^-) Total	mg/L	1.0	0.001	BDL	APHA-4500-CN E
32.	Pesticide	mg/L	0.15	0.001	BDL	APHA-6630 B

Pak Green Enviro-Engineering (Pvt) Ltd. Peshawar Pakistan

Ref #: KPGL/LAB/2026-595/WW

Issue date: 03-Apr-26

Biological Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
33.	*E. coli*	-	-	Nil	35.9	APHA-9221 F
34.	*Total Coli-form*	-	-	Nil	507.8	APHA-9221 D
35.	*Fecal Coliform*	-	-	Nil	113.4	APHA-9221 E

End of Report

NEQS: National Environmental Quality Standard
BDL: Below Detection Limits

With ^PNAC Accredited
LDL: Lowest Detection limit

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TEST REPORT

Ref. #: KPGL/LAB/2026-584/AA

Issue date:03-Apr-26

Name of Client:	NESPAK JV TES
Project Name:	Phase-I: 200049-REVAMPING OF NON-TEACHING DHQ HOSPITALS ACROSS KHYBER PAKHTUNKHWA (ADP NO. 513)
Nature of Monitoring:	Ambient Air
Monitoring By:	Pak Green Laboratories
Sampling Location:	Maulvi Jee Hospital
Coordinates:	34.01563°N 71.57937°E
Name of Sampling Person:	Farman Ullah
Monitoring Instrument:	AQMS
Monitoring Duration:	24 hours
Monitoring Date:	09-Mar-26 to 10-Mar-26

Results:

Sr. No.	Time	CO	NO	NO_2	SO_2	O_3	PM_{10}	$PM_{2.5}$	Lead (Pb)
		mg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m3
1.	9:00 AM	1.92	11.74	37.71	46.72				
2.	10:00 AM	1.98	12.53	34.58	48.41				
3.	11:00 AM	1.83	12.40	32.48	46.94				
4.	12:00 PM	1.77	11.74	29.04	45.98				
5.	1:00 PM	1.88	10.49	34.71	45.82				
6.	2:00 PM	1.77	12.21	30.52	42.35				
7.	3:00 PM	1.81	13.30	31.95	42.94				
8.	4:00 PM	1.79	12.91	31.98	37.15				
9.	5:00 PM	1.90	12.78	31.57	42.95				
10.	6:00 PM	1.85	12.96	30.76	42.33				
11.	7:00 PM	1.71	11.81	28.93	42.98				
12.	8:00 PM	3.16	10.53	31.12	42.44				
13.	9:00 PM	2.22	12.47	31.06	40.55	45.9	147.5	59.3*	0.02
14.	10:00 PM	2.36	10.36	29.51	41.50				
15.	11:00 PM	2.31	15.83	27.80	41.98				
16.	12:00 AM	1.77	15.51	41.19	44.52				
17.	1:00 AM	1.81	11.81	39.75	45.14				
18.	2:00 AM	1.83	13.39	40.18	46.72				
19.	3:00 AM	2.13	10.76	38.10	43.53				
20.	4:00 AM	1.85	13.53	42.63	43.39				
21.	5:00 AM	2.14	13.79	40.80	45.70				
22.	6:00 AM	1.61	12.21	39.43	45.62				
23.	7:00 AM	1.87	14.85	41.46	42.60				
24.	8:00 AM	2.36	8.74	44.59	44.46				
Average (24 Hours)		1.98	12.44	35.08	43.86				
NEQS		5 8hours	40 24hours	80 24hours	120 24hours	130 1 hour	150 24hours	35 24hours	1.5 24 hour

End of Report.

Ref. #: KPGL/LAB/2026-584/AA **Issue date:**03-Apr-26

NEQS: National Environmental Quality Standards
Remarks: Parameters with * are not in compliance with NEQS Limits.
Note: $PM_{2.5}$ results are not in compliance with the NEQS standard due to background air pollution, mostly due to natural surroundings and regional influences, such as dust carried by wind from open areas, dry weather conditions, traffic emissions from nearby roads.
Terms & Conditions:

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- The report is not valid for any negotiations.
- Dually calibrated instrument was used during monitoring.

Field Analyst	Chief Analyst	Laboratory Incharge

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(Environmental Laboratories Division)
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TEST REPORT

Ref. #: KPGL/LAB/2026-585/NL

Issue date: 03-Apr-26

Name of Client:	NESPAK JV TES
Project Name:	Phase-I: 200049-REVAMPING OF NON-TEACHING DHQ HOSPITALS ACROSS KHYBER PAKHTUNKHWA (ADP NO. 513)
Nature of Monitoring:	Noise Level (24 Hours)
Sampling Location:	Maulvi Jee Hospital
Coordinates:	34.01563°N 71.57937°E
Monitoring By:	Pak Green Laboratories
Name of Sampling Person:	Farman Ullah
Monitoring Time:	Real Time
Monitoring Instrument:	Smart Sensor
Monitoring Date:	09-Mar-26 to 10-Mar-26

Results:

Sr. No.	Day Time	Equivalent Noise
		dB (A)
1.	6:00 – 7:00 AM	48.8
2.	7:00 -8:00 AM	52.1
3.	8:00- 9:00 AM	47.9
4.	9:00- 10:00 AM	46.0
5.	10:00 -11:00 AM	44.9
6.	11:00- 12:00 AM	45.5
7.	12:00 -1:00 PM	40.8
8.	1:00- 2:00 PM	43.0
9.	2:00- 3:00 PM	47.9
10.	3:00 4:00 PM	47.6
11.	4:00 5:00 PM	49.8
12.	5:00 6:00 PM	44.1
13.	6:00 7:00 PM	41.8
14.	7:00 8:00 PM	46.5
15.	8:00 9:00 PM	43.2
16.	9:00 10:00 PM	40.1
	Average	45.6

Sr. No.	Night Time	Equivalent Noise
		dB (A)
17.	10:00 PM - 11:00 PM	40.0
18.	11:00 -12:00 AM	44.7
19.	12:00 -1:00 AM	46.2
20.	1:00 -2:00 AM	38.3
21.	2:00 -3:00 AM	37.5
22.	3:00 -4:00 AM	33.4
23.	4:00- 5:00 AM	35.8
24.	5:00-6:00 AM	45.6
	Average	40.1

End of Report

Ref#: KPGL/LAB/2026-585/NL

NEQS: National Environmental Quality Standards

Issue date: 03-Apr-26

Sr. No.	Category of area/Zone	Units	Day Time	Night Time
1.	Silence Zone (D)	dB (A) Leq	50	45

Remarks: All Parameters are in compliance with the NEQS limit.

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- The report is not valid for any negotiations.
- Dually calibrated instruments were used during monitoring.

Field Analyst	Chief Analyst	Laboratory Incharge

Pak Green Enviro-Engineering (Pvt) Ltd. Peshawar, Pakistan

TEST REPORT

Ref #: KPGL/LAB/2026-586/DW

Issue date:03-Apr-26

Name of Client:	NESPAK JV TES
Executing Agency:	C&W Department, Govt. of Khyber Pakhtunkhwa
Project Name:	Phase-I: 200049-REVAMPING OF NON-TEACHING DHQ HOSPITALS ACROSS KHYBER PAKHTUNKHWA (ADP NO. 513)

Sample Description:

Nature of sample:	Drinking water	
Sampling By:	Pak Green Laboratories	
Sampling Location:	Maulvi Jee Hospital	
Coordinates:	34.016064°N 71.57951°E	
Sample source:	Filteration Plant Tap Water	
Sample Code:	K-DW-075	
Date of sampling:	09-Mar-26	
Sample Receiving Date:	09-Mar-26	
Testing Facility:	Pak Green Laboratories	
Date of Completion of Analysis:	09-Mar-26 to 17-Mar-26	
Env. Conditions during Analysis:	Temp=22.4-23.9°C	RH=55.4-60.4%

Summary of Test Result:

Remarks:
Parameters with * are not in compliance with the NEQS Limit.
Note: The Presence of microbes contaimination may be due to poor sanitation practices in surrounding areas, cross contaimation within the distribution system.

Terms & Conditions:

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- The responsibility of the ethical use of the results reported in this report lies with the client.
- The leftover sample (if so available) shall be retained for fifteen days after the issuance of the report unless otherwise negotiated between the client and the laboratory.
- The report is not valid for any negotiations.
- Dually calibrated instruments were used during testing activities and monitoring.

Lab Analyst	Chief Analyst	Laboratory Incharge
	Muhammad Raza Ullah	Mian Iftikhar Ahmed

Pak Green Enviro Engineering (Pvt) Ltd. Peshawar, Pakistan

PAK GREEN ENVIRO-ENGINEERING (Pvt.) Ltd.
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[illegible]	Rev.#01	Rev date: 16-06-25

Ref #: KPGL/LAB/2026-586/DW

Issue date:03-Apr-26

Biological Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
1.	*E. coli*	-	Must not be detectable in any 100 ml sample	Nil	40.4*	APHA-9221 F
2.	*Total Coli-form*	-	Must not be detectable in any 100 ml sample	Nil	114.4*	APHA-9221 D
3.	*Fecal Coliform*	-	-	Nil	113.4*	APHA-9221 E

Physical Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
4.	pH ^	-	6.5-8.5	0.001	7.808 at 23.4°C	APHA-4500-H^+ B
5.	Taste	-	Non-Objectionable	-	Non-Objectionable	APHA-2160 C
6.	Color	TCU	≤ 15	0.001	0.000	APHA-2120 C
7.	Odor	-	Non-Objectionable	-	Non-Objectionable	APHA-2150 B
8.	Turbidity	NTU	<5	0.01	0.40	APHA-2130 B
9.	Total dissolved Solids (TDS) ^	mg/L	< 1000	10	570	APHA-2540 C

Chemical Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
10.	Total Hardness ^	mg/L	<500	0.1	390	APHA-2340 C
11.	Aluminum (Al)	mg/L	≤ 0.2	0.0010	BDL	APHA-3111 D
12.	Antimony (Sb)	mg/L	≤0.005	0.0010	BDL	APHA-3111 B
13.	Arsenic (As)	mg/L	≤ 0.05	0.0001	BDL	APHA-3114 B
14.	Barium (Ba)	mg/L	0.7	0.0500	BDL	APHA-3111 D
15.	Boron (B)	mg/L	0.3	0.0100	BDL	APHA-3111 D
16.	Cadmium (Cd) ^	mg/L	0.01	0.0010	BDL	APHA-3111 B
17.	Chloride (Cl^{-1}) ^	mg/L	< 250	0.1	25	APHA-4500-Cl^{-1} B
18.	Chromium (Cr) ^	mg/L	≤ 0.05	0.0010	BDL	APHA-3111-Cr B
19.	Copper (Cu) ^	mg/L	2	0.0001	BDL	APHA-3111 B
20.	Fluoride (F)	mg/L	≤ 1.5	0.1	0.6	APHA-4500-F D
21.	Lead (Pb) ^	mg/L	≤ 0.05	0.0010	BDL	APHA-3111 B
22.	Manganese (Mn^{2+}) ^	mg/L	≤ 0.5	0.0010	BDL	APHA-3111 B
23.	Mercury (Hg)	mg/L	≤ 0.001	0.0001	BDL	APHA-3112 B
24.	Nickle	mg/L	≤ 0.02	0.0010	BDL	APHA-3111 B
25.	Nitrate^	mg/L	≤ 50	0.001	BDL	APHA-4500-NO_3^{-1}-E

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Ref #: KPGL/LAB/2026-586/DW

Issue date:03-Apr-26

Chemical Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
26.	Nitrite^	mg/L	≤ 3	0.001	BDL	APHA-4500-NO_2^--B
27.	Selenium	mg/L	0.01	0.0001	BDL	APHA-3114 C
28.	Residual Chlorine	mg/L	0.2-0.5 at consumer end 0.5-1.5 at source	0.01	BDL	APHA-4500-Cl B
29.	Zinc (Zn^{+2}) ^	mg/L	5.0	0.0001	BDL	APHA-3111 B
30.	Phenolic Compound (As Phenol)	mg/L	-	0.0005	BDL	APHA-5530 D
31.	Iron (Fe)^	mg/L	-	0.0010	BDL	APHA-3111 B
32.	Cyanide (as CN^-) Total	mg/L	≤ 0.05	0.001	BDL	APHA-4500-CN E
33.	Pesticides	mg/L	NGVS	0.001	BDL	APHA-6630 B

End of Report

NEQS: National Environmental Quality Standard
BDL: Below Detection Limits

With ^PNAC Accredited
LDL: Lowest Detection limit

TEST REPORT

Ref #: KPGL/LAB/2026-587/WW

Issue date: 03-Apr-26

Name of Client:	NESPAK JV TES
Executing Agency:	C&W Department, Govt. of Khyber Pakhtunkhwa
Project Name:	Phase-I: 200049-REVAMPING OF NON-TEACHING DHQ HOSPITALS ACROSS KHYBER PAKHTUNKHWA (ADP NO. 513)

Sample Description:

Nature of sample:	Waste water	
Sampling By:	Pak Green Laboratories	
Sampling Location:	Maulvi Jee Hospital	
Coordinates:	34.00582° N 71.34486° E	
Sample source:	Final Drain	
Sample Code:	K-WW-076	
Date of sampling:	09-Mar-26	
Sample Receiving Date:	09-Mar-26	
Testing Facility:	Pak Green Laboratories	
Date of Completion of Analysis:	09-Mar-26 to 17-Mar-26	
Env. Conditions during Analysis:	Temp=22.4-23.9°C	RH=55.4-60.4%

Summary of Test Result:

Remarks:
All Parameters are in compliance with the NEQS Limit

Terms & Conditions:

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- The report is not valid for any negotiations.
- Dually calibrated instruments were used during testing activities and monitoring.

Lab Analyst	Chief Analyst	Laboratory Incharge
	Muhammad Raza Ullah	Mian Iftikhar Ahmed

Pak Green Enviro Engineering (Pvt) Ltd. Peshawar, Pakistan

[illegible]	Rev.#01	Rev date: 16-06-25

Ref #: KPGL/LAB/2026-587/WW

Issue date: 03-Apr-26

Physical Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
1.	Temperature	°C	-	0.1	24.2	APHA-2550 B
2.	pH^	-	6-9	0.001	7.864 at 24.2°C	APHA-4500-H^+ B

Chemical Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
3.	Biological Oxygen Demand (BOD_5 at 20 °C) ^	mg/L	80	1	28	APHA-5210 D
4.	Chemical Oxygen Demand (COD) ^	mg/L	150	0.4	40	APHA-5220 B
5.	Total Suspended Solids (TSS) ^	mg/L	200	1	10	APHA-2540 D
6.	Total Dissolved Solids (TDS) ^	mg/L	3500	10	520	APHA-2540 C
7.	Greases & Oil	mg/L	10	0.1	BDL	APHA-5520 B
8.	Phenolic Compound (As Phenol)	mg/L	0.1	0.005	BDL	APHA-5530 D
9.	Chloride (as Cl^{1-}) ^	mg/L	1000	0.1	30	APHA-4500-Cl^- B
10.	Fluoride (F^{1-})	mg/L	10	0.1	0.5	APHA-4500-F-D
11.	An Ionic detergent as MBAs	mg/L	20	0.001	0.048	APHA 5540 C
12.	Sulphate (SO_4^{2-}) ^	mg/L	600	1	55	APHA-4500-SO_4 C
13.	Sulphide (S^{2-})	mg/L	1.0	0.1	BDL	APHA-4500-S^{2-} F
14.	Ammonia (NH_3) ^	mg/L	40	0.1	1.8	APHA-4500NH_3 C
15.	Cadmium (Cd)^	mg/L	0.1	0.0010	BDL	APHA-3111 B
16.	Chromium^ (Trivalent & Hexavalent)	mg/L	1.0	0.0010	0.0482	APHA-3111 B
17.	Copper (Cu)^	mg/L	1.0	0.0001	BDL	APHA-3111 B
18.	Lead (Pb)^	mg/L	0.5	0.0010	BDL	APHA-3111 B
19.	Mercury (Hg)	mg/L	0.01	0.0001	BDL	APHA-3112 B
20.	Selenium (Se)	mg/L	0.5	0.0001	BDL	APHA-3114 C
21.	Nickel (Ni)	mg/L	1.0	0.0010	BDL	APHA-3111 B
22.	Silver (Ag)	mg/L	1.0	0.0100	0.1198	APHA-3111 B
23.	Zinc (Zn)^	mg/L	5.0	0.0001	0.0024	APHA-3111 B
24.	Arsenic (As)	mg/L	1.0	0.0001	BDL	APHA-3114 B
25.	Barium (Ba)	mg/L	1.5	0.0001	BDL	APHA-3111 D
26.	Iron (Fe)^	mg/L	8.0	0.0010	0.4012	APHA-3111 B
27.	Manganese (Mn)^	mg/L	1.5	0.0010	0.0342	APHA-3111 B
28.	Boron (B)	mg/L	6.0	0.0001	BDL	APHA-3111 D
29.	Chlorine (Cl_2)	mg/L	1.0	0.0001	BDL	APHA-4500 Cl B
30.	Total Toxic Metals (Cd, Cr, Cu, Pb, Hg, Se, Ni, Ag, As, Ba, B)	mg/L	2.0	0.0001	0.1680	APHA-3111
31.	Cyanide (as CN^{1-}) Total	mg/L	1.0	0.001	BDL	APHA-4500-CN E
32.	Pesticide	mg/L	0.15	0.001	BDL	APHA-6630 B

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Ref #: KPGL/LAB/2026-587/WW

Issue date: 03-Apr-26

Biological Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
33.	*E. coli*	-	-	Nil	Nil	APHA-9221 F
34.	*Total Coli-form*	-	-	Nil	124.2	APHA-9221 D
35.	*Fecal Coliform*	-	-	Nil	35.9	APHA-9221 E

End of Report

NEQS: National Environmental Quality Standard
BDL: Below Detection Limits

With ^PNAC Accredited
LDL: Lowest Detection limit

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TEST REPORT

Ref. #: KPGL/LAB/2026-580/AA

Issue date: 03-Apr-26

Name of Client: NESPAK JV TES
Project Name: Phase-I: 200049-REVAMPING OF NON-TEACHING DHQ HOSPITALS ACROSS KHYBER PAKHTUNKHWA (ADP NO. 513)
Sampling Location: Nasserullah Babar Memorial Hospital
Nature of Monitoring: Ambient Air
Monitoring By: Pak Green Laboratories
Coordinates: 33.983643°N 71.56096°E
Name of Sampling Person: Farman Ullah
Monitoring Instrument: AQMS
Monitoring Duration: 24 hours
Monitoring Date: 03-Mar-26 to 04-Mar-26

Results:

Sr. No.	Time	CO	NO	NO_2	SO_2	O_3	PM_{10}	$PM_{2.5}$	Lead (Pb)
		mg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m3
1.	9:00 AM	1.75	12.85	35.42	45.54				
2.	10:00 AM	1.81	13.64	32.29	47.23				
3.	11:00 AM	1.66	13.51	30.19	45.76				
4.	12:00 PM	1.60	12.85	26.75	44.80				
5.	1:00 PM	1.71	11.60	32.42	44.64				
6.	2:00 PM	1.60	13.32	28.23	41.17				
7.	3:00 PM	1.64	14.41	29.66	41.76				
8.	4:00 PM	1.62	14.02	29.69	35.97				
9.	5:00 PM	1.73	13.89	29.28	41.77				
10.	6:00 PM	1.68	14.07	28.47	41.15				
11.	7:00 PM	1.54	12.92	26.64	41.80				
12.	8:00 PM	2.99	11.64	28.83	41.26				
13.	9:00 PM	2.05	13.58	28.77	39.37				
14.	10:00 PM	2.19	11.47	27.22	40.32	47.6	164.2*	42.5*	0.02
15.	11:00 PM	2.14	16.94	25.51	40.80				
16.	12:00 AM	1.60	16.62	38.90	43.34				
17.	1:00 AM	1.64	12.92	37.46	43.96				
18.	2:00 AM	1.66	14.50	37.89	45.54				
19.	3:00 AM	1.96	11.87	35.81	42.35				
20.	4:00 AM	1.68	14.64	40.34	42.21				
21.	5:00 AM	1.97	14.90	38.51	44.52				
22.	6:00 AM	1.44	13.32	37.14	44.44				
23.	7:00 AM	1.70	15.96	39.17	41.42				
24.	8:00 AM	2.19	9.85	42.30	43.28				
Average (24 Hours)		1.81	13.55	32.79	42.68				
NEQS		5 8hours	40 24hours	80 24hours	120 24hours	130 1 hour	150 24hours	35 24hours	1.5 24 hour

End of Report

Ref. #: KPGL/LAB/2026-580/AA

Issue date: 03-Apr-26

NEQS: National Environmental Quality Standards
Remarks: Parameters with * are not in compliance with NEQS Limits.
Note: PM_{10} and $PM_{2.5}$ results are not in compliance with the NEQS standard due to background air pollution, mostly due to natural surroundings and regional influences, such as dust carried by wind from open areas, dry weather conditions, traffic emissions from nearby roads.
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- The report is not valid for any negotiations.
- Dually calibrated instrument was used during monitoring.

Field Analyst	Chief Analyst	Laboratory Incharge

Pak Green Enviro-Engineering (Pvt) Ltd. Peshawar, Pakistan

PAK GREEN ENVIRO-ENGINEERING (Pvt.) Ltd.
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TEST REPORT

Ref. #: KPGL/LAB/2026-581/NL

Issue date: 03-Apr-26

Name of Client:	NESPAK JV TES
Project Name:	Phase-I: 200049-REVAMPING OF NON-TEACHING DHQ HOSPITALS ACROSS KHYBER PAKHTUNKHWA (ADP NO. 513)
Sampling Location:	Nasserullah Babar Memorial Hospital
Nature of Monitoring:	Noise Level (24 Hours)
Coordinates:	33.983643°N 71.56096°E
Name of Sampling Person:	Farman Ullah
Monitoring By:	Pak Green Laboratories
Monitoring Time:	Real Time
Monitoring Instrument:	Smart Sensor
Monitoring Date:	03-Mar-26 to 04-Mar-26

Results:

Sr. No.	Day Time	Equivalent Noise dB (A)
1.	6:00 – 7:00 AM	46.2
2.	7:00 -8:00 AM	47.3
3.	8:00- 9:00 AM	43.8
4.	9:00- 10:00 AM	48.2
5.	10:00 -11:00 AM	50.4
6.	11:00- 12:00 AM	49.0
7.	12:00 -1:00 PM	53.3
8.	1:00- 2:00 PM	47.5
9.	2:00- 3:00 PM	51.4
10.	3:00 4:00 PM	50.1
11.	4:00 5:00 PM	48.3
12.	5:00 6:00 PM	45.6
13.	6:00 7:00 PM	47.2
14.	7:00 8:00 PM	48.0
15.	8:00 9:00 PM	41.7
16.	9:00 10:00 PM	40.4
	Average	47.4

Sr. No.	Night Time	Equivalent Noise dB (A)
17.	10:00 PM - 11:00 PM	42.1
18.	11:00 -12:00 AM	46.8
19.	12:00 -1:00 AM	48.3
20.	1:00 -2:00 AM	40.4
21.	2:00 -3:00 AM	39.6
22.	3:00 -4:00 AM	35.5
23.	4:00- 5:00 AM	37.9
24.	5:00-6:00 AM	46.2
	Average	42.1

.....End of Report.....

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Ref. #: KPGL/LAB/2026-581/NL

Issue date: 03-Apr-26

NEQS: National Environmental Quality Standards

Sr. No.	Category of area/Zone	Units	Day Time	Night Time
1.	Silence Zone (D)	dB (A) Leq	50	45

Remarks: All Parameters are in compliance with the NEQS limit.

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- This report should be reproduced as a whole and not in parts.
- The responsibility of the ethical use of the results reported in this report lies with the client. Consequently, the laboratory is absolved of its responsibility for any claim that may result through the use by the client or others of the results appearing in this report.
- The report is not valid for any negotiations.
- Dually calibrated instruments were used during monitoring.

Field Analyst	Chief Analyst	Laboratory Incharge

Pak Green Enviro-Engineering (Pvt) Ltd. Peshawar, Pakistan

TEST REPORT

Ref #: KPGL/LAB/2026-582/DW

Issue date: 03-Apr-26

Name of Client:	NESPAK JV TES
Executing Agency:	C&W Department, Govt. of Khyber Pakhtunkhwa
Project Name:	Phase-I: 200049-REVAMPING OF NON-TEACHING DHQ HOSPITALS ACROSS KHYBER PAKHTUNKHWA (ADP NO. 513)

Sample Description:

Nature of sample:	Drinking water	
Sampling By:	Pak Green Laboratories	
Sampling Location:	Nasserullah Babar Memorial Hospital	
Coordinates:	33.983643°N 71.56096°E	
Sample source:	Water Dispensor Near Cafeteria	
Sample Code:	K-DW-070	
Date of sampling:	03-Mar-26	
Sample Receiving Date:	03-Mar-26	
Testing Facility:	Pak Green Laboratories	
Date of Completion of Analysis:	03-Mar-26 to 17-Mar-26	
Env. Conditions during Analysis:	Temp=22.5-24.2°C	RH=55.4-59.4%

Summary of Test Result:

Remarks:
All Parameters are in compliance with the NEQS Limit.

Terms & Conditions:

- This report should be reproduced as a whole and not in parts.
- The Sampling was done as per the sampling and preservation protocol method APHA 1060-B&C.
- The responsibility of the ethical use of the results reported in this report lies with the client.
- The leftover sample (if so available) shall be retained for fifteen days after the issuance of the report unless otherwise negotiated between the client and the laboratory.
- The report is not valid for any negotiations.
- Dually calibrated instruments were used during testing activities and monitoring.

Lab Analyst	Chief Analyst	Laboratory Incharge
	Muhammad Raza Ullah	Mian Iftikhar Ahmed

Pak Green Enviro-Engineering (Pvt) Ltd. Peshawar, Pakistan

PAK GREEN ENVIRO-ENGINEERING (Pvt.) Ltd.
(Environmental Laboratories Division)
ISO/IEC 17025:2017 Accredited Testing Lab, ISO 9001:2015, ISO 14001:2015, ISO 45001:2018
Head Office: 46-M, Gulberg III, Lahore-Pakistan. Ph: +92-42-35441444 Cell: 0303-4442334
Peshawar Office: H. #. 4B, Railway Road, University Town, Peshawar - Pakistan. Ph: +92-91-5710744 Cell: 0308-4440895

EPA Certified

Ref #: KPGL/LAB/2026-582/DW

Issue date: 03-Apr-26

Biological Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
1.	*E. coli*	-	Must not be detectable in any 100 ml sample	Nil	Nil	APHA-9221 F
2.	*Total Coli-form*	-	Must not be detectable in any 100 ml sample	Nil	Nil	APHA-9221 D
3.	*Fecal Coliform*	-	-	Nil	Nil	APHA-9221 E

Physical Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
4.	pH ^	-	6.5-8.5	0.001	7.936 at 23.4°C	APHA-4500-H^+ B
5.	Taste	-	Non-Objectionable	-	Non-Objectionable	APHA-2160 C
6.	Color	TCU	≤ 15	0.001	0.000	APHA-2120 C
7.	Odor	-	Non-Objectionable	-	Non-Objectionable	APHA-2150 B
8.	Turbidity	NTU	<5	0.01	0.24	APHA-2130 B
9.	Total dissolved Solids (TDS) ^	mg/L	< 1000	10	620	APHA-2540 C

Chemical Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
10.	Total Hardness ^	mg/L	<500	0.1	440	APHA-2340 C
11.	Aluminum (Al)	mg/L	≤ 0.2	0.0010	BDL	APHA-3111 D
12.	Antimony (Sb)	mg/L	≤0.005	0.0010	BDL	APHA-3111 B
13.	Arsenic (As)	mg/L	≤ 0.05	0.0001	BDL	APHA-3114 B
14.	Barium (Ba)	mg/L	0.7	0.0500	BDL	APHA-3111 D
15.	Boron (B)	mg/L	0.3	0.0100	BDL	APHA-3111 D
16.	Cadmium (Cd) ^	mg/L	0.01	0.0010	BDL	APHA-3111 B
17.	Chloride (Cl^-) ^	mg/L	< 250	0.1	35	APHA-4500-Cl^- B
18.	Chromium (Cr) ^	mg/L	≤ 0.05	0.0010	BDL	APHA-3111-Cr B
19.	Copper (Cu) ^	mg/L	2	0.0001	0.0261	APHA-3111 B
20.	Fluoride (F)	mg/L	≤ 1.5	0.1	0.6	APHA-4500-F D
21.	Lead (Pb) ^	mg/L	≤ 0.05	0.0010	BDL	APHA-3111 B
22.	Manganese (Mn^{2+}) ^	mg/L	≤ 0.5	0.0010	0.0106	APHA-3111 B
23.	Mercury (Hg)	mg/L	≤ 0.001	0.0001	BDL	APHA-3112 B
24.	Nickle	mg/L	≤ 0.02	0.0010	BDL	APHA-3111 B
25.	Nitrate^	mg/L	≤ 50	0.001	BDL	APHA-4500-NO_3^--E

Pak Green Enviro-Engineering (Pvt) Ltd. Peshawar, Pakistan

Ref #: KPGL/LAB/2026-582/DW

Issue date: 03-Apr-26

Chemical Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
26.	Nitrite^	mg/L	≤ 3	0.001	0.085	APHA-4500-NO_2^{-1}-B
27.	Selenium	mg/L	0.01	0.0001	BDL	APHA-3114 C
28.	Residual Chlorine	mg/L	0.2-0.5 at consumer end 0.5-1.5 at source	0.01	BDL	APHA-4500-Cl B
29.	Zinc (Zn^{+2}) ^	mg/L	5.0	0.0001	BDL	APHA-3111 B
30.	Phenolic Compound (As Phenol)	mg/L	-	0.0005	BDL	APHA-5530 D
31.	Iron (Fe)^	mg/L	-	0.0010	BDL	APHA-3111 B
32.	Cyanide (as CN^{1-}) Total	mg/L	≤ 0.05	0.001	BDL	APHA-4500-CN E
33.	Pesticides	mg/L	NGVS	0.001	BDL	APHA-6630 B

End of Report

NEQS: National Environmental Quality Standard
BDL: Below Detection Limits

With ^PNAC Accredited
LDL: Lowest Detection limit

Pak Green Enviro-Engineering (Pvt) Ltd. Peshawar, Pakistan

PAK GREEN ENVIRO-ENGINEERING (Pvt.) Ltd.
(Environmental Laboratories Division)
ISO/IEC 17025:2017 Accredited Testing Lab, ISO 9001:2015, ISO 14001:2015, ISO 45001:2018
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Peshawar Office: H. #. 4B, Railway Road, University Town, Peshawar - Pakistan. Ph: +92-91-5710744 Cell: 0308-4440895
EPA Certified

TEST REPORT

Ref #: KPGL/LAB/2026-583/WW

Issue date: 03-Apr-26

Name of Client:	NESPAK JV TES
Executing Agency:	C&W Department, Govt. of Khyber Pakhtunkhwa
Project Name:	Phase-I: 200049-REVAMPING OF NON-TEACHING DHQ HOSPITALS ACROSS KHYBER PAKHTUNKHWA (ADP NO. 513)

Sample Description:

Nature of sample:	Waste water	
Sampling By:	Pak Green Laboratories	
Sampling Location:	Nasserullah Babar Memorial Hospital	
Coordinates:	33.98407° N 71.561° E	
Sample source:	Main Drain	
Sample Code:	K-WW-071	
Date of sampling:	03-Mar-26	
Sample Receiving Date:	03-Mar-26	
Testing Facility:	Pak Green Laboratories	
Date of Completion of Analysis:	03-Mar-26 to 17-Mar-26	
Env. Conditions during Analysis:	Temp=22.6-23.9°C	RH=54.4-58.4%

Summary of Test Result:

Remarks:
All Parameters are in compliance with the NEQS Limit

Terms & Conditions:

- This report should be reproduced as a whole and not in parts.
- The Sampling was done as per the sampling and preservation protocol method APHA 1060-B&C.
- The responsibility of the ethical use of the results reported in this report lies with the client.
- The leftover sample (if so available) shall be retained for fifteen days after the issuance of the report unless otherwise negotiated between the client and the laboratory.
- The report is not valid for any negotiations.
- Dually calibrated instruments were used during testing activities and monitoring.

Lab Analyst	Chief Analyst	Laboratory Incharge
	Muhammad Raza Ullah	Mian Iftikhar Ahmed

Pak Green Enviro-Engineering (Pvt) Ltd. Railway Road, University Town, Peshawar, Pakistan

Ref #: KPGL/LAB/2026-583/WW

Issue date: 03-Apr-26

Physical Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
1.	Temperature	°C	-	0.1	23.8	APHA-2550 B
2.	pH^	-	6-9	0.001	7.560 at 23.8°C	APHA-4500-H^+ B

Chemical Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
3.	Biological Oxygen Demand (BOD_5 at 20 °C) ^	mg/L	80	1	68	APHA-5210 D
4.	Chemical Oxygen Demand (COD) ^	mg/L	150	0.4	112	APHA-5220 B
5.	Total Suspended Solids (TSS) ^	mg/L	200	1	20	APHA-2540 D
6.	Total Dissolved Solids (TDS) ^	mg/L	3500	10	2380	APHA-2540 C
7.	Greases & Oil	mg/L	10	0.1	BDL	APHA-5520 B
8.	Phenolic Compound (As Phenol)	mg/L	0.1	0.005	BDL	APHA-5530 D
9.	Chloride (as Cl^-) ^	mg/L	1000	0.1	820	APHA-4500-Cl^- B
10.	Fluoride (F^-)	mg/L	10	0.1	2.0	APHA-4500-F-D
11.	An Ionic detergent as MBAs	mg/L	20	0.001	0.134	APHA 5540 C
12.	Sulphate (SO_4^{2-}) ^	mg/L	600	1	200	APHA-4500-SO_4 C
13.	Sulphide (S^{2-})	mg/L	1.0	0.1	BDL	APHA-4500-S^{2-} F
14.	Ammonia (NH_3) ^	mg/L	40	0.1	7.4	APHA-4500NH_3 C
15.	Cadmium (Cd)^	mg/L	0.1	0.0010	BDL	APHA-3111 B
16.	Chromium^ (Trivalent & Hexavalent)	mg/L	1.0	0.0010	0.0404	APHA-3111 B
17.	Copper (Cu)^	mg/L	1.0	0.0001	BDL	APHA-3111 B
18.	Lead (Pb)^	mg/L	0.5	0.0010	BDL	APHA-3111 B
19.	Mercury (Hg)	mg/L	0.01	0.0001	BDL	APHA-3112 B
20.	Selenium (Se)	mg/L	0.5	0.0001	BDL	APHA-3114 C
21.	Nickel (Ni)	mg/L	1.0	0.0010	BDL	APHA-3111 B
22.	Silver (Ag)	mg/L	1.0	0.0100	0.0346	APHA-3111 B
23.	Zinc (Zn)^	mg/L	5.0	0.0001	0.0252	APHA-3111 B
24.	Arsenic (As)	mg/L	1.0	0.0001	BDL	APHA-3114 B
25.	Barium (Ba)	mg/L	1.5	0.0001	BDL	APHA-3111 D
26.	Iron (Fe)^	mg/L	8.0	0.0010	0.3574	APHA-3111 B
27.	Manganese (Mn)^	mg/L	1.5	0.0010	0.0116	APHA-3111 B
28.	Boron (B)	mg/L	6.0	0.0001	BDL	APHA-3111 D
29.	Chlorine (Cl_2)	mg/L	1.0	0.0001	BDL	APHA-4500 Cl B
30.	Total Toxic Metals (Cd, Cr, Cu, Pb, Hg, Se, Ni, Ag, As, Ba, B)	mg/L	2.0	0.0001	0.0750	APHA-3111
31.	Cyanide (as CN^-) Total	mg/L	1.0	0.001	BDL	APHA-4500-CN E
32.	Pesticide	mg/L	0.15	0.001	BDL	APHA-6630 B

Ref #: KPGL/LAB/2026-583/WW

Issue date: 03-Apr-26

Biological Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
33.	*E. coli*	-	-	Nil	124.4	APHA-9221 F
34.	*Total Coli-form*	-	-	Nil	35.9	APHA-9221 D
35.	*Fecal Coliform*	-	-	Nil	BDL	APHA-9221 E

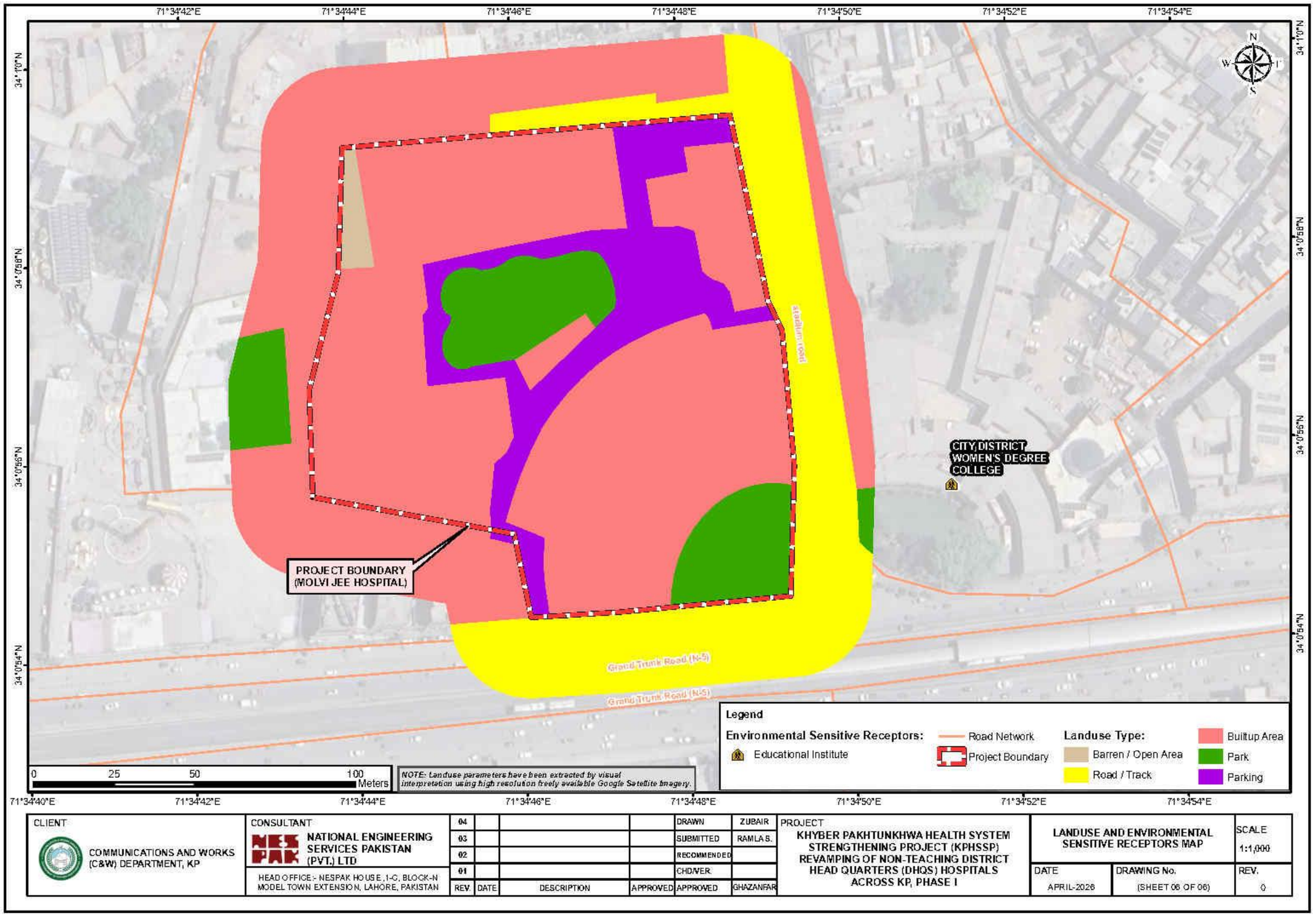
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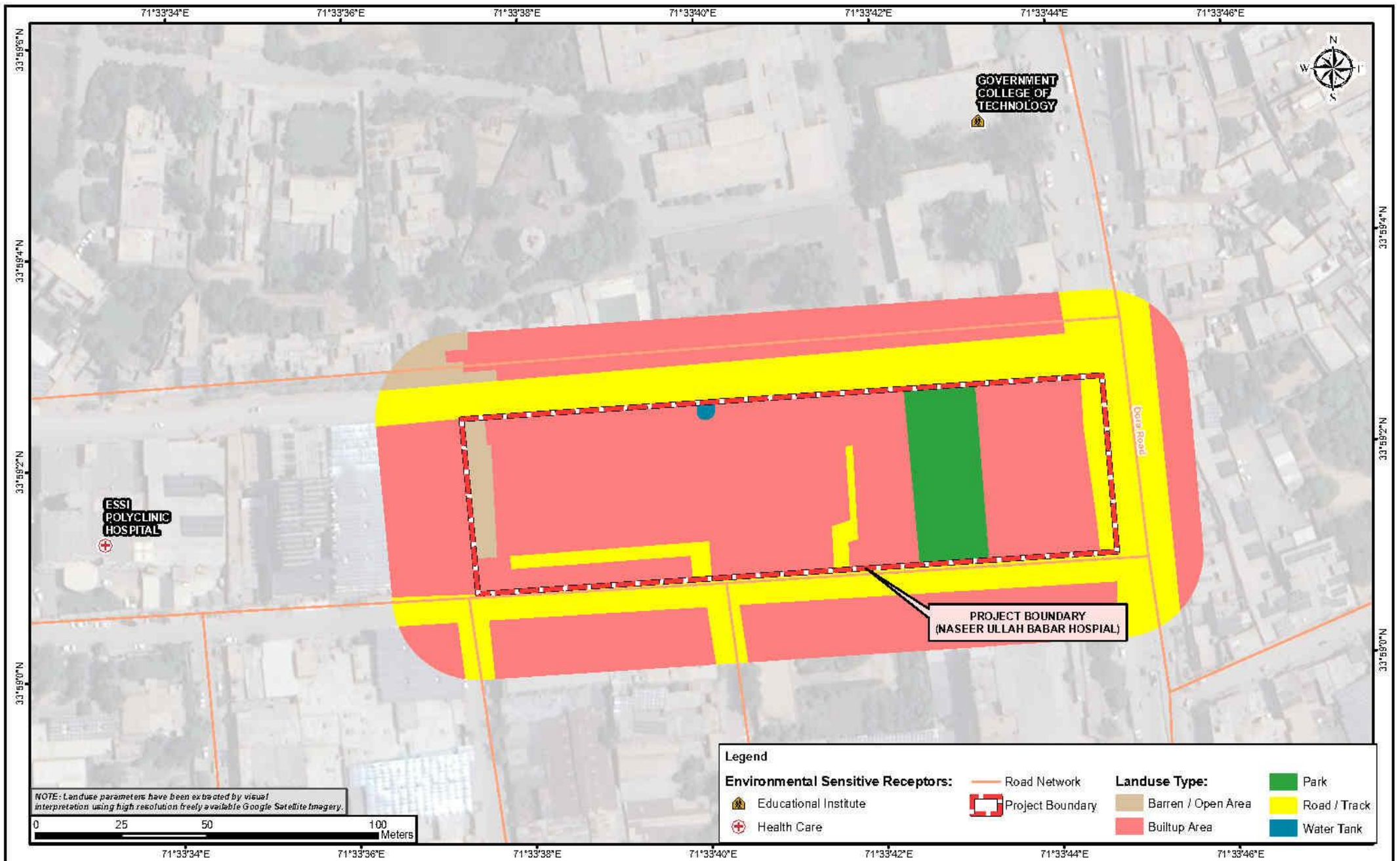
NEQS: National Environmental Quality Standard
BDL: Below Detection Limits

With ^PNAC Accredited
LDL: Lowest Detection limit

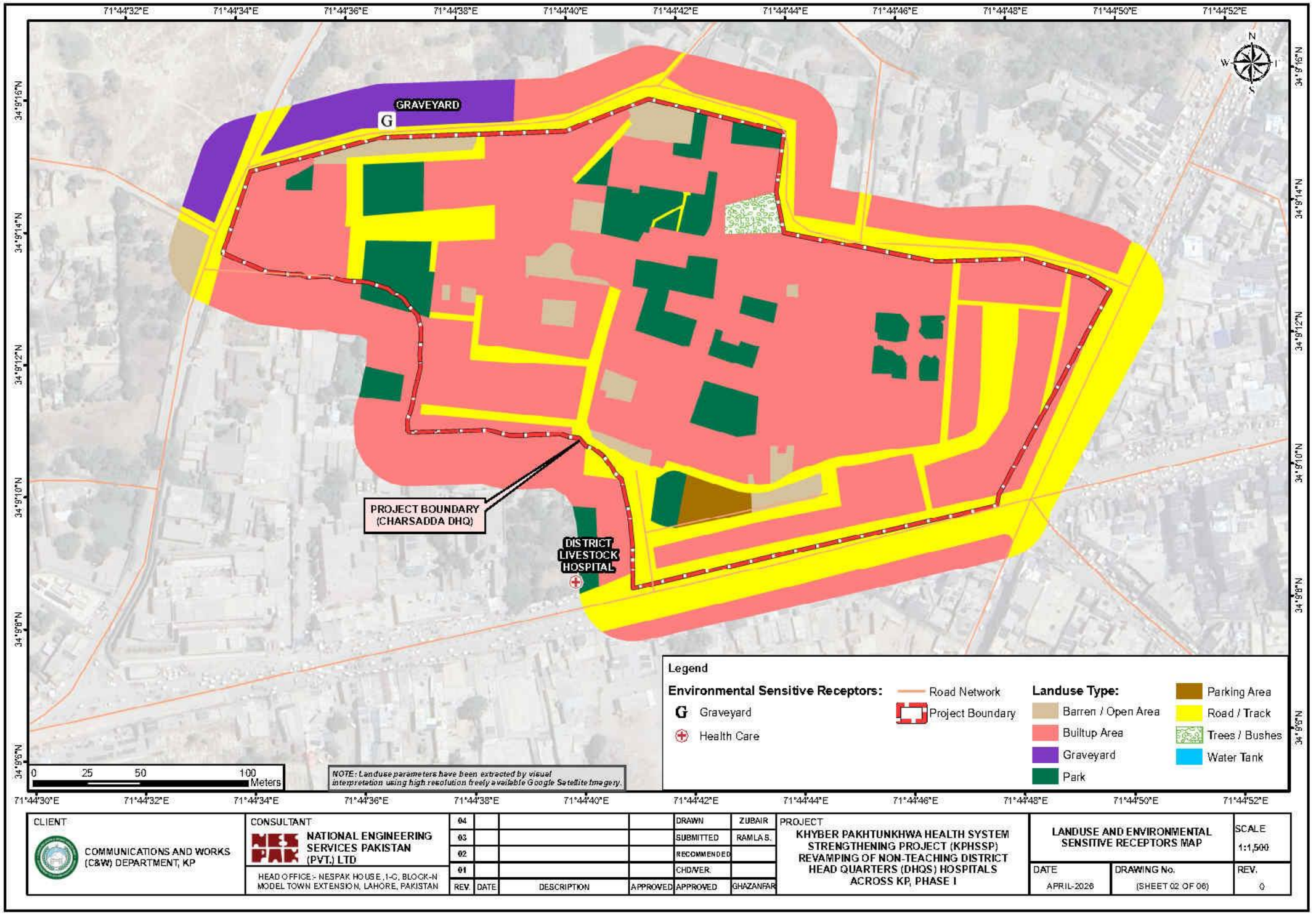
Page 3 of 3

ANNEXURE-IV: LAND USE AND SENSITIVE RECEPTORS


71°34'42"E
71°34'44"E
71°34'46"E
71°34'48"E
71°34'50"E
71°34'52"E
71°34'54"E
34°1'0"N
34°0'58"N
34°0'56"N
34°0'54"N
N
W
E
S
PROJECT BOUNDARY
(MOLVI JEE HOSPITAL)
CITY DISTRICT
WOMEN'S DEGREE
COLLEGE
Grand Trunk Road (N-5)
Grand Trunk Road (N-5)
0
25
50
100
Meters
NOTE: landuse parameters have been extracted by visual interpretation using high resolution freely available Google Satellite Imagery.
Legend
Environmental Sensitive Receptors:
Educational Institute
Road Network
Project Boundary
Landuse Type:
Barren / Open Area
Road / Track
Builtup Area
Park
Parking
CLIENT
COMMUNICATIONS AND WORKS (C&W) DEPARTMENT, KP
CONSULTANT
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD
HEAD OFFICE:- NESPAK HOUSE,1-C, BLOCK-N MODEL TOWN EXTENSION, LAHORE, PAKISTAN
REV. DATE DESCRIPTION APPROVED
04 DRAWN ZUBAIR
03 SUBMITTED RAMLA S.
02 RECOMMENDED
01 CHD/VER.
APPROVED GHAZANFAR
PROJECT
KHYBER PAKHTUNKHWA HEALTH SYSTEM STRENGTHENING PROJECT (KPHSSP)
REVAMPING OF NON-TEACHING DISTRICT HEAD QUARTERS (DHQS) HOSPITALS ACROSS KP, PHASE I
LANDUSE AND ENVIRONMENTAL SENSITIVE RECEPTORS MAP
SCALE
1:1,000
DATE
APRIL-2026
DRAWING No.
(SHEET 06 OF 06)
REV.
0

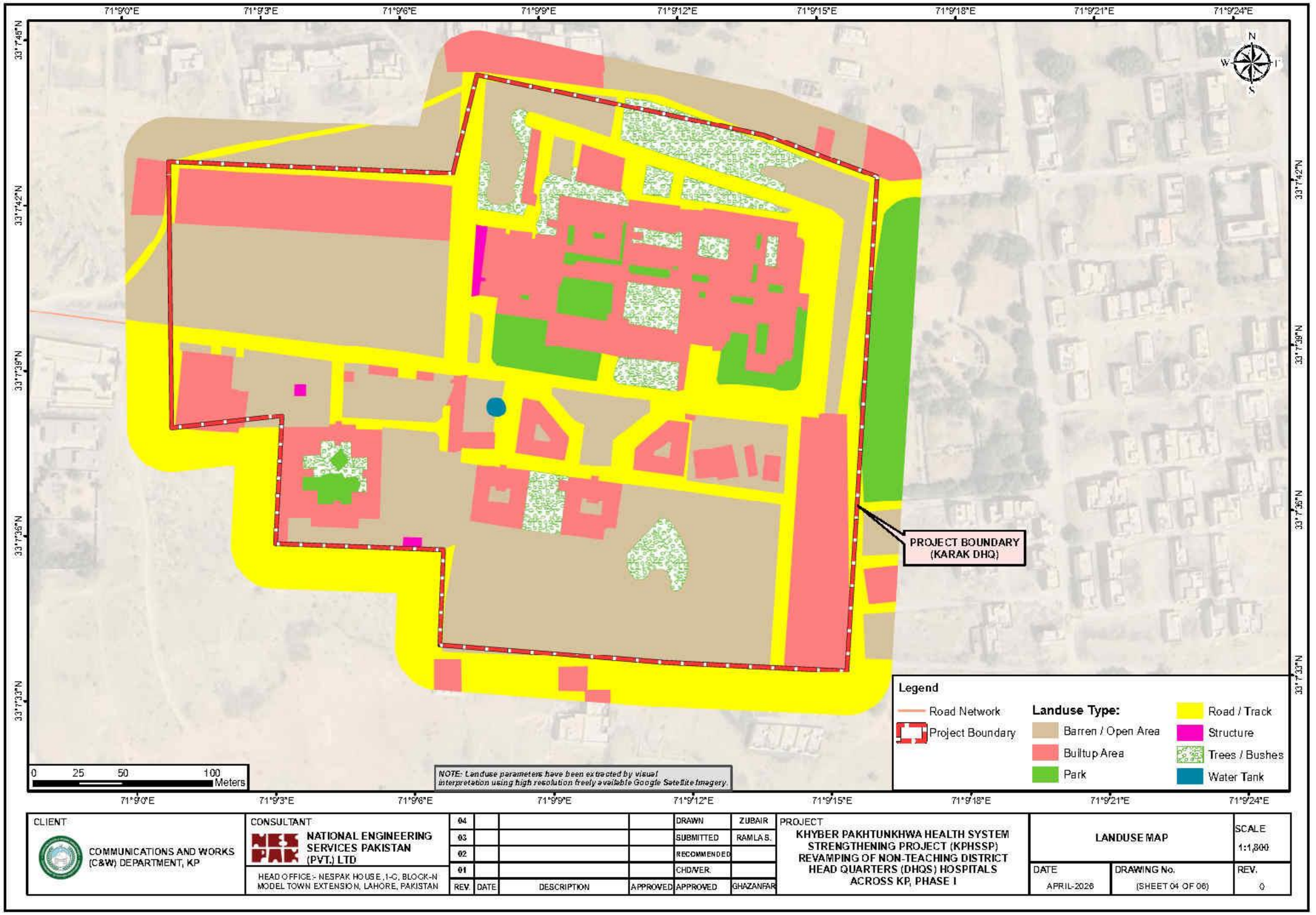


CLIENT: COMMUNICATIONS AND WORKS (C&W) DEPARTMENT, KP	CONSULTANT: NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. HEAD OFFICE:- NESPAK HOUSE ,1-C, BLOCK-N MODEL TOWN EXTENSION, LAHORE, PAKISTAN	04				DRAWN	ZUBAIR	PROJECT: KHYBER PAKHTUNKHWA HEALTH SYSTEM STRENGTHENING PROJECT (KPHSSP) REVAMPING OF NON-TEACHING DISTRICT HEAD QUARTERS (DHQS) HOSPITALS ACROSS KP, PHASE I	LANDUSE AND ENVIRONMENTAL SENSITIVE RECEPTORS MAP	SCALE 1:1,000
		03				SUBMITTED	RAMLA S.			
		02				RECOMMENDED				
		01				CHD/VER.			DATE: APRIL-2026	DRAWING No.: (SHEET 05 OF 06)
		REV.	DATE	DESCRIPTION	APPROVED	APPROVED	GHAZANFAR			REV.: 0



CLIENT: COMMUNICATIONS AND WORKS (C&W) DEPARTMENT, KP	CONSULTANT: NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. HEAD OFFICE:- NESPAK HOUSE,1-C, BLOCK-N MODEL TOWN EXTENSION, LAHORE, PAKISTAN	04		DRAWN	ZUBAIR	PROJECT: KHYBER PAKHTUNKHWA HEALTH SYSTEM STRENGTHENING PROJECT (KPHSSP) REVAMPING OF NON-TEACHING DISTRICT HEAD QUARTERS (DHQS) HOSPITALS ACROSS KP, PHASE I
		03		SUBMITTED	RAMLA S.	
		02		RECOMMENDED		
		01		CHD/VER.		
		REV.	DATE / DESCRIPTION / APPROVED	APPROVED	GHAZANFAR	

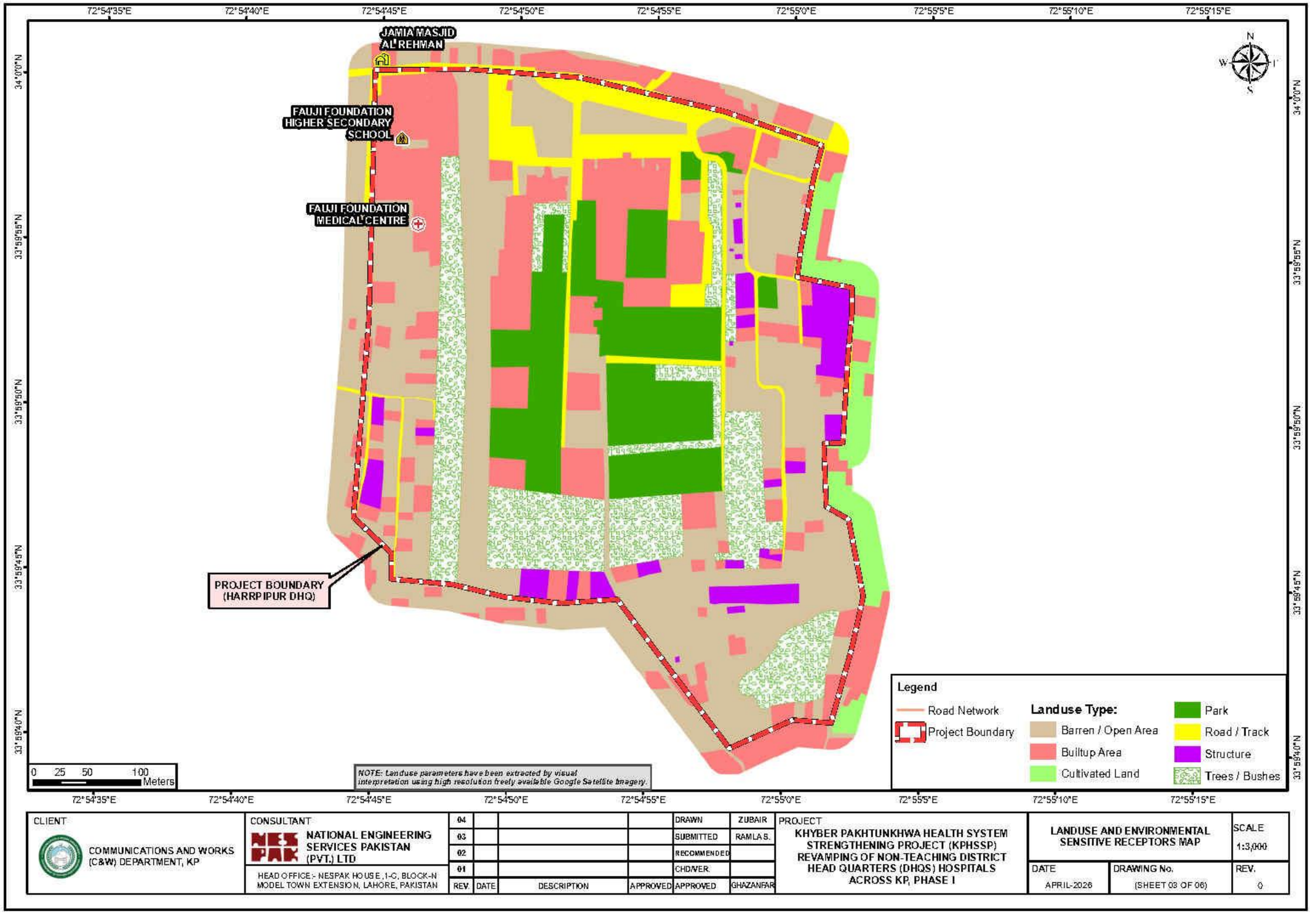
LANDUSE AND ENVIRONMENTAL SENSITIVE RECEPTORS MAP		SCALE: 1:1,500
DATE: APRIL-2026	DRAWING No.: (SHEET 02 OF 06)	REV.: 0

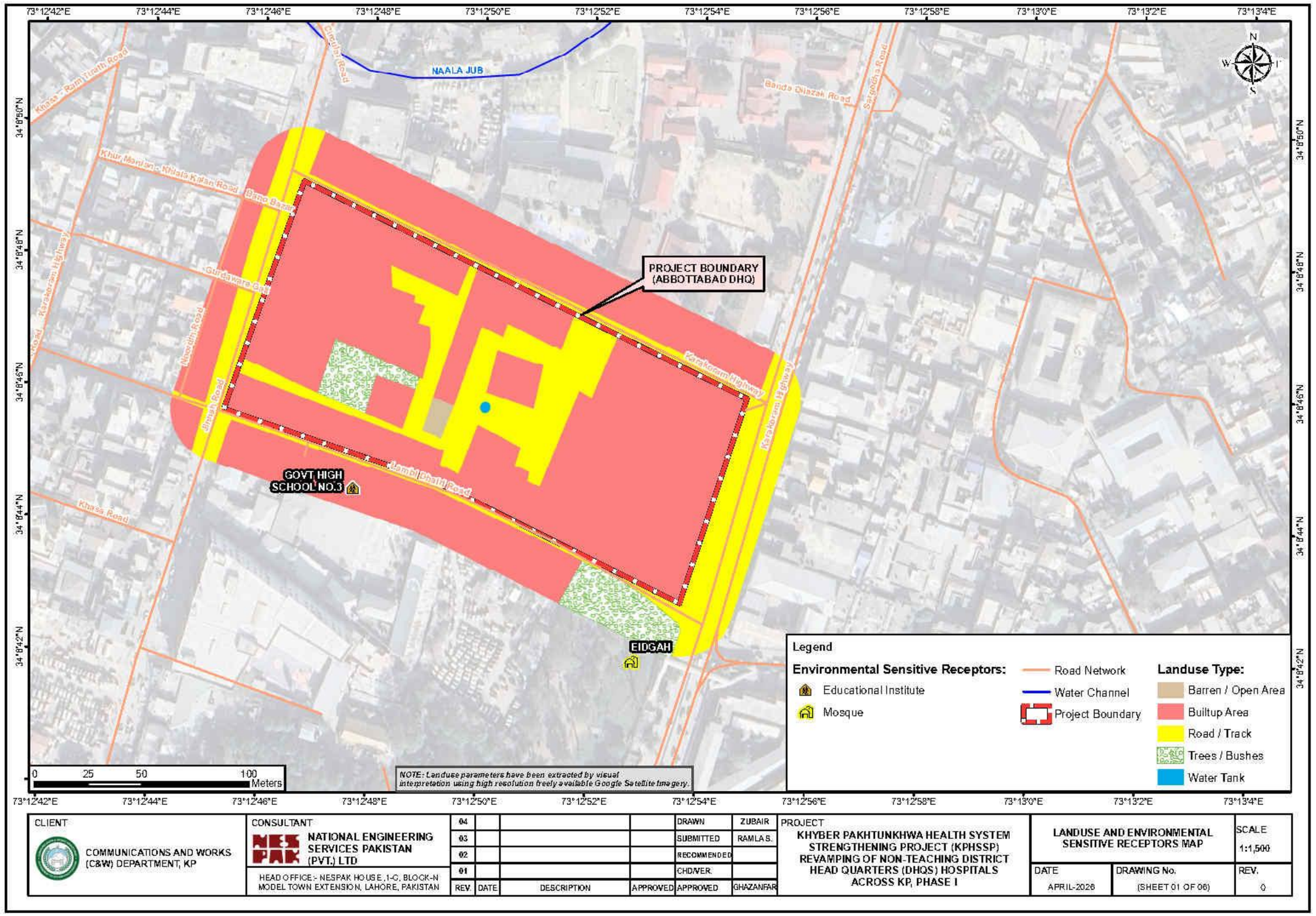


CLIENT: COMMUNICATIONS AND WORKS (C&W) DEPARTMENT, KP	CONSULTANT: NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. HEAD OFFICE:- NESPAK HOUSE ,1-C, BLOCK-N MODEL TOWN EXTENSION, LAHORE, PAKISTAN	04			DRAWN	ZUBAIR
		03			SUBMITTED	RAMLA S.
		02			RECOMMENDED	
		01			CHD/VER.	
		REV.	DATE	DESCRIPTION / APPROVED	APPROVED	GHAZANFAR

PROJECT: KHYBER PAKHTUNKHWA HEALTH SYSTEM STRENGTHENING PROJECT (KPHSSP) REVAMPING OF NON-TEACHING DISTRICT HEAD QUARTERS (DHQS) HOSPITALS ACROSS KP, PHASE I

LANDUSE MAP		SCALE
		1:1,800
DATE: APRIL-2026	DRAWING No.: (SHEET 04 OF 06)	REV.: 0


72°54'35"E
72°54'40"E
72°54'45"E
72°54'50"E
72°54'55"E
72°55'0"E
72°55'5"E
72°55'10"E
72°55'15"E
34°0'0"N
33°59'55"N
33°59'50"N
33°59'45"N
33°59'40"N
N
W
E
S
JAMIA MASJID AL' REHMAN
FAUJI FOUNDATION HIGHER SECONDARY SCHOOL
FAUJI FOUNDATION MEDICAL CENTRE
PROJECT BOUNDARY (HARRPIPUR DHQ)
0 25 50 100 Meters
NOTE: Landuse parameters have been extracted by visual interpretation using high resolution freely available Google Satellite Imagery.
Legend
Road Network
Project Boundary
Landuse Type:
Barren / Open Area
Builtup Area
Cultivated Land
Park
Road / Track
Structure
Trees / Bushes
CLIENT
COMMUNICATIONS AND WORKS (C&W) DEPARTMENT, KP
CONSULTANT
NESPAK
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD
HEAD OFFICE:- NESPAK HOUSE,1-C, BLOCK-N MODEL TOWN EXTENSION, LAHORE, PAKISTAN
REV. DATE DESCRIPTION APPROVED
04 03 02 01
DRAWN ZUBAIR
SUBMITTED RAMLA S.
RECOMMENDED
CHD/VER.
APPROVED GHAZANFAR
PROJECT
KHYBER PAKHTUNKHWA HEALTH SYSTEM STRENGTHENING PROJECT (KPHSSP) REVAMPING OF NON-TEACHING DISTRICT HEAD QUARTERS (DHQS) HOSPITALS ACROSS KP, PHASE I
LANDUSE AND ENVIRONMENTAL SENSITIVE RECEPTORS MAP
SCALE 1:3,000
DATE APRIL-2026
DRAWING No. (SHEET 03 OF 06)
REV. 0



CLIENT: COMMUNICATIONS AND WORKS (C&W) DEPARTMENT, KP	CONSULTANT: NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. HEAD OFFICE:- NESPAK HOUSE,1-C, BLOCK-N MODEL TOWN EXTENSION, LAHORE, PAKISTAN	04				DRAWN	ZUBAIR	PROJECT: KHYBER PAKHTUNKHWA HEALTH SYSTEM STRENGTHENING PROJECT (KPHSSP) REVAMPING OF NON-TEACHING DISTRICT HEAD QUARTERS (DHQS) HOSPITALS ACROSS KP, PHASE I	LANDUSE AND ENVIRONMENTAL SENSITIVE RECEPTORS MAP	SCALE: 1:1,500
		03				SUBMITTED	RAMLA S.			
		02				RECOMMENDED				
		01				CHD/VER.			DATE: APRIL-2026	DRAWING No.: (SHEET 01 OF 06)
		REV.	DATE	DESCRIPTION	APPROVED	APPROVED	GHAZANFAR			REV.: 0

ANNEXURE-V: SOCIAL SURVERY TOOLS

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LIMITED (NESPAK)

KHYBER PAKHTUNKHWA HEALTH SYSTEMS STRENGTHENING PROGRAM

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

A. GENERAL INFORMATION

Date: _____ District: _____

Village/Settlement: _____ Tehsil: _____

B. RESPONDENT IDENTIFICATION

Respondent Category:

☐ Hospital Staff (medical/paramedical/admin/support) ☐ Patient

☐ Nearby Resident/Community Member ☐ Patient Attendant / Visitor

Name of Respondent: _____ Father's/Spouse's Name: _____

Contact No.: _____

Age (Years): _____ Religion: _____

Caste/Ethnic Group: _____ Mother Tongue: _____

Marital Status: ☐ Married ☐ Unmarried ☐ Widow/Widower ☐ Divorced

C. EDUCATION & HOUSEHOLD PROFILE

Highest Level of Education Completed:

☐ Illiterate ☐ Primary ☐ Middle ☐ Matric

☐ Intermediate ☐ Graduation ☐ Post-Graduation ☐ Other: _____

Family System: ☐ Nuclear ☐ Joint

Household Members: Males _____ Females ____

Children (under 10 years) Males _____ Females ____ Total _____

D. LIVELIHOOD & ECONOMIC STATUS

Main Occupation:

☐ Government Job ☐ Private Job ☐ Business ☐ Labor

☐ Agriculture ☐ Livestock ☐ Unemployed ☐ Other: _____

Average Monthly Household Income (PKR): _____

Average Monthly Household Expenditure (PKR): _____

E. HOUSING & BASIC SERVICES (HOUSEHOLD LEVEL)

House Ownership: ☐ Owner ☐ Rented ☐ Other: _____

House Construction Type: ☐ Pacca ☐ Semi-Pacca ☐ Katcha ☐ Hut

Source of Drinking Water: ☐ Public Supply ☐ Hand pump ☐ Filtration Plant ☐ Other: _____

Satisfied with Drinking water quality? ☐ Yes ☐ No

In case of No, specify: _____

F. TRANSPORT & CONNECTIVITY

Primary Mode of Transport to DHQ/City: ☐ Public ☐ Private ☐ Both

Average Travel Time to Hospital: ☐ <15 min ☐ 15–30 min ☐ 30–60 min ☐ >60 min

G. DHQ HOSPITAL SERVICES & FACILITIES

Available Health Services at DHQ: ☐ OPD ☐ Emergency ☐ Maternity

☐ Child Health ☐ Diagnostic Services ☐ Pharmacy/Medicines ☐ Ambulance

Any Other: _____

Is the medical staff available on daily basis? _____

H. DRINKING WATER WITHIN HOSPITAL

Availability of Safe Drinking Water at Hospital:

Category	Yes	No	Source
For Patients			
For Attendants			
For Staff			
Available only through canteen/tuck shop (paid bottled water)			

H. SANITATION, HYGIENE & INFECTION CONTROL

Availability of Toilets in Hospital: ☐ Sufficient ☐ Insufficient ☐ Not Available

Separate Toilets Available For: ☐ General Public ☐ Persons with Disabilities ☐ None

Cleanliness of Wards & Toilets: ☐ Satisfactory ☐ Unsatisfactory

I. PERSONS WITH DISABILITIES & INCLUSIVE ACCESS

Any household member with disability? ☐ Yes ☐ No

If Yes, type: ☐ Physical / Mobility ☐ Visual ☐ Hearing ☐ Intellectual ☐ Chronic illness

Accessibility Features at DHQ Hospital:

Wheelchair ramps ☐ Yes ☐ No ☐ Don't know

Elevators / lifts ☐ Yes ☐ No ☐ Don't know

Wheelchairs at entry ☐ Yes ☐ No ☐ Don't know

Accessible toilets ☐ Yes ☐ No ☐ Don't know

Handrails / clear signage ☐ Yes ☐ No ☐ Don't know

Overall Ease of Access for Persons with Disabilities: _____

J. PROJECT PERCEPTION & IMPACT

Do you know about the project? _____

Expected Positive Impacts:

☐ Improved healthcare quality ☐ Improved drinking water & sanitation

☐ Improved accessibility for PwDs ☐ Employment opportunities ☐ Reduced travel to other cities

Others (Please specify): _____

_____

Possible Negative Impacts during Construction: _____

_____

Suggested mitigation measures: _____

General Remarks of Respondent: _____

_____

General Observations of Interviewer: _____

Name of Interviewer: _____ Signature: _____

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LIMITED (NESPAK)

KHYBER PAKHTUNKHWA HEALTH SYSTEMS STRENGTHENING PROGRAM

GENDER SURVEY

1. Location & Respondent Profile

Settlement: _____ Tehsil: _____ District: _____

Gender: ☐ Female ☐ Male ☐ Transgender ☐ Prefer not to say

Age: ☐ <18 ☐ 18–25 ☐ 26–35 ☐ 36–45 ☐ 46+

Respondent Type:

☐ Patient ☐ Visitor/Attendant ☐ Hospital Staff ☐ Community Member

If staff, designation: _____

Education: ☐ Illiterate ☐ Primary ☐ Middle ☐ Matric

☐ Intermediate ☐ Graduation ☐ Post Graduation

Marital status: ☐ Married ☐ Unmarried

Family size (M/F): ___ / ___

2: Household Roles & Decision-Making (Community Only)

Main role of women (tick all):

☐ Household care ☐ Income generation ☐ Both ☐ Other _____

Who usually decides? (Men=1, Women=2, Both=3)

- Children's education _____ - Women working outside home _____
- Choice of health facility _____ - Major household purchases _____

3: Access to Education & Skills (Community)

Are girls facing barriers to education? ☐ Yes ☐ No

If yes, key reasons: _____

Are skills/vocational centers available for women? ☐ Yes ☐ No

If yes, type of training: _____

4: Access to Health Services (Community)

Nearest health facility: _____ Distance (km): _____

Do women access pre/post-natal care? ☐ Yes ☐ No

If no, main constraint: _____

Major health issues in area (incl. water-borne): _____

5: Hospital Access, Safety & Privacy (Patients / Visitors / Staff)

Is the hospital easy to access? ☐ Yes ☐ No

Main barrier (if any): _____

Do women require permission/accompaniment to visit? ☐ Always ☐ Sometimes ☐ No

Do you feel safe within hospital premises? ☐ Yes ☐ No ☐ Sometimes

Are the following adequate?

- Separate female toilets ☐ Yes ☐ No -
- Clean toilets ☐ Yes ☐ No
- Lighting ☐ Yes ☐ No
- Privacy during examination ☐ Yes ☐ No

Female doctor/nurse available when needed? ☐ Yes ☐ No ☐ N/A

6: Workplace Environment (Hospital Staff Only)

Equal opportunities for male/female staff? ☐ Yes ☐ No ☐ Don't know

Facilities for female staff available?

☐ Toilets ☐ Rest area ☐ Breastfeeding space ☐ Safe night duty

Harassment reporting mechanism exists? ☐ Yes ☐ No ☐ Don't know

7: Water & Basic Services (Community)

Main drinking water source: _____

Do women collect water? ☐ Yes ☐ No Distance/time (if yes):_____

Key water-related issue: _____

8: Finance, Assets & Livelihoods (Community / Staff)

Are women engaged in income-generating work? ☐ Yes ☐ No

Type: ☐ Job ☐ Livestock ☐ Stitching/Embroidery ☐ Other _____

Do families support women's employment? ☐ Yes ☐ No ☐ Sometimes

Can women save income independently? ☐ Yes ☐ No

Main use of women's income (tick):

☐ Household needs ☐ Education ☐ Marriage ☐ Other _____

Key opportunity to increase women's income: _____

9: Vulnerability & GBV (Ask sensitively)

Key vulnerable groups present (tick):

☐ Financially ☐ Elderly ☐ Disabled ☐ Widows ☐ Minorities

Are support/social protection programs available? ☐ Yes ☐ No

Have you faced or witnessed violence against women? ☐ Yes ☐ No

If yes, type: ☐ Physical ☐ Psychological ☐ Economic

10: Project / Hospital Revamp Feedback

What design or service improvement would benefit women most?

_____

How can women's participation be ensured in the project?

_____

Any potential negative impact on women? _____

Top priority need of women in this area: _____

Interviewers Notes

Name: _____ Date: _____ Signature_____

ANNEXURE-VI: IMPACT EVALUATION MATRIX

IMPACT EVALUATION MATRIX - MAULVI JEE HOSPITAL

Project Component	Physical Environment					Ecological Environment		Social Environment									
	Soil	Air Quality	Noise	Water Quality	Waste Generation	Vegetation	Urban Fauna	Community Health and Safety	Patient Safety and Infection Risk	Healthcare Service Continuity	Access and Mobility	Labor and Working Conditions	Gender and Vulnerable Groups	Traffic Management and parking	Employment	Security	Health Service Quality
A. Pre-Construction Phase																	
Topographic Survey	0	0	2	0	0	0	0	0	2	0	0	0	0	0	2	0	0
Utility Mapping	0	0	2	0	0	0	0	0	2	0	0	0	0	0	2	0	0
Site Clearance	0	0	1	0	0	0	2	4	4	2	2	0	2	0	2	2	0
B. Construction Phase																	
Construction Camps & Workshops	4	4	6	4	6	2	4	2	6	4	6	8	4	8	6	4	2
Demolition Works	5	8	12	4	8	0	0	0	8	2	6	6	2	4	2	0	2
Material Transport, Storage and Handling	4	8	8	4	6	2	0	0	6	2	6	4	2	4	2	0	2
Structural & Civil Works	6	8	9	4	8	0	0	0	8	2	6	9	4	4	2	0	3
Drainage & Utilities	6	6	6	4	6	0	0	0	4	2	4	6	2	8	2	0	4
Landscaping	0	0	2	2	4	4	2	0	0	0	0	2	2	2	2	0	3
C. Operational Phase																	
Hospital Operations	0	4	4	4	8	0	0	9	9	2	2	4	6	4	2	2	9
Waste Management (incl. biomedical)	4	4	2	6	0	2	2	2	4	0	0	4	2	4	2	0	2
Energy Systems Operation (Grid+Solar)	0	2	2	0	2	0	0	0	0	2	0	0	0	0	2	0	2
Drainage and Sanitation facilities	0	2	0	4	2	0	0	2	4	2	0	2	2	0	2	0	6
Building Maintenance	2	4	4	2	4	2	0	0	4	0	0	6	2	4	2	0	4

Positive Impact Score	Impact Significance	Adverse Impact Score
0	Negligible	0
2 to 4	Low	2 to 4
5 to 8	Medium	5 to 8
9 to 12	High	9 to 12
>12	Very High	>12

IMPACT EVALUATION MATRIX - NASEERULLAH KHAN BABAR HOSPITAL																	
Project Component	Physical Environment					Ecological Environment		Social Environment									
	Soil	Air Quality	Noise	Water Quality	Waste Generation	Vegetation	Urban Fauna	Community Health and Safety	Patient Safety and Infection Risk	Healthcare Service Continuity	Access and Mobility	Labor and Working Conditions	Gender and Vulnerable Groups	Traffic Management and parking	Employment	Security	Health Service Quality
A. Pre-Construction Phase																	
Topographic Survey	0	0	2	0	0	0	0	0	2	0	0	0	0	0	2	0	0
Utility Mapping	0	0	2	0	0	0	0	0	2	0	0	0	0	0	2	0	0
Site Clearance	0	0	1	0	0	0	2	4	4	2	2	0	2	0	2	2	0
B. Construction Phase																	
Construction Camps & Workshops	4	4	6	4	6	2	4	2	6	4	9	8	6	9	6	4	2
Demolition Works	5	8	12	4	8	0	0	0	8	2	9	6	4	9	2	0	2
Material Transport, Storage and Handling	4	8	8	4	6	2	0	0	6	2	9	4	4	9	2	0	2
Structural & Civil Works	6	8	9	4	8	0	0	0	8	2	9	9	4	9	2	0	3
Drainage & Utilities	6	6	6	4	6	0	0	0	4	2	4	6	2	9	2	0	4
Landscaping	0	0	2	2	4	4	2	0	0	0	0	2	2	9	2	0	3
C. Operational Phase																	
Hospital Operations	0	4	4	4	8	0	0	6	6	2	2	6	6	4	2	2	6
Waste Management (incl. biomedical)	4	4	2	6	0	2	2	2	4	0	0	6	2	4	2	0	2
Energy Systems Operation (Grid+Solar)	0	2	2	0	2	0	0	0	0	2	0	0	0	0	2	0	2
Drainage and Sanitation facilities	0	2	0	4	2	0	0	2	4	2	0	2	2	0	2	0	6
Building Maintenance	2	4	4	2	4	2	0	0	4	0	0	6	2	4	2	0	4

Positive Impact Score	Impact Significance	Adverse Impact Score
0	Negligible	0
2 to 4	Low	2 to 4
5 to 8	Medium	5 to 8
9 to 12	High	9 to 12
>12	Very High	>12

IMPACT EVALUATION MATRIX - DHQ CHARSADDA																	
Project Component	Physical Environment					Ecological Environment		Social Environment									
	Soil	Air Quality	Noise	Water Quality	Waste Generation	Vegetation	Urban Fauna	Community Health and Safety	Patient Safety and Infection Risk	Healthcare Service Continuity	Access and Mobility	Labor and Working Conditions	Gender and Vulnerable Groups	Traffic Management and parking	Employment	Security	Health Service Quality
A. Pre-Construction Phase																	
Topographic Survey	0	0	2	0	0	0	0	0	2	0	0	0	0	0	2	0	0
Utility Mapping	0	0	2	0	0	0	0	0	2	0	0	0	0	0	2	0	0
Site Clearance	0	0	1	0	0	0	2	4	4	2	2	0	2	0	2	2	0
B. Construction Phase																	
Construction Camps & Workshops	4	4	6	4	6	2	4	2	6	4	6	8	4	8	6	4	2
Demolition Works	5	8	12	4	8	0	0	0	8	2	6	6	2	4	2	0	2
Material Transport, Storage and Handling	4	8	8	4	6	2	0	0	6	2	6	4	2	8	2	0	2
Structural & Civil Works	6	8	9	4	8	0	0	0	8	2	6	6	4	4	2	0	3
Drainage & Utilities	6	6	6	4	6	0	0	0	4	2	4	6	2	6	2	0	4
Landscaping	0	0	2	2	4	4	2	0	0	0	0	2	2	2	2	0	3
C. Operational Phase																	
Hospital Operations	0	4	4	4	8	0	0	9	9	2	2	4	6	4	2	2	9
Waste Management (incl. biomedical)	4	4	2	6	0	2	2	2	4	0	0	4	2	4	2	0	2
Energy Systems Operation (Grid+Solar)	0	2	2	0	2	0	0	0	0	2	0	0	0	0	2	0	2
Drainage and Sanitation facilities	0	2	0	4	2	0	0	2	4	2	0	2	2	0	2	0	6
Building Maintenance	2	4	4	2	4	2	0	0	4	0	0	6	2	4	2	0	4

Positive Impact Score	Impact Significance	Adverse Impact Score
0	Negligible	0
2 to 4	Low	2 to 4
5 to 8	Medium	5 to 8
9 to 12	High	9 to 12
>12	Very High	>12

IMPACT EVALUATION MATRIX - DHQ KARAK																	
Project Component	Physical Environment					Ecological Environment		Social Environment									
	Soil	Air Quality	Noise	Water Quality	Waste Generation	Vegetation	Urban Fauna	Community Health and Safety	Patient Safety and Infection Risk	Healthcare Service Continuity	Access and Mobility	Labor and Working Conditions	Gender and Vulnerable Groups	Traffic Management and parking	Employment	Security	Health Service Quality
A. Pre-Construction Phase																	
Topographic Survey	0	0	2	0	0	0	0	0	2	0	0	0	0	0	2	0	0
Utility Mapping	0	0	2	0	0	0	0	0	2	0	0	0	0	0	2	0	0
Site Clearance	0	0	1	0	0	0	2	4	4	2	2	0	2	0	2	2	0
B. Construction Phase																	
Construction Camps & Workshops	4	4	6	4	6	2	4	2	6	6	4	6	4	6	6	4	2
Demolition Works	5	8	12	4	8	0	0	0	8	6	4	6	2	6	2	0	2
Material Transport, Storage and Handling	4	8	8	4	6	2	0	0	6	6	4	4	2	6	2	0	2
Structural & Civil Works	6	8	9	4	8	0	0	0	8	6	4	6	4	6	2	0	3
Drainage & Utilities	6	6	6	4	6	0	0	0	4	6	4	6	2	6	2	0	4
Landscaping	0	0	2	2	4	4	2	0	0	0	0	2	2	2	2	0	3
C. Operational Phase																	
Hospital Operations	0	4	4	4	8	0	0	9	9	2	2	4	6	4	2	2	9
Waste Management (incl. biomedical)	4	4	2	6	0	2	2	2	4	0	0	4	2	4	2	0	2
Energy Systems Operation (Grid+Solar)	0	2	2	0	2	0	0	0	0	2	0	0	0	0	2	0	2
Drainage and Sanitation facilities	0	2	0	4	2	0	0	2	4	2	0	2	2	0	2	0	6
Building Maintenance	2	4	4	2	4	2	0	0	4	0	0	6	2	4	2	0	4

Positive Impact Score	Impact Significance	Adverse Impact Score
0	Negligible	0
2 to 4	Low	2 to 4
5 to 8	Medium	5 to 8
9 to 12	High	9 to 12
>12	Very High	>12

IMPACT EVALUATION MATRIX - DHQ HARIPUR																	
Project Component	Physical Environment					Ecological Environment		Social Environment									
	Soil	Air Quality	Noise	Water Quality	Waste Generation	Vegetation	Urban Fauna	Community Health and Safety	Patient Safety and Infection Risk	Healthcare Service Continuity	Access and Mobility	Labor and Working Conditions	Gender and Vulnerable Groups	Traffic Management and parking	Employment	Security	Health Service Quality
A. Pre-Construction Phase																	
Topographic Survey	0	0	2	0	0	0	0	0	2	0	0	0	0	0	2	0	0
Utility Mapping	0	0	2	0	0	0	0	0	2	0	0	0	0	0	2	0	0
Site Clearance	0	0	1	0	0	0	2	4	4	2	2	0	2	0	2	2	0
B. Construction Phase																	
Construction Camps & Workshops	4	4	6	4	6	2	4	2	6	4	4	6	4	6	6	4	2
Demolition Works	5	8	12	4	8	0	0	0	8	2	4	6	2	6	2	0	2
Material Transport, Storage and Handling	4	8	8	4	6	2	0	0	6	2	4	4	2	8	2	0	2
Structural & Civil Works	6	8	9	4	8	0	0	0	8	2	4	6	4	6	2	0	3
Drainage & Utilities	6	6	6	4	6	0	0	0	4	2	4	6	2	6	2	0	4
Landscaping	0	0	2	2	4	4	2	0	0	0	0	2	2	2	2	0	3
C. Operational Phase																	
Hospital Operations	0	4	4	4	8	0	0	9	9	2	2	4	6	4	2	2	9
Waste Management (incl. biomedical)	4	4	2	6	0	2	2	2	4	0	0	4	2	4	2	0	2
Energy Systems Operation (Grid+Solar)	0	2	2	0	2	0	0	0	0	2	0	0	0	0	2	0	2
Drainage and Sanitation facilities	0	2	0	4	2	0	0	2	4	2	0	2	2	0	2	0	6
Building Maintenance	2	4	4	2	4	2	0	0	4	0	0	6	2	4	2	0	4

Positive Impact Score	Impact Significance	Adverse Impact Score
0	Negligible	0
2 to 4	Low	2 to 4
5 to 8	Medium	5 to 8
9 to 12	High	9 to 12
>12	Very High	>12

IMPACT EVALUATION MATRIX - DHQ ABBOTTABAD																	
Project Component	Physical Environment					Ecological Environment		Social Environment									
	Soil	Air Quality	Noise	Water Quality	Waste Generation	Vegetation	Urban Fauna	Community Health and Safety	Patient Safety and Infection Risk	Healthcare Service Continuity	Access and Mobility	Labor and Working Conditions	Gender and Vulnerable Groups	Traffic Management and parking	Employment	Security	Health Service Quality
A. Pre-Construction Phase																	
Topographic Survey	0	0	2	0	0	0	0	0	2	0	0	0	0	0	2	0	0
Utility Mapping	0	0	2	0	0	0	0	0	2	0	0	0	0	0	2	0	0
Site Clearance	0	0	1	0	0	0	2	4	4	2	2	0	2	0	2	2	0
B. Construction Phase																	
Construction Camps & Workshops	4	4	6	4	6	2	4	2	6	4	8	6	4	8	6	4	2
Demolition Works	5	8	12	4	8	0	0	0	8	2	8	6	2	9	2	0	2
Material Transport, Storage and Handling	4	8	8	4	6	2	0	0	6	2	8	4	2	8	2	0	2
Structural & Civil Works	6	8	9	4	8	0	0	0	8	2	8	6	4	9	2	0	3
Drainage & Utilities	6	6	6	4	6	0	0	0	4	2	8	6	2	8	2	0	4
Landscaping	0	0	2	2	4	4	2	0	0	0	0	2	2	2	2	0	3
C. Operational Phase																	
Hospital Operations	0	4	4	4	8	0	0	9	9	2	2	4	6	4	2	2	9
Waste Management (incl. biomedical)	4	4	2	6	0	2	2	2	4	0	0	4	2	4	2	0	2
Energy Systems Operation (Grid+Solar)	0	2	2	0	2	0	0	0	0	2	0	0	0	0	2	0	2
Drainage and Sanitation facilities	0	2	0	4	2	0	0	2	4	2	0	2	2	0	2	0	6
Building Maintenance	2	4	4	2	4	2	0	0	4	0	0	6	2	4	2	0	4

Positive Impact Score	Impact Significance	Adverse Impact Score
0	Negligible	0
2 to 4	Low	2 to 4
5 to 8	Medium	5 to 8
9 to 12	High	9 to 12
>12	Very High	>12

ANNEXURE-VII: RESOURCE CONSERVATION PLAN

RESOURCES CONSERVATION PLAN

1. INTRODUCTION

The most of the resources in this world are finite and non-renewable in nature. We are completely dependent on these resources to fulfill all our daily requirements. Therefore, sustainable development calls for the need to conserve resources in a way that meet our needs of present generation as well as future generation, especially the non-renewable resources.

2. OBJECTIVE OF THE PLAN

The Resources Conservation Plan is intended to make an effort towards achievingsustainable development. The objective of the resources conservation plan is to:

- Minimize the use of natural resources; and
- Mitigate and prevent pollution contaminating the natural resources.

3. PLANNING

Careful estimations of quantities of material, fuel, water and energy required directly or indirectly shall be done to avoid excessive or unnecessary wastage of these materials. In addition to this, pollution prevention strategies shall also be devised to prevent contamination of resources.

- The estimations include the following:
  - Estimation of construction material required for the project;
  - Estimation of fuel consumption for construction machinery, construction vehicles and generators;
  - Estimations of the energy requirements during all the stages of the project; and
  - Estimations of water consumption for construction activities and construction camp sites.
- Strategies shall be planned to reduce loads on the identified resources to be consumed;
- Best management practices shall be devised to control or reduce pollution resulting from theactivities during different stages of the project; and
- An inspector shall be assigned responsibility to oversee the ongoing activities to check thecompliance of the planned strategies.

4. EXECUTION OF THE PLAN

The planned strategies shall be implemented to conserve the natural resources including butnot limited to the following:

i. Material

- Material supplied shall be in conformance with the estimated quantities and excess material shallbe returned to the supplier;
- Material wastage shall be avoided by using best management practices;
- Waste produced during the project execution shall be disposed off safely to the designateddisposal sites through approved contractors; and
- Reuse of the materials shall be appreciated.

ii. Energy

- Reduce trips and optimize routes to and from the construction site for all kinds of activities;
- Regular maintenance of equipment and vehicles to avoid leaks and sustain efficient fuelconsumption;
- Switch off idle equipment and vehicles to avoid wastage of fuel;
- Minimize warm up time, unnecessary acceleration and deceleration of the construction equipmentand vehicles;
- Avoid unnecessary burning of fuel for cooking in construction camps;
- Avoid unnecessary use of heating and cooling systems during extreme weathers events;
- Construction shall start in early hours of the day to avoid heat in summers and utilization of daylight; and
- Alternate energy sources shall be considered for electricity generations during construction andoperation to conserve fossil fuel as it is non-renewable resource.

iii. Water

- Avoid using potable water for sprinkling, curing and washing of equipment and vehicles. Surfacewater or treated effluent can be used instead;
- Wastage of water should be controlled through providing proper valves and through controllingpressure of the water;
- Unnecessary equipment washings should be avoided;
- Awareness amongst workers shall be raised to conserve water and immediately report for anyleaks detected; and
- Ensure protection of canal water from contamination resulting from construction activities.

iv. Pollution

- Emissions shall be reduced and controlled as far as possible and direct discharges to air shall beavoided by strictly adhering to the mitigation measures outlined in ESIA report;
- Waste water shall not be discharged directly and must be managed as per the recommendationspresented in IEE; and
- Construction and demolition waste, and municipal solid waste shall not be dumped and burntopenly, and shall be handled according to the preventative measure given in EIA study.

5. CHECKING AND CORRECTIVE ACTIONS

The Proponent shall bind the construction contractor through contract agreement to comply with the strategies outlined in the Resources Conservation Plan. The Environmental Inspector shall monitor the daily onsite activities and shall report any issues and concerns raised in relation to Resources Conservation Plan. The inspector shall recommend adequate corrective actions to mitigate the issues raised

ANNEXURE-VIII: TRAFFIC MANAGEMENT PLAN

1. OBJECTIVES OF TMP AROUND THE PROPOSED PROJECT BUILDING

One of the prime objectives of this TMP is to ensure the safety of all the road users along the work sites, and to address the following issues:

- Safety of pedestrians, bicyclists, and motorists travelling through the construction sites;
- Protection of workers from hazards associated with moving traffic;
- Mitigation of the adverse impact on road capacity and delays to the road users;
- Maintenance of access to adjoining properties; and
- Addressing issues and concerns that may delay the implementation of the proposed Project.

2. OPERATING POLICIES FOR TMP

The following policies will help promote safe and efficient movement for all road users (motorists, bicyclists, and pedestrians, including persons with disabilities) through and around Project sites, while reasonably protecting workers and equipment:

- Make traffic safety and temporary traffic control an integral and high-priority element of Project from planning through design, construction, and maintenance;
- Inhibit traffic movement as little as possible;
- Provide clear and positive guidance to drivers, bicyclists, and pedestrians as they approach and travel through the temporary traffic routes;
- Inspect traffic control elements routinely, both day and night, and make modifications when necessary;
- Pay increased attention to roadside safety in the vicinity of temporary traffic routes;
- Train all persons that select, place, and maintain temporary traffic control devices;
- Keep the public well informed; and
- Make appropriate accommodation for abutting property owners, residents, businesses, emergency services, railroads, commercial vehicles, and transit operations.

Policy steps for the TMP are shown in **Figure 1**.

3. ANALYZE THE IMPACT DUE TO STREET AND ROAD CLOSURE

Apart from the capacity analysis, final decisions to temporary close a particular street and road and divert the traffic should involve the following steps:

- Approval from the concerned authority to use the local streets and roads as detours; Consultation with businesses, community members, residents, road users and traffic police regarding the mitigation measures necessary at the detours where the road is diverted during the construction;

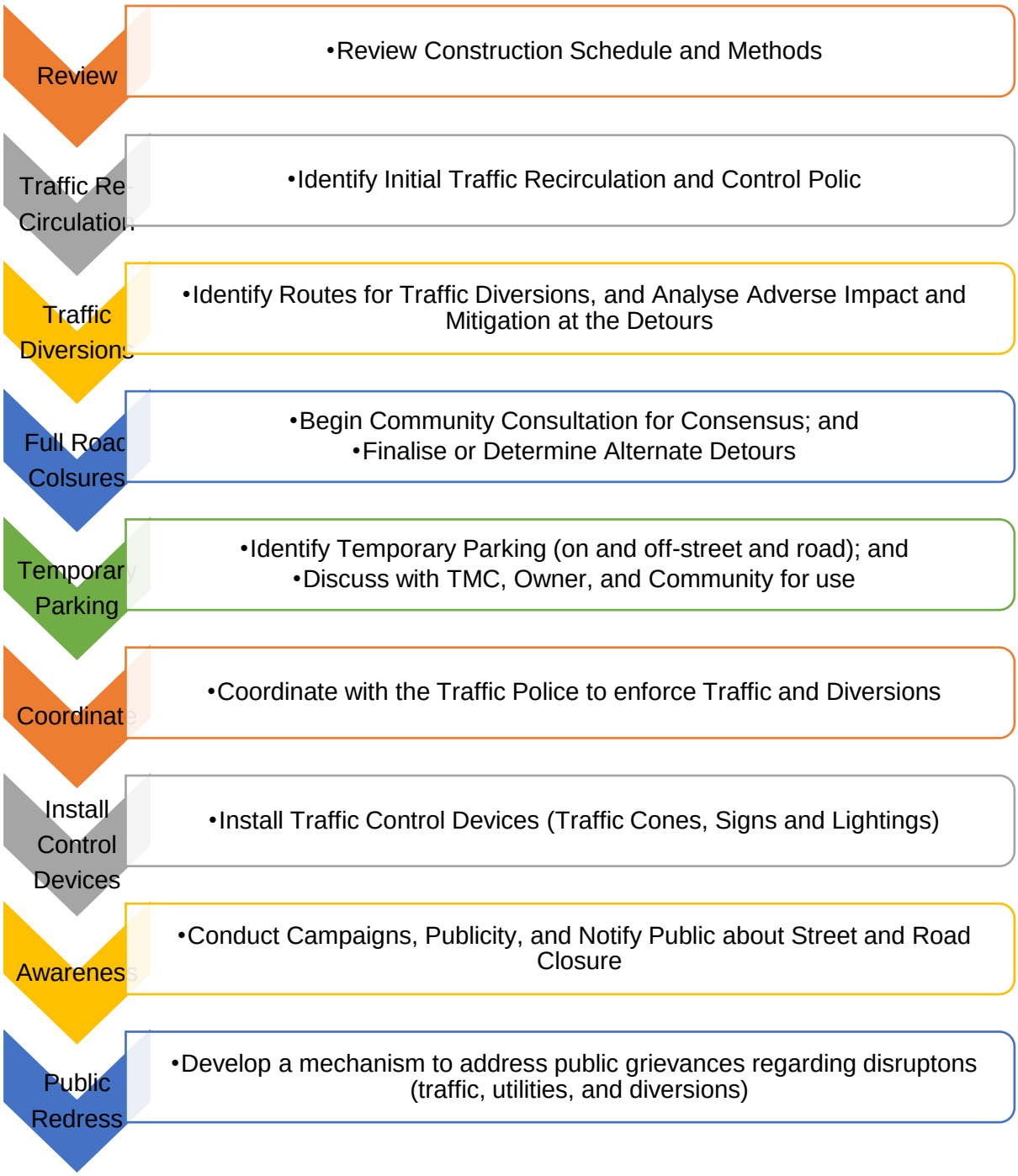


Figure 1: Policy Steps for the TMP

- Determining of the maximum number of days allowed for road closure, and incorporation of such provisions into the contract documents;
- Determining if additional traffic control or temporary improvements are needed along the detour route;
- Considering how access will be provided to the worksite;
- Contacting emergency service, school officials, and transit authorities to determine if there are impacts to their operations; and
- Publish a notice through print and electronic media about road closure to avoid hindrance to public. As part of this notice, the public should be advised of alternate routes that commuters can take or will have to take as result of the traffic diversion.

If full road-closure of certain routes within the proposed Project area is not feasible due to inadequate capacity of the Detour Street or public opposition, the full closure can be restricted to weekends with the construction commencing on Saturday night and ending on Monday morning prior to the morning peak period.

4. PUBLIC AWARENESS AND NOTIFICATIONS

As per discussions in the previous sections, there will be travel delays during the construction, as is the case with most construction Projects, although on a reduced scale if utilities and traffic management are properly coordinated.

The awareness campaign and the prior notification for the public will be a continuous activity, which the Project will carry out to compensate for the traffic delays and minimize public claims as result of these problems. These activities will take place sufficiently in advance of the time, when the roadblocks or traffic diversions take place at the particular streets and roads. The reason for this is to allow sufficient time for the public and residents to understand the changes to their travel plans. The Project will notify the public about the roadblocks and traffic diversion through public notices, ward level meetings, and area level meeting with the elected representatives.

The Project Director of proposed Project, Supervision Consultant and Contractor will also conduct an awareness campaign to educate the public about the following issues:

- Traffic control devices in place at the construction sites (signs, traffic cones, and barriers);
- Defensive driving behavior along the construction sites; and
- Reduced speeds enforced at the construction sites and traffic diversions.

It may be necessary to conduct the awareness programs and campaigns on road safety during construction.

The campaign will cater to all types of target groups i.e. children, adults, disabled and drivers. In addition, the Project will publish a brochure for public information. These brochures will be widely circulated around the proposed Project area and will also be available at the Contractor's site office. The text of the brochure should be concise to be effective, with a lot of graphics. It will serve the following purpose:

- Explain why the brochure was prepared, along with a brief description of the proposed Project;
- Advise the public to expect the unexpected delays or roadblocks;
- Educate the public about the various traffic control devices and safety measures adopted at the construction sites;
- Educate the public about the safe road user behavior to emulate at the construction sites;
- Inform the public how to stay informed or where to inquire about road safety issues at the construction sites (name, telephone and mobile number of the contact person); and
- Indicate the office hours of authorized representatives.

5. INSTALL TRAFFIC CONTROL DEVICES AT THE CONSTRUCTION SITES AND TRAFFIC DIVERSION ROUTES

The purpose of installing traffic control devices at the construction sites is to delineate these areas to warn, inform, and direct the road users about a hazard ahead, and to protect them as well as the workers. As proper delineation is a key to achieve the above objective, it is important to install good traffic signs at the construction sites. The following traffic control devices are used in construction sites:

- Signs;
- Pavement Markings;
- Channelizing Devices;
- Arrow Panels; and
- Warning Lights.

Procedures for installing traffic control devices at any construction sites vary, depending on road configuration, location of the work, construction activity, duration, traffic speed and volume, and pedestrian traffic. However, regardless of where the construction takes place, all the construction sites should be cordoned off, and traffic shifted away at least with traffic cones, barricades, and temporary signs (temporary “STOP” and “GO”).

The construction sites should take into consideration, for the space required for a buffer zone between the workers and the traffic (lateral and longitudinal), and the transition space required for delineation, as applicable. For the construction works, a 30 centimeter clearance between the traffic and the temporary STOP and GO signs should be provided. In addition, at least 60 centimeters is necessary to install the temporary traffic signs and cones.

Traffic police should regulate traffic away from the construction sites and enforce the traffic diversion outcome from full street closure in certain areas during construction. Flaggers and personnel should be equipped with reflective jackets at all times and have traffic control batons (preferably the LED type) for regulating the traffic during night time.

In addition to the delineation devices, all the construction workers should wear fluorescent safety vests and helmets in order to be visible to the motorists at all times. There should be provision for lighting beacons and illumination for night constructions.

6. SITE WORKERS TRAFFIC

Site personnel should not be permitted to park vehicles right on the road; this will lead to disruption in material deliveries. Designated parking areas with appropriate parking space will be needed for this purpose; any plain area near construction site can be used for this purpose.

7. SITE RULES

- Access to and from the site must be only via the specified entrance;
- On leaving the site, vehicles must be directed to follow the directions given;
- Drivers must adhere to the site speed limits;
- All material deliveries to site must keep allocated time limits;

- No material or rubbish should be left in the loading-unloading area;
- Develop a map for alternate routes showing material delivery services;
- Assign designated personnel on site to receive deliveries and to direct the vehicles;
- Monitor vehicle movement to reduce the likelihood of queuing or causing congestion in and around the area; and
- Project vehicles should have a unanimous badge or logo on windscreen displaying that they belong to the Project.

8. CONTRACTOR'S OBLIGATION

The traffic management plan of the Contractor should be safe enough and widening of any access roads and construction of the detours (as applicable and practical) must be completed prior to start of project construction activities so that heavy vehicular transportation for construction activities do not hinder the normal course of traffic lanes. Contractor must ensure that road closures are carried out by a competent person. The Contractor obligation must include the display of traffic signs according to the need to divert the traffic volume and to guide the road users in advance. The traffic sign, traffic light should be placed from any diverting route or road marking.

The Contractor should consider the environmental and social impacts of the traffic during construction. It will be sole responsibility of the Contractor to implement a plan, which produces minimum nuisance to the local people and to the environment. Safety of the people will be given due importance. It will be under Contractor obligation to notify the traffic management plan and its later changes to Proponent, Supervisory Consultant and Traffic Police, and publish weekly programme in the local newspaper.

ANNEXURE-IX: SANITATION PLAN

1. INTRODUCTION

This plan outlines the measures that can improve conditions of sanitation at construction sites during construction and operation phase.

2. PURPOSE OF THE PLAN

The plan intends to ensure sanitation including the control of water supplies, excrete and wastewater disposal, refuse disposal, vectors of diseases, housing conditions, food supplies and handling, atmospheric conditions and the safety of the working environment.

3. MANAGEMENT OF SANITATION DURING CONSTRUCTION PHASE

i) Responsibility

The Health and Safety Inspector designated by construction contractor shall also inspect sanitation conditions and ensure safe working environment for workers.

ii) Location of Camp Sites

- The accommodation and ancillary facilities for labor shall be constructed and maintained to standards and scales approved by the Resident Engineer.
- The camps must be located such that the drainage from and through the camps shall not endanger any domestic or public water supply.
- All sites must be managed to avoid ditches and depressions to minimize nuisance due to stagnant water.

iii) Water Supply

An adequate and convenient water supply, approved by the appropriate health authority, will be provided in each camp for drinking, cooking, bathing and laundry purposes.

Potable water supply systems for labor camps occupants shall meet the drinking water quality standards of NEQS, 2000. In addition, the design of water system facilities shall be based on the suppliers Engineer's estimates of water demands. The drinking water must be monitored regularly for drinking water quality parameters.

At all construction camps and other workplaces, good and sufficient water supply shall be provided and maintained to eliminate chances of waterborne diseases to ensure the health and hygiene of the workers.

iv) Toilet Facilities and Hygiene

According to health and safety guidelines OR-OSHA number of toilets required at construction site is as one (01) toilet for 20 workers. **Table 1** shows the number of toilets required in accordance with the number of employees at construction site. The total numbers of employees at construction sites are estimated to be 25 persons.

Table 1: Number of Toilets Required for Employees at Construction Site

No. of Employees	No. of Toilets and Urinals by OSHA	Total No. Toilets and Urinals Required at Construction Site
Up to 20 Employees	1 Toilet	2 Toilets
Up to 40 Employees	1 Urinal	2 Urinals

Within the premises of every workplace, toilets and urinals shall be provided in an accessible place, and the accommodation, separately for each of these, as per standards prevailing in the province and country.

Toilet facilities adequate for the capacity of the camp must be provided. Each toilet room must be located, so as to be accessible.

A toilet room must be located within 200 feet of the camp. No toilet may be closer than 100 feet to kitchen and sleeping area.

These toilets must be distinctly marked by signs printed in native language of the persons occupying the camp, or marked with easily understood pictures or symbols.

Urinals troughs in privies must drain freely into the pit or vault, and the construction of this drain must be such as to exclude flies and rodents from the pit.

Proper facility for hand washing and other cleaning activities to be provided as follows:

- Provide individual hand towels from a sanitary dispenser and receptacles for disposing of waste towels;
- Providing hand soap and industrial hand cleaner for removing paints and other contaminants;
- Prohibited use of gasoline or solvent for hand washing; and
- Keep the floor of facilities dry to prevent spills and falls.

v) Waste Disposal

The sewage system for the camp must be designed, built and operated in compliance with the relevant legislation so that no health hazard occurs and no pollution to the air, ground or adjacent watercourse takes place.

Garbage bins must be provided in the camps and regularly emptied and the garbage disposed of in a hygienic manner.

Unless otherwise arranged for by the local sanitary authority, arrangement for disposal of excreta should be done in the already existing sewerage system in the area.

On completion of the works, all such temporary structures shall be cleared away, all rubbish burnt, excreta tank and other disposal pits or trenches filled in and effectively sealed off and the outline site left clean and tidy, at the Contractor's expense, to the entire satisfaction of the engineer.

vi) Maintenance of Sanitary Facility

Proper maintenance of toilets and other sanitary facilities should assure by health and safety inspector. Toilets and other sanitary facilities shall be cleaned at least four times daily and at least twice during working hours and kept in a strict sanitary condition. Receptacles shall be tarred inside and outside at least once a year.

All buildings, rooms and equipment and the grounds surrounding them shall be maintained in a clean and operable condition, and be protected from rubbish accumulation.

All necessary means shall be employed to eliminate and control any infestations of insects and rodents within all parts of any labor camp.

4. MANAGEMENT OF SANITATION DURING OPERATIONAL PHASE:

A proper sanitation plan is to be adopted for maintaining the hygienic conditions during the operational phase of the Project. These includes

- Site Clearance;
- Sewage Pipe Clearing, and
- Solid Waste Management.

i) Site Clearance

The construction contractor shall assure the clearance of construction machinery, vehicle and other equipment used during the construction period after the completion of the Project.

ii) Solid Waste Management

Municipal solid waste produced in and around the construction site will be collected and managed properly by the contractor. Waste bins will be placed in and around the construction site; regular cleaning of the construction site shall be carried out using mechanical sweepers and at least two (02) to four (04) sweepers will be deputed for the proposed Project to assure regular cleaning.

iii) Awareness and Training

A training and awareness sessions shall be conducted for workers before commencement of the Project. The implementation of sanitation plan would be more effective if the importance of hygiene; sanitation and safety are known to the workers.

ANNEXURE-X: WASTE MANAGEMENT PLAN

CONSTRUCTION WASTE MANAGEMENT PLAN

Construction waste material consists mainly of concrete, masonry, limestone, sandstone, metal, and wood, depending on the construction type. In building waste, a larger percentage of paper, plastic, etc. expected due to packaging materials and the wood retired from formwork and scaffolding. This is in addition to significant amounts of concrete, masonry and metal materials.

1. ORIGINS AND CAUSES OF CONSTRUCTION WASTE

ORIGINS OF WASTE	CAUSES OF WASTE
Contractual	▪ Errors in contract documents; and ▪ Contract documents incomplete at commencement of construction.
Design	▪ Design changes; ▪ Design and detailing complexity; ▪ Design and construction detail errors; ▪ Unclear/unsuitable specification; and ▪ Poor coordination and communication (late information, last minute Client requirements, slow drawing revision and distribution).
Procurement	▪ Ordering errors (i.e., ordering items not in compliance with specification); ▪ Over allowances (i.e., difficulties to order small quantities); and ▪ Supplier errors.
Transportation	▪ Damage during transportation; ▪ Difficulties for delivery vehicles accessing construction sites; ▪ Insufficient protection during unloading; and ▪ Inefficient methods of unloading.
On-Site Management And Planning	▪ Lack of on-site waste management plans; ▪ Improper planning for required quantities; ▪ Delays in passing information on types and sizes of materials and components to be used; ▪ Lack of on-site material control; and ▪ Lack of supervision.
Material Storage	▪ Inappropriate site storage space leading to damage or deterioration; ▪ Improper storing methods; and ▪ Materials stored far away from point of application.
Material Handling	▪ Materials supplied in loose form; ▪ On-site transportation methods from storage to the point of application; and ▪ Inadequate material handling.
Site Operation	▪ Accidents due to negligence; ▪ Unused materials and products; ▪ Equipment malfunction; ▪ Poor craftsmanship; ▪ Use of wrong materials resulting in their disposal; ▪ Time pressure; and ▪ Poor work ethics.
Residual	▪ Waste from application processes (i.e., over preparation of mortar); ▪ Off-cuts from cutting materials to length; ▪ Waste from cutting uneconomical shapes; and

ORIGINS OF WASTE	CAUSES OF WASTE
	▪ Packaging.
Other	▪ Weather; ▪ Vandalism; and ▪ Theft.

2. CONSTRUCTION WASTE MANAGEMENT PLAN

a. Waste Management Goals

To establish clear goals with respect to waste management and the processes shall be employed to ensure that this goal is met. These shall include prevention of damage to materials to be incorporated into the work due to mishandling, improper storage, contamination, inadequate protection or other factors as well as minimizing poor quantity estimation, as well as through building design.

b. Responsibility

- The PMIU shall be responsible for the implementation of the administrative portions of this program, including the notification of subcontractor management, the training of the site supervisor and the onsite posting of this plan; and
- The site supervisor will be responsible for the implementation of the onsite portions of this program including the training of subcontractor personnel.

c. Waste Prevention Planning

- In addition to other requirements specified herein it is a requirement for the work of this Project that the contractor comply with the applicable city waste disposal requirements;
- Of the inevitable waste that is generated, the waste materials designated in this specification shall be salvaged for reuse and or recycling where practical and possible;
- Project Construction Documents: The General Contractor will contractually require all subcontractors to comply with these recycling guidelines. A copy of this “Construction Waste Management Plan” will accompany all subcontractor agreements and require subcontractor participation; and
- The “Construction Waste Management Plan” shall be implemented and executed as follows and as on the chart:
    - Salvageable materials will be diverted from disposal where feasible;
    - There will be a designated area on the construction site reserved for materials that can be recycled;
    - Areas shall be marked to designate what recycle materials are to be stored there; and
    - Hazardous waste will be managed by a licensed hazardous waste vendor.

d. Communication & Education Plan

- This Construction Waste Management Plan will be posted onsite;
- Each subcontractor will be made aware of the intent of this Project with respect to reduction of waste and recycling;
- Onsite recycling containers and/or areas will be plainly marked;

- The subcontractor will be expected to make sure all their crews comply with the Waste Management Plan;
- All recycling containers/areas will be clearly marked;
- Lists of acceptable/unacceptable materials will be posted at the site; and
- All subcontractors will be informed in writing of the importance of non-contamination with other materials or trash.

e. Motivation Plan

The General Contractor will conduct a pre-award meeting for subcontractors. Subcontractors under consideration will be required to attend the meeting to review Project goals and requirements with the Project team. Attendance will be a prerequisite for award of subcontracts. This document will be an attachment to every subcontract. Copies of the attachment will be posted prominently at the job site.

f. Expected Project Waste, Disposal, and Handling

The following chart identifies waste materials expected on this Project, their expected disposal methods and handling procedures. New items may be added as needed.

Material	Disposal Method	Handling Procedure
Land Clearing Debris	Keep separate for reuse and or wood sale. Separate topsoil and rock for future landscaping use.	Keep separated in designated areas onsite.
Clean Dimensional Wood and Palette Wood	Keep separate for reuse by on-site construction or by site employees for either heating stoves or reuse in home projects. May be offered to public.	Keep separated in designated areas onsite.
Plywood, OSB and Particle Board	Reuse onsite when possible, landfill or recycle off site.	Keep separated in designated areas onsite. Place in "Trash" container.
Painted or Treated Wood	Reuse, off site recycle and landfill.	Keep separated in designated areas onsite. Place in "Trash" container.
Concrete	Recycle when possible.	Keep separated in designated areas onsite.
Concrete Masonry Units	Keep separate for re-use by on-site construction or by site employees.	Keep separated in designated areas onsite.
Metals	Recycle off site when possible. Separate copper wire when possible.	Keep separated in designated areas onsite. Place in "Metals" container.
Paint	Reuse onsite.	Keep separated in designated areas onsite.
Insulation	Reuse and landfill.	Keep separated in designated areas onsite.

Material	Disposal Method	Handling Procedure
Flooring	Reuse and landfill.	Keep separated in designated areas onsite.
Carpet and Pad	Reuse or recycle with carpet manufacturer.	Keep separated in designated areas onsite.
Glass	Glass Bottles: recycle locally.	Keep separated in designated areas onsite.
Plastics	Plastic Bottles: recycle locally; be aware of plastics that are acceptable to recycle facility.	Keep separated in designated areas onsite.
Beverage	Recycle locally	Keep separated in designated areas onsite.
Cardboard	Recycle locally	Keep separated in designated areas onsite.
Paper and Newsprint	Recycle locally	Keep separated in designated areas onsite.

3. WASTE DISPOSAL COMPANY

The contractor shall engage a licensed waste transporter and disposal facility, where required, in accordance with applicable regulatory requirements. Details of the proposed waste disposal company, including contact information and relevant licenses/authorizations, shall be submitted to the PMIU/Supervision Consultant (SC) for review and approval prior to mobilization. Waste transfer records/manifests shall be maintained for all off-site waste disposal.

4. RECYCLE HAULER

Recyclable materials shall be transported by a licensed recycling contractor or authorized recycler, where applicable. If recyclable materials are transported directly by the contractor/builder, they shall be delivered only to authorized recycling facilities. Details of the recycler/hauler and contact information shall be submitted to the PMIU/SC prior to mobilization, and records of recycled materials shall be maintained.

5. POSSIBLE RECYCLE LOCATIONS AND ACCEPTABLE MATERIALS

- Coordinate with companies which are registered with local Municipality that accept materials for recycle; and
- Using the above as a resource, a list will be kept indicating local opportunities for recycle of expected materials. New locations shall be added as needed.

ANEEXURE-XI: SERVICE CONTINUITY PLAN

Service Continuity Plan (SCP)

1.1 Introduction

The Service Continuity Plan (SCP) has been developed to ensure uninterrupted delivery of essential healthcare services during the implementation of KHSSP. The objective is to minimize disruption to hospital operations while ensuring patient safety, maintaining access to critical services, and enabling coordinated execution of construction activities.

1.2 Scope of the Plan

The SCP applies to all rehabilitation-related activities within operational hospital premises, including internal refurbishment, utility upgrades, minor excavation works, and temporary relocation of selected hospital units. Since all works are confined within existing hospital boundaries, the approach emphasizes phased execution, careful planning, and continuous coordination with hospital administration to maintain service delivery.

1.3 Continuity of Critical Healthcare Services

Critical services shall remain operational through hospital-specific phasing, approved temporary relocation arrangements, emergency access plans, backup utilities, infectioncontrol barriers, and prior communication with hospital administration.

(i) Phased Implementation and Work Scheduling

Rehabilitation works will be executed in small, manageable phases to avoid simultaneous disruption of multiple departments. High-impact activities such as demolition, drilling, and heavy equipment operation will be scheduled during off-peak hospital hours.

(ii) Temporary Relocation of Hospital Units

Where necessary, selected hospital units will be temporarily relocated within available spaces such as vacant rooms or designated temporary areas. These arrangements will be made in coordination with hospital administration and will use temporary partitions or modular setups. All relocations will be clearly communicated to hospital staff, patients, and visitors to ensure continuity and avoid confusion.

1.4 Emergency Access and Internal Traffic Management

Emergency access routes and ambulance movement will remain fully functional at all times. Temporary diversions, where required, will be clearly identified and communicated. Traffic management measures will include segregation of construction and hospital traffic, installation of signage, and deployment of personnel at key locations to ensure safe and uninterrupted movement within hospital premises.

1.5 Utility Continuity

Continuous availability of essential utilities including electricity, water supply, sewerage, and medical gas systems will be ensured throughout the construction period. Any unavoidable interruptions will be planned in advance, approved by hospital administration, and executed within the shortest possible duration with appropriate backup arrangements.

1.6 Patient, Staff, and Visitor Movement

Safe and clearly marked pathways will be maintained for patients, staff, and visitors throughout the project. Temporary access routes will be installed where required, along with protective barriers separating construction zones from operational hospital areas. Signage and directional information will be provided to minimize disruption and ensure safe navigation.

1.7 Infection Prevention and Control (IPC)

Strict infection prevention and control measures will be implemented to safeguard patients and healthcare staff. Construction zones will be physically isolated, dust control measures will be applied, and access to sensitive areas such as ICUs and OTs will be strictly controlled in accordance with hospital IPC protocols.

1.8 Coordination, Communication, and Stakeholder Engagement

Continuous coordination will be maintained between the contractor, supervision consultant, and hospital administration. Regular meetings will be held to plan activities, resolve operational issues, and monitor service continuity. Advance communication regarding relocations, access changes, or temporary disruptions will be provided through signage, staff briefings, and institutional communication channels.

1.9 Grievance Redress Mechanism

A site-specific grievance redress mechanism will be established at each hospital to address concerns from patients, staff, and visitors. A designated focal person or Community Liaison Officer will manage complaints, ensure timely resolution, and escalate issues where necessary.

1.10 Monitoring and Compliance

Regular monitoring will be conducted to ensure effective implementation of the SCP. This will include daily coordination with hospital management, periodic inspections of access routes and service areas, and documentation of incidents, complaints, and corrective actions.

1.11 Restoration and Post-Construction Activities

Upon completion of rehabilitation works, all temporary arrangements will be dismantled and affected areas will be restored to their original or improved condition. Relocated hospital units will be shifted back to their designated locations in coordination with hospital administration, followed by final inspection and formal approval.

1.12 Conclusion

The implementation of this Service Continuity Plan will ensure that rehabilitation activities are executed in a controlled, phased, and coordinated manner, minimizing disruption to healthcare services. With effective planning and continuous stakeholder engagement, impacts on hospital operations will remain temporary, localized, and manageable across all project sites.

ANNEXURE-XII: EMERGENCY RESPONSE PLAN

1. PURPOSE

The purpose of this Emergency Response Procedure is to provide measures and guidance for the establishment and implementation of emergency preparedness plans for the proposed Project. The aim of the Emergency Response Procedure is to:

- Ensure all personnel and visitors to the office/job sites are given the maximum protection from unforeseen events; and
- Ensure all personnel are aware of the importance of this procedure to protection of life and property.

2. EMERGENCY PREPARATION AND RESPONSE MEASURE SCOPE

The emergency management program is applied to all Project elements and intended for use throughout the Project life cycle. The following are some emergencies that will require coordinated response:

- Construction Accident;
- Road & Traffic Accident;
- Hazardous Material Spills;
- Structure Collapse or Failure;
- Trauma or Serious Illness;
- Sabotage;
- Fire;
- Environmental Pollution;
- Loss of Person; and
- Community Accident.

3. RESPONSIBILITIES

The detailed roles and responsibilities of certain key members of the Emergency Response team available to assist in emergency are provided in **Table 1** below.

Table 1: Emergency Response Team

Action Group	Responsibility
Emergency Coordinator	▪ Overall control of personnel and resources. ▪ The Emergency Coordinator will support and advise the Site Safety Supervision as necessary. ▪ Serves as public relations spokes persons, or delegates to some staff member the responsibility for working with news media regarding any disaster or emergency. Also assure proper coordination of news release with appropriate corporate staff or other designated people.
Site Safety Supervision (Emergency Commander)	▪ Overall responsibility for activating emergency plan and for terminating emergency actions. ▪ Be alternative of emergency response chairpersons. ▪ Disseminates warnings and information as required to ensure all people in the immediate area have been warned and evacuated either by alarms or by word of mouth. ▪ Supervise the actions of the Emergency Response Team to ensure all persons are safe from the danger. ▪ Notify outside authorities if assistance is required.

Action Group	Responsibility
	▪ Carries the responsibility for coordinating actions including other organizations in accordance with the needs of the situation. ▪ Ensure maximum co-operation and assistance is provided to any outside groups called to respond to an emergency. ▪ Establish and appoint all emergency organization structure and team. ▪ Assures adequate delegation of responsibilities for all key positions of assistants on the Project to assist with any foreseeable emergency. ▪ Ensure resources available to purchase needed emergency response equipment and supplies. ▪ Assures that all persons on the Emergency Response Team aware and fully understand their individual responsibilities for implementing and supporting the emergency plan. ▪ Establish the emergency drill schedule of all identified emergency scenarios, track the status and evaluate the emergency. ▪ The Emergency Commander shall ensure that senior management personnel have been reported of the emergency as soon as practical after the event.
Security Team	▪ Ensure that the exit route is regularly tested and maintained in good working order. ▪ Maintain station at the security gate or most suitable location to secure the area during any emergency such that only authorized personnel and equipment will enter, prevent access to the site of unauthorized personnel. ▪ Assist with strong/activation of services during an emergency. ▪ Ensure vehicles and obstructions are moved to give incoming emergency vehicles access to the scene, if ambulance or emergency services are attending the site, ensure clear access and personnel are located to direct any incoming emergency service to the site of emergency.
Rescue & Medical Team	▪ Protect the injured from further danger and weather. ▪ Provide treatment to the victim(s) to the best of their ability by first aid and then transfer to hospital. ▪ Remain familiar with the rescue activities and rescue apparatus. ▪ Assist outside medical services personnel when they arrive
General Administration Team	Response to support any requested general facilities for assisting Emergency Response Team in their work.
Government Relation Team	▪ Coordinate with local government on a matter of concerned in the emergency response plan to liaise with local officers in their affair for support Emergency Response Team. ▪ Coordinate emergency plan with the government authorities, local community.
Environment Team	In case of emergency related to the environmental pollution such as the chemical spill, oil spill into the ambient, the environment team will support the technical advice to control and mitigate the pollution until return to the normal situation.
Department Heads	▪ Call up of personnel into the safe location for protective life and property. ▪ Take immediate and appropriate action while Emergency Response Team is being mobilized. ▪ Keep in touch with the Emergency Commander ▪ Control and supervise operators and contractors on the implementation of this procedure, with consultation with Safety Team as necessary. ▪ Provide and maintain emergency equipment of their responsible areas.
Other Staff and Employees	▪ All other staff and employees will remain at their workstations or assembly point unless directed otherwise from Emergency Response Team.

Action Group	Responsibility
	▪ Each supervisor will ensure that all members of his/her work group are accounted for and keep in touch with each of their Department Head.

4. PROCEDURE

Emergency situation and injuries to person can occur at any time or place either on Project site or elsewhere. The most two common types of emergencies on site are fire and serious accident. The emergency procedures for fire and serious accident is shown in **Figure 1** and **2** respectively.

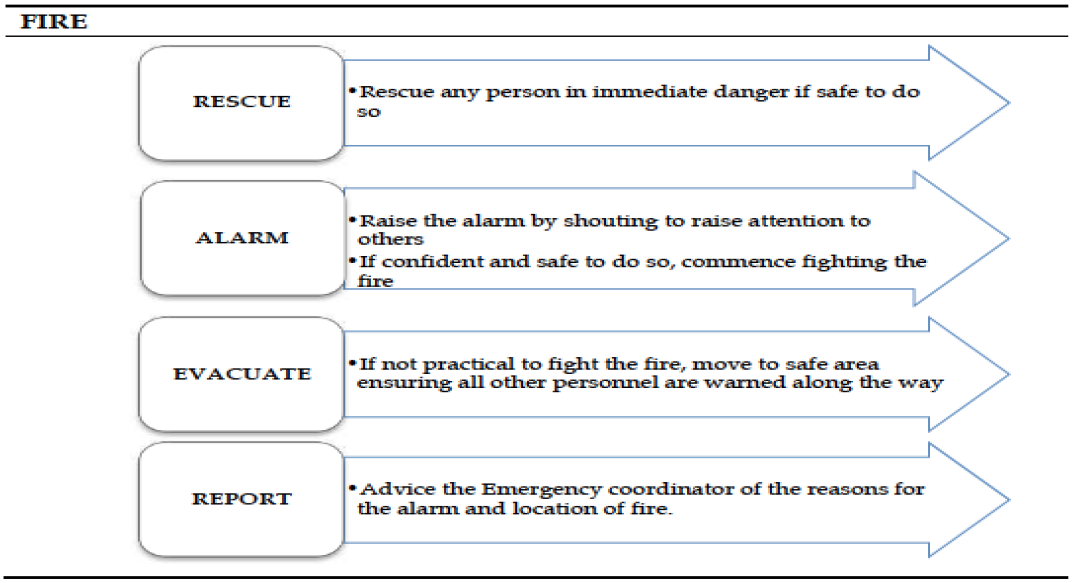


Figure 1: Emergency Procedures for Fire

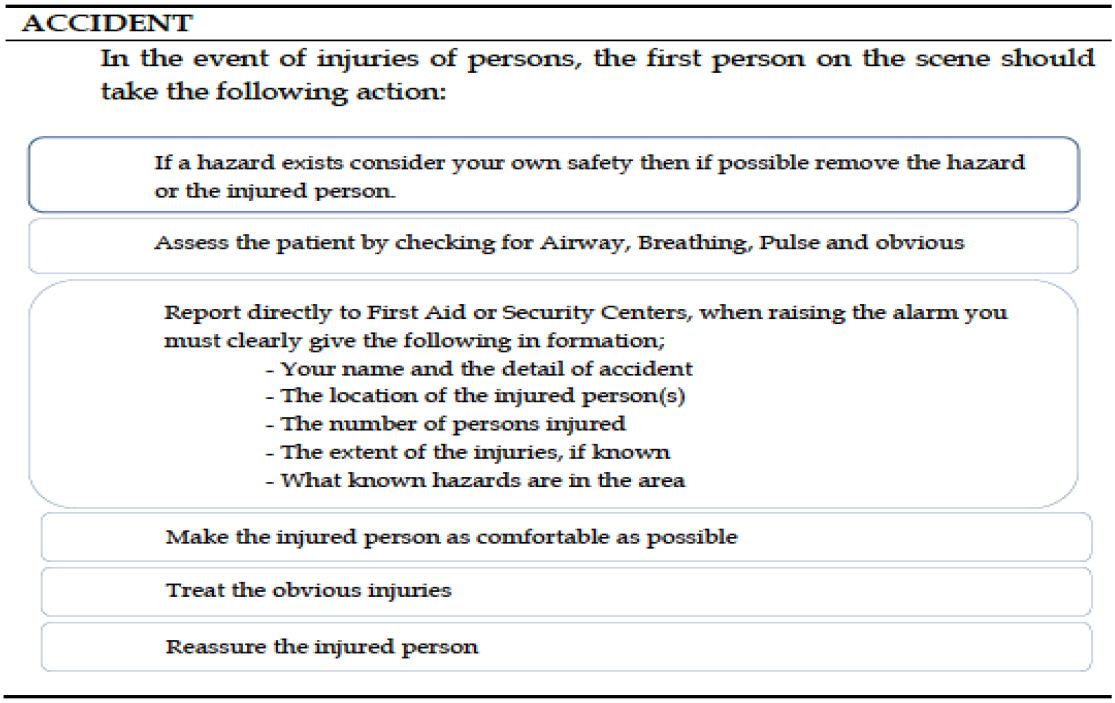


Figure 2: Emergency Procedures for Serious Accident

5. COMMUNICATION WITH AUTHORITIES / PRESS AT SITE

In the event of an accident or incident, only senior staff is permitted to give factual information to the authorities for resource of liability exposure. The press must be avoiding politely, at all costs, with the terse comment that “the matter is under investigation and relevant information when available will be provided by our Head Office”. Do not ever give your opinion or story.

6. First Aid Persons

Upon advice of medical emergency, make immediate assessment to response required and if necessary, advise security to summon ambulance or medical assistance, the qualified first aid attendant should also:

- Provide treatment to the victim(s) to the best of his/her ability;
- Ensure the safety of victims by ceasing any work activity in the area;
- Protect the injured from further danger and weather; and
- Assist medical services personnel when they arrive.
-

7. General Administration Team

Upon advice of medical emergency, maintain contact with First Aid personnel and summon ambulance if required.

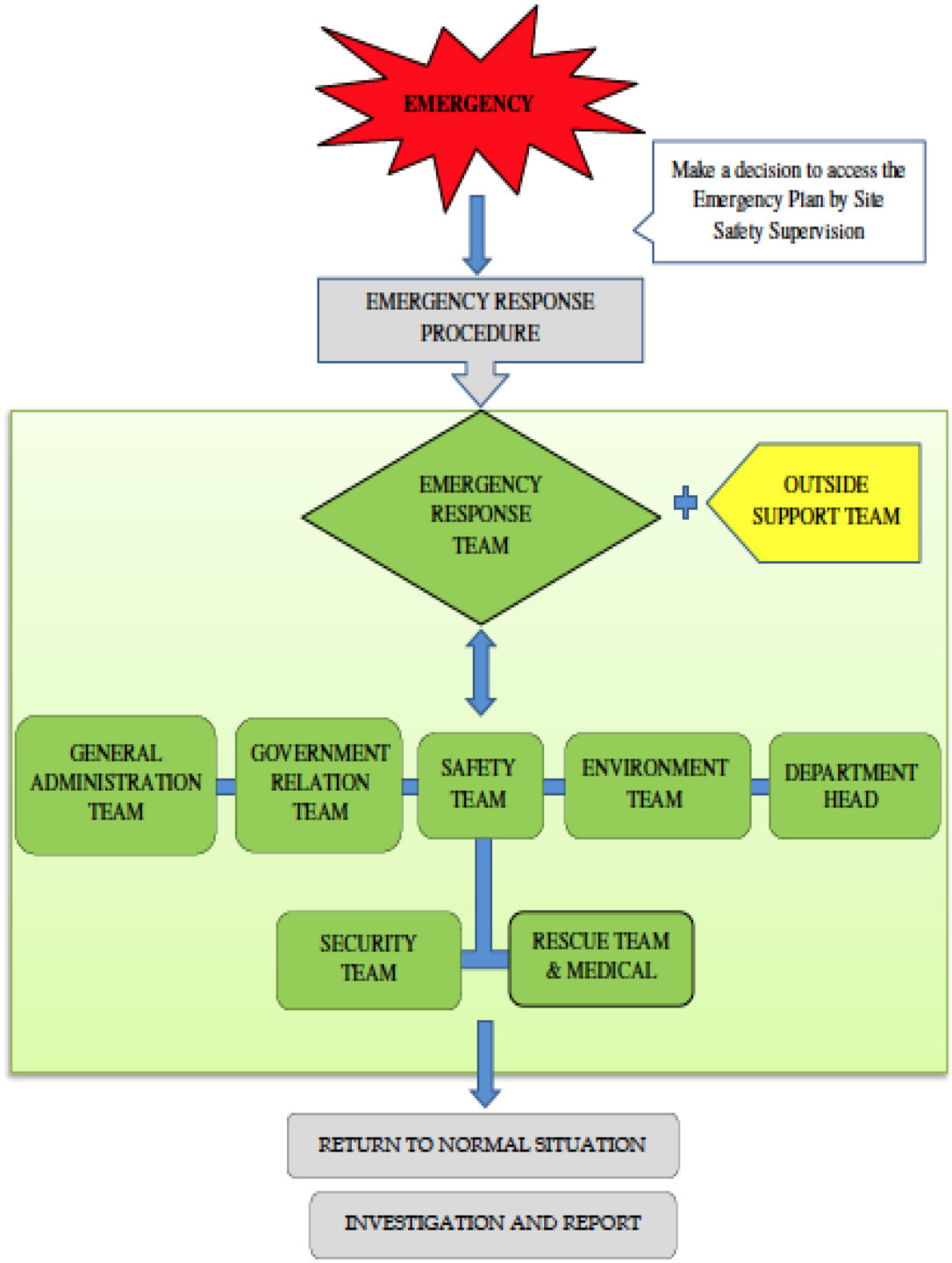
8. Security Team

- If ambulance or emergency services are attending the site, ensure clear access and personnel are located to direct vehicle closest to the scene; and
- Prevent access to the site of unauthorized personnel (press, etc.).

9. Emergency Coordinator

- The Emergency Coordinator shall assist emergency personnel at the scene as required through allocation of company resources;
- The Emergency Coordinator shall ensure next-of-kin are properly notified as soon as possible and give whatever company support and assistance is necessary to assist them bundle the situation; and
- The Emergency Coordinator shall ensure that senior management personnel are advised of the emergency as soon as practical after the event.

The emergency response procedure is shown in **Figure 3**.



Note: Name of contact person and call number from Owner/Contractor to be determined.

Figure 3: Emergency Response Procedure

10. INCIDENT AND ACCIDENT REPORT

Section A: Identification Data

Report No:	Date of Reported:	Reporter:	Sign:
Job Title:		Company Name:	

Section B: Violence Rate

Accident Violence: ☐ 01-Death ☐ 02-Serious Injury ☐ 03-Lost Time Injury ☐ 04-First Aid ☐ 05- Not Injury ☐ 06-Near Miss

Property Damage Cost: ☐ 1-2,000 USD ☐ 2,001-10,000 USD ☐ 10,001-50,000 ☐ > 50,001

Section C: Environmental Impact

Affected area	☐ Construction area	☐ Public area	
Receptor	☐ None	☐ Workers	☐ Community
Type of pollution	☐ Physical	☐ Chemical	☐ Biological
Toxicity	☐ Non-toxic	☐ Low - toxic	☐ High - toxic
Return to Normal	☐ 1 day	☐ 1 day to 1 week	☐ ≥ 1 week
Cumulative impact	☐ Non-cumulative	☐ Cumulative	

Section D: Injured/Illness Employee

1.Name:	Sex: ☐ Male ☐ Female	Date of Birth: Month / Day / Year	Age:	Regular Job Title:	Experience: In this job title (Years, Weeks) / In this Project (Years, Weeks)

Site:	Company:	Reference:	Phone No:	Social Security Number

Part of Body Injured or Affected:

☐ Head	☐ Hands	☐ Face	☐ Nose
☐ Eyes	☐ Legs	☐ Teeth	☐ Neck
☐ Trunk	☐ Toes	☐ Elbow	☐ Shoulder
☐ Back	☐ Ankle	☐ Wrist	☐ Foot
☐ Arms	☐ Thump	☐ Fingers	☐ Internal

Remark: .....

Nature of Injury or Illness:

☐ Laceration	☐ Amputation	☐ Puncture	☐ Fracture
☐ Strain & Sprain	☐ Burns	☐ Contusion	☐ Dry Heat Friction
☐ Hernia	☐ Foreign Body	☐ Chemical	☐ Contamination
☐ Skin (Occupationnel)	☐ Rash	☐ Irritation	

Remark: .....

2.Name:	Sex: ☐ Male ☐ Female	Date of Birth: Month / Day / Year	Age:	Regular Job Title:	Experience: In this job title (Years, Weeks) / In this Project (Years, Weeks)

Site:	Company:	Reference:	Phone No:	Social Security Number

Part of Body Injured or Affected:

☐ Head	☐ Hands	☐ Face	☐ Nose
☐ Eyes	☐ Legs	☐ Teeth	☐ Neck
☐ Trunk	☐ Toes	☐ Elbow	☐ Shoulder
☐ Back	☐ Ankle	☐ Wrist	☐ Foot
☐ Arms	☐ Thump	☐ Fingers	☐ Internal

Remark: .....

Nature of Injury or Illness:

☐ Laceration	☐ Amputation	☐ Puncture	☐ Fracture
☐ Strain & Sprain	☐ Burns	☐ Contusion	☐ Dry Heat Friction
☐ Hernia	☐ Foreign Body	☐ Contamination	☐ Chemical
☐ Skin (Occupationnel)	☐ Rash	☐ Irritation	

Remark: .....

Section E: Accidents/incident Details

Date Accident/Incident Occurred:	Time Accident/Incident Occurred:	Exact Location of the Accident / Incident:

Details of the actual Job Being done at the time:

Details of Accident / Incident / What actually happened?

Section F: Accident Cause (Basic cause mark X / Contributing cause, if any mark O)

	UNSAFE CONDITIONS		UNSAFE ACTS
1	☐ Inadequately Guarded	1	☐ Operating Without Authority / Training
2	☐ Unguarded	2	☐ Operating at Unsafe Speed
3	☐ Defective Tools, Equipment, or Substance	3	☐ Marking SHE Device Inoperative
4	☐ Unsafe Design or Construction	4	☐ Using Unsafe Equipment or Equipment Unsafely
5	☐ Hazardous Arrangement	5	☐ Unsafe Loading, Placing, Mixing
6	☐ Unsafe Illumination	6	☐ Taking Unsafe Position
7	☐ Unsafe Ventilation	7	☐ Working on Moving or Dangerous Equipment
8	☐ Unsafe Clothing	8	☐ Distraction, Teasing, Horse Play
9	☐ Insufficient Instruction	9	☐ Failure to use Personal Protective Devices
10	☐ Lack of system of work	10	☐ Lack of effective instruction or supervision

Why was the unsafe act committed? _____ Why did the unsafe condition exist? _____

Section G: Guide to Corrective Action (Base on the cause checked above, I am taking the following corrective action)

UNSAFE ACT	UNSAFE CONDITION	If Supervisor can't handle, then recommend to
☐ Stop the Behaviour	☐ Remove	☐ Site Engineer, or
☐ Study the job	☐ Guard	☐ Site Manager, or
☐ Instruct (tell-show-try-check)	☐ Warn	☐ Project Manager, or
☐ Follow Up	☐ Supervisory Training	☐ Safety Committee
☐ Enforce		

Detail below any immediate remedial actions that have been taken:

Detail below any corrective and preventative actions that could be taken to prevent future re-occurrence:	Responsible	Completion Date

Section H: Witness Statement	
Witness Name	**Interviewer Name**

Section I: Reviewed & Recommend by			
Recommendation:			
Reviewed By:	Position:	Signature:	Date:

Remarks : If Accident or Incident happened with lost time injury and affected to the publicity must further report to Safety Department;
: First Aid Cases will not applicable to this form;
: The accident report shall submit to Safety Department within 3 days
: Attached the photograph or sketch the location of accident / incident;

11. Suggested Contents of ERP

The Contractor should prepare the ERP based on the guidelines provided in the above sections. The suggested structure of the ERP is listed below:

1. Purpose;
2. Applicable Scope;
3. Preparation Basis;
4. Emergency Response System:
   - 4.1 Generals;
   - 4.2 Emergency Response System; and
   - 4.3 Responsibilities.
5. Major Safety Risks;
6. Precautionary Measures:
   - 6.1 Training and Exercise ;
   - 6.2 Hazard Source Monitor;
   - 6.3 Alert Action; and
   - 6.4 Management Measures.
7. Control Measures:
   - 7.1 Response;
   - 7.2 Response Procedures;
   - 7.3 Emergency Response; and
   - 7.4 Emergency Completion and Restoration.

8 Emergency Response Report and Settlement;

9 Supporting Measures:
   - 9.1 Communication;
   - 9.2 Emergency Team;

9.3 Funding for Emergency; and
9.4 Provisions and Resources.

10. Records.

ANNEXURE-XIII: CHANCE-FIND PROCEDURE

CHANCE FIND PROCEDURE

Project will involve deep excavation. Therefore, the possibility of chance find is not ignorable. In case of any chance find, the contractor will immediately report through Supervision Consultant to Deputy Secretary (Heritage) of Archeology and Museums Department, Government of Pakistan to take further suitable action to preserve those antique or sensitive remains. Representative of the Deputy Secretary (Heritage) will visit the site and observed the significance of the antique, artifact and cultural (religious) properties and significance of the Project. The report will be prepared by the representative and will be given to the Deputy Secretary (Heritage). The documentation will be completed and if required suitable action will be taken to preserve those antiques and sensitive remains.

In case any artifact, antiques and sensitive remains are discovered, chance find procedures will be adopted by contractor workers as follows:

- Stop the construction activities in the areas of chance find;
- Delineate the discovered site or area;
- Consult with the local community and Archeological Department
- The suggestion of the local communities and the concerned authorities will be suitably incorporated during taking the preventive measures to conserve the antique, artifact and cultural (religious) properties;
- Secure the site to prevent any damage or loss of removable objects. In case of removable antiquities or sensitive remain, a night guard shall be arranged until the responsible local authorities take over; and
- After stopping work, the contractor must immediately report the discovery to the Supervision Engineer.

The contact Address of Directorate General of Archeology and Museums KPK is given below:

Address	Jail Road, adjacent to Archives and libraries department, Finance Department, Civil Secretariat, Peshawar, Pakistan
Contact Number	0092-91-9211488
Fax Number	0092-91-9211194
Email Address	info.archaeology@kp.gov.pk

ANNEXURE-XIV: TREE PLANTATION PLAN

Tree Plantation Plan

Introduction

This is general Tree Planation Plan for Hospitals of the six districts in KPK. It is meant to make provision for the landscaping and trees planation in each hospital. Each site has variable space and outdoor setting. The plan gives the generic provision for each site. The choice of trees, shrubs for each site would according to the available space and site conditions.

1. Objective

The objective of the tree plantation plan is to improve the hospital environment by:

- Enhancing air quality
- Providing shade and cooling
- Reducing noise pollution
- Creating a healing and calming environment for patients and staff
- Supporting biodiversity and environmental sustainability

2. Proposed Plantation Areas

Tree plantation should be planned strategically in the following areas:

1. **Entrance and Main Gate Area**
    - Decorative and shade trees to enhance aesthetics.
2. **Parking Areas**
    - Large canopy trees for shade and heat reduction.
3. **Boundary Walls**
    - Rows of trees to act as noise and pollution barriers.
4. **Patient Garden / Healing Garden**
    - Flowering and fragrant trees for relaxation.
5. **Walkways and Internal Roads**
    - Medium-sized shade trees planted at regular intervals.
6. **Open Spaces / Vacant Land**
    - Mixed native tree species for biodiversity.

3. Recommended Tree Species

Native and low-maintenance species are recommended.

Category	Tree Species	Benefits
Shade Trees	Neem, Rain Tree, Banyan	Cooling, air purification
Flowering Trees	Gulmohar, Jacaranda, Tabebuia	Beautification
Medicinal Trees	Neem, Amla, Arjuna	Health benefits
Fragrant Trees	Champa, Mogra	Calming environment
Fruit Trees	Mango, Guava, Jamun	Biodiversity

4. Plantation Design and Spacing

- Large trees: **6–8 meters spacing**
- Medium trees: **4–6 meters spacing**
- Small ornamental trees: **3–4 meters spacing**
- Boundary plantations: **staggered double rows**

5. Implementation Plan

Step 1: Site Assessment

- Identify available spaces
- Soil testing
- Mark plantation locations

Step 2: Pit Preparation

- Pit size: **1 m × 1 m × 1 m**
- Fill with mixture of soil, compost, and organic manure.

Step 3: Plantation

- Best time: **Monsoon season**
- Plant healthy saplings (1–2 years old)

Step 4: Protection

- Install tree guards
- Mulching around base

6. Maintenance Plan

Proper maintenance ensures survival and growth.

Activity	Frequency
Watering	2–3 times per week (first year)
Weeding	Monthly
Fertilization	Twice per year
Pruning	Annually
Pest Control	As needed

7. Community Participation

- Organize **Tree Plantation Day**
- Involve doctors, staff, and patients
- Partner with local environmental groups
- Install **name plates for trees**

8. Expected Benefits

- Improved **air quality**
- Reduced **temperature and heat stress**
- Better **patient recovery environment**
- Enhanced **hospital aesthetics**
- Contribution to **climate change mitigation**

9. Estimated Cost

Rs.500,000/ for each Hosiptal

ANNEXURE-XV: GUIDELINE HSE PLAN

HEALTH, SAFETY AND ENVIRONMENT PLAN

1. GENERAL

Occupational Health and Safety covers all personnel working under the Project. The Occupational Health and Safety program will aim to ensure that the workplace is safe and healthy by: addressing the hazards and risks at the workplace; outlining the procedures and responsibilities for preventing, eliminating and minimizing the effects of those hazards and risks; identifying the emergency management plans for the workplace or workplaces; and, specifying how consultation, training and information are to be provided to employees at various workplaces.

Some of the risks/hazards associated with workplaces are due to working close to or at sites associated with the various Project construction activities. Other risks associated with the Project construction phase include risk of increase of vector borne and other different diseases.

The following sections will be implemented during the construction phase to address and ensure workers' health and safety.

2. SCREENING AND REGULAR UNANNOUNCED CHECKING OF WORKERS

As per the procedure for hiring workers, all contractors and labor agencies are required to make all prospective workers undergo medical tests to screen for diseases and sicknesses, prior to selection and employment of any worker. The contractor is also responsible for ensuring that no worker who has a criminal record is employed at the Project site. It will be ensured that all workers undergo medical tests to screen diseases at source and at sites in consultation with the designated Health Officer.

In addition to this, the Proponent will also undertake sudden, unannounced checks on workers to look for diseases such as COVID-19, HIV, STDs, and hepatitis and take necessary steps as mandated by the Contractual agreement between the Contractor and the Worker(s).

3. MINIMIZING HAZARDS AND RISKS AT THE WORKPLACE

To ensure safety at all work sites, the following will be carried out:

- Installation of signboards and symbols in risky and hazardous areas, to inform workers to be careful;
- Construction of barricades around construction sites and deep excavated pits, to cordon off and deter entry of unauthorized personnel and workers into these areas;
- Providing a safe storage site/area for large equipment such as power tools and chains, to prevent misuse and loss;
- Proper Housekeeping: Ensuring that materials are all stacked, racked, blocked, interlocked, or otherwise secured to prevent sliding, falling, or collapse. Brick stacks will not be more than seven (07) feet in height and for concrete blocks they will not be more than six (06) feet high;

- Removing all scrap timber, waste material and rubbish from the immediate work area as the work progresses;
- Where scaffolds are required, ensuring that each scaffold or its components shall be capable of supporting its own weight and at least four (04) times the maximum intended load applied or transmitted to it. The platform/scaffold plank shall be at least 15 inches wide and 1.5 inches thick. The rope should be capable of supporting at least six (06) times the maximum intended load applied or transmitted to that rope. Pole scaffolds over 60 feet in height shall be designed by a registered professional engineer and shall be constructed and loaded in accordance with that design. Where scaffolds are not provided, safety belts/safety nets shall be provided;
- Ensure that all ramps or walkways are at least six (06) feet wide, having slip resistance threads and not inclined at more than a slope of one (01) vertical and three (03) horizontal;
- Stacking away all excavated earth at least two (02) feet from the pit to avoid material such as loose rocks from falling back into the excavated area and injuring those working inside excavated sites;
- Constructing support systems, such as bracing to adjoining structures that may be endangered by excavation works nearby;
- Only a trained electrician to construct, install and repair all electrical equipment to prevent risks of electrical shocks and electrocution; and
- Install fire extinguishers and/or other fire-fighting equipment at every work site to prepare for any accidental fire hazards.

4. PROVISION OF PERSONAL PROTECTIVE EQUIPMENT

Risks to the health and safety of workers can be prevented by provision of Personal Protective Equipment (PPEs) to all workers. This will be included in the construction cost for each Contractor. Depending on the nature of work and the risks involved, contractors must provide without any cost to the workers, the following protective equipment:

- High visibility clothing for all personnel during building works must be mandatory;
- Helmet shall be provided to all workers, or visitors visiting the site, for protection of the head against impact or penetration of falling or flying objects;
- Safety belt shall be provided to workers working at heights (more than 20 ft.) such as roofing, painting, and plastering;
- Safety boots shall be provided to all workers for protection of feet from impact or penetration of falling objects on feet;
- Ear protecting devices shall be provided to all workers and will be used during the occurrence of extensive noise;
- Eye and face protection equipment shall be provided to all welders to protect against sparks;
- Respiratory protection devices shall be provided to all workers during occurrence of fumes, dusts, or toxic gas/vapor; and
- Safety nets shall be provided when workplaces are more than 25 feet (7.5 m) above the ground or other surfaces where the use of ladders, scaffolds, catch platforms, temporary floors or safety belts is impractical.

The specific PPE requirements for each type of work are summarized below.

Table 1: PPE Requirement List

Type of Work	PPE
Elevated Work	Safety helmet, safety belt (height greater than 20 ft.) and footwear for elevated work.
Handling Work Safety	Helmet, leather safety shoes and work gloves.
Welding and Cutting Work	Eye protectors, shield, helmet and protective gloves.
Grinding Work	Dust respirator, earplugs and eye protectors.
Work Involving Handling of Chemical Substances	Dust respirator, gas mask, chemical-proof gloves, chemical proof clothing, air-lined mask and eye protectors.
Wood Working	Hard hat, eye protectors, hearing protection, safety footwear, leather gloves and dust respirator.
Blasting	Hard hat, eye and hearing protection.
Concrete and Masonry Work	Hard hat, eye protectors, hearing protection, safety footwear, leather gloves and dust respirator.
Excavation, Heavy Equipment, Motor Graders, and Bulldozer Operation	Hard hat, safety boots, gloves and hearing protection.
Quarries	Hard hat, eye protectors, hearing protection, safety footwear, leather gloves and dust respirator.

5. PROCEDURES TO DEAL WITH EMERGENCIES SUCH AS ACCIDENTS, SUDDEN ILLNESS AND DEATH OF WORKERS

First Aid kits will be made available at all times throughout the entire construction period by the respective contractors. This is very important, because most work sites will be at some distance from the nearest hospital. In addition to the First Aid kits, the following measures will be in place:

- Provision of dispensaries by the contractor;
- A vehicle shall be on standby from the Project Office so that emergency transportation can be arranged to take severely injured/sick workers to the nearest hospital for immediate medical attention;
- A designated Health Officer/Worker for the Project will be identified as a focal person to attend to all health and safety related issues. This employee's contact number will be posted at all work sites for speedy delivery of emergency services. The focal person shall be well versed with the medical system and facilities available at the hospital; and
- Communication arrangements, such a provision of radios or mobile communication for all work sites, for efficient handling of emergencies, will be made.

6. RECORD MAINTENANCE AND REMEDIAL ACTION

The Contractor will maintain a record of all accidents and injuries that occur at the work site. This work will be delegated by the contractor to the site supervisor and regularly reviewed every quarter by supervisory consultant. Reports prepared by the contractor shall include information on the place, date and time of the incident, name of persons involved, cause of incident, witnesses present and their statements. Based on such reports, the supervisory consultant can jointly identify any unsafe conditions, acts or procedures and recommend for the contractor to undertake certain meditative actions to change any unsafe or harmful conditions.

7. COMPENSATION FOR INJURIES AND DEATH

Any casualty or injury resulting from occupational activities should be compensated as per the local labor laws of Pakistan. Where compensation is sought by the injured party, proper procedures for documentation of the case will be followed, including a detailed report on the accident, written reports from witnesses, report of the examining doctor and his/her recommendation for treatment. Contractor will be responsible for ensuring compensation for the respective workers.

8. AWARENESS PROGRAMS

The supervisory consultant will undertake awareness programs through posters, talks, and meetings with the contractors to undertake the following activities:

- Dissemination sessions will clarify the rights and responsibilities of the workers regarding interactions with local people (including communicable disease risks, such as HIV/AIDS, COVID-19), work site health and safety, waste management (waste separation, recycling, and composting) and the illegality of poaching; and
- Make workers aware of procedures to be followed in case of emergencies such as informing the focal health person who in turn will arrange the necessary emergency transportation or treatment.

9. NOMINATION OF A HEALTH AND SAFETY FOCAL PERSON

Within Project site, a Health and Safety Focal Person will be appointed. The Terms of Reference for the focal person will mainly be as follows:

- Function as the focal person / representative for all health and safety matters at the workplace;
- Responsible for maintaining records of all accidents and all health and safety issues at each site, the number of accidents and its cause, actions taken and remedial measures undertaken in case of safety issues;
- Be the link between the contractor and all workers and submit grievances of the workers to the contractor and instructions / directives on proper health care and safety from the contractors back to the workers;
- Ensure that all workers are adequately informed on the requirement to use Personal Protective Equipment and its correct use; and
- Ensure presence of First Aid kit at site and making sure that the basic immediate medicines are readily available.

10. SUGGESTED CONTENTS OF OCCUPATIONAL HEALTH AND SAFETY PLAN

The suggested contents of Occupational Health and Safety Plan to be developed by the Contractor(s) are described below:

- Purpose;
- Scope of Application;

- Complying Basis;
- Occupational Health and Safety Objectives;
- Organization and Responsibility:
  - Contractor's Project Manager;
  - HSE Management Department of the Contractor(s);
  - Medical Treatment Room of the Contractor(s);
  - Subcontractor's Project Manager;
  - Subcontractor's HSE Managers;
  - Occupational Health and Safety; and
  - Community Health and Safety.
- Health Plan:
  - Labor Protection; and
  - Sanitary Epidemic Prevention.
- Safety Plan:
  - Summary;
  - Qualification Review;
  - Safety Training;
  - Construction Plans and Documents;
  - Control Measures;
  - Monitoring Measures; and
  - Management of the Key Safety Accidents.
- Public Security Plan; and
- Local Community Health and Safety.

CONSTRUCTION HEALTH AND SAFETY CHECKLIST

1. GENERAL INTRODUCTION

This checklist identifies some of the hazards most commonly found on construction sites. The questions it asks are intended to help the safety supervisor decide whether the construction site is a safe and healthy place to work.

2. ACCESS ON SITE

- Can everyone get to their place of work safely?
- Are access routes free from obstructions and clearly signposted?
- Are holes protected with clearly marked and fixed covers to prevent falls?
- Are temporary structures stable, adequately braced and not overloaded?
- Will permanent structures remain stable during any refurbishment or demolition work?
- Is the site tidy, and are materials stored safely?
- Is lighting adequate, especially when work is being carried on after dark outside or inside tunnels?

3. WELFARE

- Are toilets readily available and are they kept clean and properly lit?
- Are there washbasins, hot and cold (or warm) running water, soap and towels?
- Are the washbasins large enough to wash up to the elbow and are they kept clean?

- Is there somewhere to change, dry and store clothing?
- Is there a place where workers can sit, make hot drinks and prepare food?
- Are drinking water and cups provided?
- Can everyone who needs to use them get to the welfare facilities easily and safely?

4. SCAFFOLDS

- Are scaffolds erected, altered and dismantled by competent people?
- Are all uprights provided with base plates (and where necessary, timber sole plates)?
- Are all uprights, ledgers, transoms and braces in position?
- Is the scaffold tied to the structure in enough places to prevent collapse?
- Are there double guard rails and toe boards or other suitable protection at every edge, to prevent falling?
- Are brick guards provided to prevent materials falling from scaffolds?
- Are the working platforms fully boarded and are the boards arranged to avoid tipping or tripping?
- Are there effective barriers or warning notices in place to stop people using an incomplete scaffold, e.g. where working platforms are not fully boarded?
- Is the scaffold strong enough to carry the weight of materials stored on it and are these evenly distributed?
- Does a competent person inspect the scaffold regularly, e.g. at least once a week if the working platform is two (02) meter or above in height or at suitable intervals if less than two meter (02), and always after it has been altered or damaged and following extreme weather events?
- Are the results of inspections recorded and kept?
- Have proprietary scaffolds been inspected and are they being used in accordance with suppliers' instructions?
- Have the wheels of scaffolds been locked and outriggers deployed when in use and are the platforms empty when they are moved?

5. POWERED ACCESS EQUIPMENT

- Has the equipment been installed by a competent person?
- Are the operators trained and competent?
- Is the safe working load clearly marked?
- Is the equipment inspected by a competent person?
- Does the working platform of the powered access equipment have adequate, secure guard rails and toe boards or other barriers to prevent people and materials falling off?
- Have precautions been taken to prevent people being struck by the (i) moving platform; and (ii) falling materials?

6. TRAFFIC, VEHICLES AND PLANT

- Are vehicles and pedestrians kept apart? If not, do you:
- Separate them as much as you can and use barriers?
- Tell people about the problem, and what to do about it?
- Display warning signs?

- Can zero tail swing excavators be used or is there adequate clearance around slewing vehicles?
- Can reversing be avoided, e.g. by using a one-way system, or if not, are properly trained signalers used?
- Are vehicles and plant properly maintained?
- Have drivers received proper training and are they competent for the vehicles or plant they are operating?
- Are loads properly secured?
- Have you made sure that passengers are only carried on vehicles designed to carry them?
- Have you made sure that plant and vehicles are not used on dangerous slopes?

7. CRANES

- Is the crane suitable for the job?
- Has the lift been properly planned by an 'appointed person'?
- Is the crane on a firm, level base? Are the riggers properly set?
- Who is the appointed 'crane supervisor' responsible for controlling the lifting operation on site?
- Are the crane driver and signaler trained and competent?
- Is the load secure?
- Has the signaler and slinger been trained to give signals and to attach loads correctly?
- Have you made arrangements to make sure the driver can see the load or has a signaler been provided to help?
- Are people stopped from walking or working beneath a raised load?
- Does the crane have a current report of thorough examination and record of inspection?

8. EXCAVATIONS

- Is there adequate support for the excavation, or has it been sloped or battered back to a safe angle?
- Is there a safe method used for putting in the support, without people working in an unsupported trench?
- Is there safe access into the excavation, e.g. a sufficiently long and secured ladder?
- Are there barriers or other protection to stop people and vehicles falling in?
- Are properly secured stop blocks provided to prevent tipping vehicles falling in?
- Could the excavation affect the stability of neighboring structures or services?
- Are materials, spoil and plant stored away from the edge of the excavation to reduce the chance of a collapse?
- Is the excavation regularly inspected by a competent person?

9. MANUAL HANDLING

Are there heavy materials such as concrete lintels, curbstones or bagged products which could cause problems if they have to be moved by hand? If so, can you:

- Choose lighter materials;
- Use wheelbarrows, hoists, tail handlers and other plant or equipment so that – manual lifting of heavy objects is kept to a minimum;

- Order materials such as cement and aggregates in 25 kilogram bags;
- Avoid the repetitive laying of heavy building blocks weighing more than 20 kilogram; and
- Have people been instructed and trained how to lift safely?

10. HAZARDOUS SUBSTANCES

- Have you identified all harmful substances and materials, such as asbestos, lead, solvents, paints, cement and dust?
- Have you checked whether a licensed contractor is needed to deal with asbestos on site?
- Have you identified and put into place precautions to prevent or control exposure to hazardous substances by:
  - Doing the work in a different way, to remove the risk entirely;
  - Using a less hazardous material; and
  - Using tools fitted with dust extraction?
- Have workers had information and training so they know what the risks are from the hazardous substances used and produced on site, and what they need to do to avoid the risks?
- Have you got procedures to prevent contact with wet cement (as this can cause both dermatitis and cement burns)?
- Have you arranged health surveillance for people using certain hazardous substances?

11. NOISE

- Have workers had information and training so they know what the risks are from noise on site, and what they need to do to avoid those risks?
- Have you identified and assessed workers' exposure to noise?
- Can the noise be reduced by using different working methods or selecting quieter plant, e.g. by fitting breakers and other plant or machinery with silencers?
- Are people not involved in the work kept away from the source of the noise?
- Is suitable hearing protection provided and worn in noisy areas?
- Have hearing protection zones been marked?
- Have you arranged health surveillance for people exposed to high levels of noise?

12. HAND-ARM VIBRATION

- Have workers had information and training so they know what the risks are from hand-arm vibration (HAV) on site, and what they need to do to avoid those risks?
- Have you identified and assessed risks to workers from prolonged use of vibrating tools such as concrete breakers, angle grinders or hammer drills?
- Has exposure to HAV been reduced as much as possible by selecting suitable work methods and plant?
- Are reduced-vibration tools used whenever possible?
- Have vibrating tools been properly maintained?
- Have you arranged health surveillance for people exposed to high levels of hand-arm vibration, especially when exposed for long periods?

13. ELECTRICITY AND OTHER SERVICES

- Have all necessary services been provided on site before work begins and have you also identified existing services present on site (e.g. electric cables or gas mains) and taken effective steps (if necessary) to prevent danger from them?
- Are you using low voltage for tools and equipment, e.g. battery-operated tools or low-voltage systems?
- Where mains voltage has to be used, are trip devices (e.g. residual current devices (RCDs)) provided for all equipment?
- Are RCDs checked daily by users and properly maintained?
- Are cables and leads protected from damage?
- Are all connections to the system properly made and are suitable plugs used?
- Are tools and equipment checked by users, visually examined on site and regularly inspected and tested by a competent person?
- Where there are overhead lines, has the electricity supply been turned off, or have other precautions been taken, such as providing goal posts or taped markers?
- Have hidden electricity cables and other services been located (e.g. with a locator and plans) and marked, and have you taken precautions for safe working?

14. CONFINED SPACES

- Do you work in confined spaces where there may be an inadequate supply of oxygen or the presence of poisonous or flammable gas? If so, have you taken all necessary precautions?
- Confined spaces include tanks, sewers and manholes; they do not have to look dirty to be dangerous?

15. TOOLS AND MACHINERY

- Are the right tools or machinery being used for the job?
- Are all dangerous parts guarded, e.g. gears, chains drives, projecting generator shafts?
- Are guards secured and in good repair?
- Are tools and machinery maintained in good repair and are all safety devices operating correctly?
- Are all operators trained and competent?

16. FIRES AND EMERGENCIES

General

- Are there emergency procedures, e.g. for evacuating the site in case of fire or for rescue from a confined space?
- Do people on site know what the procedures are?
- Is there a means of raising the alarm, and does it work?
- Is there a way to contact the emergency services from site?
- Are there adequate escape routes and are these kept clear?
- Is there adequate First-Aid provision?

Fire

- Is the quantity of flammable materials, liquids and gases on site kept to a minimum?
- Are they properly stored?
- Are suitable containers used for flammable liquids?
- Are flammable gas cylinders returned to a ventilated store at the end of the shift?
- Are smoking and other ignition sources banned in areas where gases or flammable liquids are stored or used?
- Are gas cylinders, associated hoses and equipment properly maintained and in good condition?
- When gas cylinders are not in use, are the valves fully closed?
- Is flammable and combustible waste removed regularly and stored in suitable bins or skips?
- Are suitable fire extinguishers provided?

17. PROTECTING THE PUBLIC

- Is the work fenced off from the public?
- Are the public protected from falling material?
- Have you provided a safe route through road works or pavement scaffolding for people with prams, wheelchair users and visually impaired people?
- When work has stopped for the day:
    - Is the boundary secure and undamaged?
    - Are all ladders removed or their rungs boarded so that they cannot be used?
    - Are excavations and openings securely covered or fenced off?
    - Is all plant immobilized to prevent unauthorized use?
    - Are bricks and materials safely stacked?
    - Are flammable or dangerous substances locked away in secure storage places?