Initial Environmental Examination

Date: July 2026

Pakistan: Khyber Pakhtunkhwa Health Systems Strengthening Program (KPHSSP)

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

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.

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	_	0.041 m^3/hr
1 Cusec	_	28.31 liters/sec
1km	–	1000m
1ft	–	12 inches
1 acre	–	4,046.8 m^2

LIST OF ABBREVIATIONS

AOI	Area of Influence
ACMs	Asbestos-Containing Materials
ADB	Asian Development Bank
AJ&K	Azad Jammu and Kashmir
AMP	Asbestos Management Plan
AIP	Access to Information Policy
AHUs	Air Handling Units
AVVSU	Area Valve Service Unit
BCP	Building Code of Pakistan
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
EHS	Environmental, Health, and Safety
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
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
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
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
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

ºC	–	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.

This Initial Environment Examination is a document of the borrower. The views expressed herein do not necessarily represent those of ADB's Board of Directors, Management, or staff, and may be preliminary in nature.

In preparing any country program or strategy, financing any project, or by making any designation of or reference to a particular territory or geographic area in this document, the Asian Development Bank does not intend to make any judgments as to the legal or other status of any territory or area.

Khyber Pakhtunkhwa Health Systems Strengthening Program

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

INITIAL ENVIRONMENTAL EXAMINATION

TABLE OF CONTENT

LIST OF TABLES ..... **XI**
LIST OF FIGURES ..... **XII**

EXECUTIVE SUMMARY **1**
1 INTRODUCTION **1-1**
1.1 PROJECT BACKGROUND 1-1
1.2 PROJECT OBJECTIVES 1-1
1.3 SCOPE OF WORK 1-1
1.4 APPROACH AND METHODOLOGY 1-2
1.5 STRUCTURE OF REPORT 1-3

2 POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK **2-1**
2.1 GENERAL 2-1
2.2 SUMMARY OF RELEVANT STRATEGIES, POLICIES, ACTS AND LEGISLATION 2-1
2.3 ASIAN DEVELOPMENT BANK REQUIREMENTS 2-10
2.3.1 ADB's Requirements for Preparation of Environmental Assessments of Projects 2-10
2.3.2 ADB's Access to Information Policy (AIP) 2018 2-11
2.3.3 ADB's Accountability Mechanism Policy 2012 2-11
2.3.4 ADB's Safeguard Policy Statement, 2009 2-11
2.3.5 Implications of ADB's safeguard policies on proposed project 2-13
2.3.6 Comparison of International and Local Environmental Legislations 2-14
2.4 INTERNATIONAL PROTOCOL / CONVENTIONS 2-18

3 DESCRIPTION OF THE PROJECT **3-1**
3.1 GENERAL 3-1
3.2 OBJECTIVES OF THE PROJECT 3-1
3.3 LOCATION OF THE PROJECT 3-2
3.4 ACCESSIBILITY OF THE PROJECT 3-5
3.4.1 District Headquarter (DHQ) Hospital, Khar (Bajaur) 3-5
3.4.2 District Headquarter (DHQ) Hospital, Ghalanai (Mohmand) 3-5
3.4.3 District Headquarter (DHQ) Hospital, Landi Kotal (Khyber) 3-5
3.4.4 District Headquarter (DHQ) Hospital, Mishti Mela (Orakzai) 3-5
3.4.5 District Headquarter (DHQ) Hospital, Parachinar (Kurram) 3-5
3.4.6 District Headquarter (DHQ) Hospital, Miran Shah (North Waziristan) 3-5
3.4.7 Headquarter (DHQ) Hospital, Wana (South Waziristan) 3-6
3.5 COMPONENTS OF THE PROJECT 3-6
3.5.1 Internal Upgrades 3-6
3.5.2 External Works and Services 3-6
3.5.3 Specialized Units 3-6
3.6 SALIENT FEATURES OF THE PROJECT 3-7
3.6.1 Civil and Building Works 3-7
3.6.2 WATSAN and Fire-Fighting Works 3-7
3.6.3 Electrical and Information and Communication Technology (ICT) Works 3-8
3.6.4 Mechanical Works 3-8
3.6.5 Climate-Responsive Design: 3-8
3.7 LAND ACQUISITION 3-9
3.8 PROJECT ADMINISTRATIVE JURISDICTION 3-9

3.9 PROJECT IMPLEMENTATION SCHEDULE 3-9
3.10 COST OF THE PROJECT 3-9
3.11 CONSTRUCTION MATERIAL 3-9
3.12 EXPECTED EQUIPMENT FOR CONSTRUCTION 3-11
3.13 CONSTRUCTION CAMPS 3-12
3.14 WORKFORCE REQUIREMENTS 3-12
3.15 SOURCE OF WATER 3-12
3.16 WATER REQUIREMENT 3-13
3.17 WASTEWATER GENERATION 3-13
3.18 SOLID WASTE ESTIMATION 3-14
3.19 POWER REQUIREMENT/ POWER SOURCE 3-14

4 DESCRIPTION OF THE ENVIRONMENT 4-1
4.1 GENERAL 4-1
4.2 PROJECT STUDY AREA 4-1
4.3 FIELD VISIT 4-1
4.4 PHYSICAL ENVIRONMENT 4-1
4.4.1 Physiography and Topography 4-2
4.4.2 Geology 4-3
4.4.3 Soil 4-6
4.4.4 Surface Water Resources 4-8
4.4.5 Seismology 4-11
4.4.6 Water Supply System 4-14
4.4.7 Sewerage System 4-15
4.4.8 Climate of Khar, Bajaur 4-17
4.4.9 Climate of Parachinar, Kurram 4-18
4.4.10 Climate of Landi Kotal 4-18
4.4.11 Climate of Ghallanai, Mohmand 4-19
4.4.12 Climate of Miran Shah, North Waziristan 4-19
4.4.13 Climate of Wana, South Waziristan 4-20
4.4.14 Climate of Orakzai 4-20
4.4.15 Floods 4-20
4.4.16 Climate Change 4-21
4.4.17 Solid Waste System 4-21
4.4.18 Environmental Monitoring 4-23
4.4.19 Land Use Pattern 4-30
4.4.20 Environmental Sensitive Receptors 4-30
4.4.21 Environmental Compliance Status 4-31
4.4.22 Existing Environmental Liabilities and Associated Risks 4-40
4.5 ECOLOGICAL ENVIRONMENT DISTRICT BAJAUR 4-45
4.5.1 Regional Ecological Setting 4-45
4.5.2 Flora Vegetation 4-45
4.5.3 Fauna (Wildlife) 4-45
4.6 ECOLOGICAL ENVIRONMENT LANDI KOTAL (DISTRICT KHYBER) 4-45
4.6.1 Ecological Context 4-45
4.6.2 Vegetation Profile 4-45
4.6.3 Faunal Elements 4-45
4.7 ECOLOGICAL ENVIRONMENT GHALLANAI (DISTRICT MOHMAND) 4-46
4.7.1 Environmental Setting 4-46
4.7.2 Flora (Vegetation) 4-46
4.7.3 Fauna (Wildlife) 4-46
4.8 ECOLOGICAL ENVIRONMENT WANA (SOUTH WAZIRISTAN DISTRICT) 4-46
4.8.1 Regional Context 4-46
4.8.2 Vegetation 4-46
4.8.3 Faunal Characteristics 4-46
4.9 ECOLOGICAL ENVIRONMENT MIRAN SHAH (NORTH WAZIRISTAN DISTRICT) 4-46
4.9.1 Ecological Setting 4-46

4.9.2 Flora (Vegetation) 4-46
4.9.3 Fauna (Wildlife) 4-47
4.10 ECOLOGICAL ENVIRONMENT PARACHINAR (DISTRICT KURRAM) 4-47
4.10.1 Regional Ecology 4-47
4.10.2 Vegetation 4-47
4.10.3 Fauna 4-47
4.11 ECOLOGICAL ENVIRONMENT MISHTI MELA (DISTRICT ORAKZAI) 4-47
4.11.1 Ecological Setting 4-47
4.11.2 Flora and Vegetation 4-47
4.11.3 Faunal Resources 4-47
4.11.4 Conservation Status 4-47
4.12 SOCIOECONOMIC ENVIRONMENT 4-47
4.13 METHODOLOGY 4-48
4.13.1 Task Specific Approach 4-49
4.13.2 Discussion with Officials 4-49
4.13.3 Data Collection and Field Survey 4-49
4.13.4 Community/Stakeholders' Participation 4-49
4.13.5 Khar, Bajaur 4-49
4.13.6 Parachinar, Kurram 4-50
4.13.7 Landi Kotal, Khyber 4-50
4.13.8 Ghallanai, Mohmand 4-50
4.13.9 Miran Shah, North Waziristan 4-50
4.13.10 Wana, South Waziristan 4-51
4.13.11 Mishti Mela, Orakzai 4-51
4.14 SOCIOECONOMIC PROFILE OF STUDIED HOUSEHOLDS 4-51
4.14.1 Gender Distribution of the Respondents 4-51
4.14.2 Population and Family Size 4-52
4.14.3 Age Composition of the Respondents 4-53
4.14.4 Literacy 4-53
4.15 ECONOMIC ASPECTS 4-54
4.15.1 Occupations 4-54
4.15.2 Monthly Household Income 4-55
4.15.3 Monthly Household Expenditures 4-56
4.15.4 Family System 4-56
4.15.5 Sources of Drinking Water 4-57
4.15.6 Mode of Transportation 4-58
4.16 AWARENESS & IMPLEMENTATION OF PROPOSED PROJECT 4-58
4.16.1 Awareness about the Project 4-58
4.17 GENDER SURVEY 4-60
4.17.1 Decision-Making Autonomy and Household Dynamics 4-60
4.17.2 Healthcare Access and Physical Barriers 4-61
4.17.3 Infrastructure Facility: Water, Sanitation, Lighting, and Safety 4-61

5 ANTICIPATED IMPACTS AND MITIGATION MEASURES 5-1
5.1 NOTION OF SIGNIFICANCE 5-1
5.2 METHODOLOGY FOR IMPACT EVALUATION 5-2
5.3 POTENTIAL POSITIVE IMPACTS 5-3
5.4 POTENTIAL ADVERSE IMPACTS 5-3
5.5 ADVERSE IMPACTS DURING PLANNING AND DESIGN AND PRE-CONSTRUCTION PHASE 5-4
5.5.1 Design-Stage Considerations: Hospital Layout, Utilities, and Infrastructure 5-4
5.5.2 Topography 5-4
5.5.3 Seismic Hazard 5-5
5.5.4 Resource Conservation 5-5
5.5.5 Flora 5-6
5.5.6 Fauna 5-6
5.5.7 Land Acquisition and Resettlement 5-7
5.5.8 Temporary Acquisition of Land 5-7

5.5.9 Existing Utilities 5-8
5.5.10 Physical and Cultural Resources 5-8
5.6 ADVERSE IMPACTS DURING CONSTRUCTION STAGE....5-9
5.6.1 Excavation 5-9
5.6.2 Construction campsites and Contractor Facilities 5-10
5.6.3 Air Quality 5-12
5.6.4 Noise 5-14
5.6.5 Traffic Management....5-15
5.6.6 Impact on Soil....5-16
5.6.7 Community Health and Safety....5-18
5.6.8 Occupational Health and Safety....5-20
5.6.9 Generation of Solid Waste 5-21
5.6.10 Generation of Wastewater....5-22
5.6.11 Impact on Water Resources....5-24
5.6.12 Hazardous Waste Management....5-25
5.6.13 Disturbance to Hospital Services and Shifting of Units 5-26
5.6.14 Disturbance to Utilities....5-28
5.6.15 Disposal of Mucking Material 5-28
5.6.16 Emergency Preparedness and Response 5-29
5.6.17 Flora and Fauna 5-31
5.6.18 Discovery of Heritage Sites/ Structures during Excavation....5-31
5.6.19 Social/ Cultural Conflicts 5-31
5.6.20 GBV, Child Labour and Forced Labour 5-32
5.7 ANTICIPATED IMPACTS DURING OPERATIONAL PHASE 5-33
5.7.1 Water Supply & Usage 5-33
5.7.2 Wastewater and Sewage 5-33
5.7.3 Solid Waste Generation 5-34
5.7.4 Energy Consumption and Air Quality 5-34
5.7.5 Noise Pollution....5-35
5.7.6 Traffic and Accessibility....5-35
5.7.7 Patient and Staff Safety....5-36
5.7.8 Infection Control and Public Health 5-36
5.7.9 Environmental and Community Impacts....5-37
5.7.10 Noise and Odor from pretreatment of Medical Waste....5-37
5.7.11 Staff and Visitor Traffic Management 5-38
5.7.12 Emergency Preparedness and Disaster Management 5-38
5.7.13 Climate Change Impacts 5-39

6 ANALYSIS OF THE ALTERNATIVES 6-1
6.1 NO PROJECT OPTION (NPO) 6-1
6.2 WITH PROJECT OPTION....6-2
6.2.1 Alternative I- Full Implementation (Simultaneous Construction at 30 Sites)....6-2
6.2.2 Alternative II- Phased Implementation Option....6-2
6.3 ENERGY ALTERNATIVES 6-3
6.3.1 Alternative I-Conventional Grid-Based System backed up by Generators 6-3
6.3.2 Alternative II- Solar Energy Integration (Preferred Option) 6-3
6.3.3 Selected Option: Phased Implementation 6-5

7 INFORMATION DISCLOSURE, CONSULTATION AND PARTICIPATION....7-1
7.1 CONSULTATION, PARTICIPATION AND INFORMATION DISCLOSURE STRATEGY (CPID)....7-1
7.2 STAKEHOLDER CONSULTATIONS DURING PROJECT PROCESSING PHASE 7-1
7.3 APPROACH FOR THE CONSULTATION AND INFORMATION DISSEMINATED....7-2
7.4 DEPARTMENTAL CONSULTATIONS....7-2
7.4.1 Consultations with Departments....7-3
7.4.2 Views & Suggestions of the Officials of Departments 7-4
7.5 PUBLIC CONSULTATION AND PARTICIPATION PROCESS 7-7
7.5.1 Methods of Public Consultation....7-7

7.5.2 Consultations with Hospital Staff, Patients, Attendants and Nearby Community 7-7
7.5.3 Stakeholders and their apprehensions....7-8

8 GRIEVANCE REDRESS MECHANISM 8-1
8.1 INTRODUCTION....8-1
8.1.1 Health Center Level GRC-I 8-2
8.1.2 PMIU/C&W Level GRC-II 8-3
8.1.3 Department of Health Level GRC-III 8-4
8.2 GBV COMMITTEE 8-4
8.3 INFORMATION DISSEMINATION AND COMMUNITY OUTREACH 8-5

9 ENVIRONMENTAL MANAGEMENT PLAN 9-1
9.1 OBJECTIVES 9-1
9.2 INSTITUTIONAL SETUP FOR IMPLEMENTATION AND MANAGEMENT OF EMP 9-1
9.3 ROLES AND RESPONSIBILITIES....9-2
9.4 BIDDING AND CONTRACT DOCUMENTS....9-7
9.5 TRAINING AND CAPACITY BUILDING....9-7
9.6 COMMUNICATION & DOCUMENTATION....9-8
9.6.1 Meetings and Reports 9-8
9.6.2 Photographic Record and Data Base....9-8
9.6.3 Non-compliance of EMP....9-9
9.7 ENVIRONMENTAL MANAGEMENT MATRIX....9-9
9.8 MONITORING PLAN....9-49
9.8.1 Monitoring Mechanism 9-49
9.8.2 Monitoring Plan....9-49
9.9 MANAGEMENT PLANS AND WORKERS COC 9-54
9.9.1 Tree Plantation Plan 9-54
9.9.2 HSE Management Plan....9-54
9.9.3 Emergency Preparedness and Response Framework 9-55
9.9.4 Waste Management Plan 9-56
9.9.5 Traffic Management Plan 9-57
9.9.6 Change Management Plan....9-58
9.9.7 Sanitation Plan 9-58
9.9.8 Resource Conservation Plan....9-58
9.9.9 Service Continuity Plan 9-58
9.10 CHANCE FIND PROCEDURE....9-59
9.11 GRIEVANCE REDRESSAL MECHANISM 9-59
9.12 EMP COST....9-60
9.13 IMPLEMENTATION OF THE CORRECTIVE ACTION PLAN 9-61

10 CONCLUSION AND RECOMMENDATIONS....10-1
10.1 CONCLUSION....10-1
10.2 RECOMMENDATIONS 10-2

Volume-II: Annexures

LIST OF TABLES

Table 2.1: Main Strategies/Policies Related to Environment and their Relevance to the Project 2-1
Table 2.2: Main Legislation/Acts Related to Environment and their Relevance to the Project.....2-4
Table 2.3: ADB Safeguard Policies 2009 Relevant to Project.....2-12
Table 2.4: ADB Policy Principles 2-13
Table 2.5: IFC Work Environment Noise limits 2-14
Table 2.6: Comparison of International and local Air Quality Standards*.....2-15
Table 2.7: Comparison of International and Local Noise Standards 2-16
Table 2.8: Comparison of National and International Drinking Water Standards.....2-16
Table 2.9: Comparison of National and International Surface Water Standards.....2-17
Table 2.10: International Agreements/Conventions Relevant to the Project.....2-19
Table 3.1:-Locations of Hospitals Assessed under Phase IV.....3-2
Table 3.2:-Construction Material for the proposed project.....3-9
Table 3.3: Machinery and Equipment Requirement for the Proposed Project 3-12
Table 4.1: Spectral Horizontal Acceleration Values.....4-14
Table 4.2: Ambient Air Monitoring Results.....4-25
Table 4.3: Noise Level Monitoring Results 4-25
Table 4.4: Surface Water/Wastewater Sampling Results.....4-26
Table 4.5: Groundwater / Drinking Water Sampling Results 4-28
Table 4.6: Landuse land use characteristics within hospital premises 4-30
Table 4.7: Environmental Compliance Status of Hospital facilities in Phase IV 4-32
Table 4.8: Environmental Liabilities and Associated Risks.....4-41
Table 4.9 Gender Distribution of Respondents.....4-51
Table 4.10 Population and Family Size 4-52
Table 4.11: Age Composition of the Respondents 4-53
Table 4.12: Educational Level of the Respondents 4-54
Table 4.13: Occupation of the Respondents.....4-55
Table 4.14: Average Monthly Income of the Respondents.....4-55
Table 4.15: Monthly Expenditures of the Respondents.....4-56
Table 4.16: Family System Statistics 4-57
Table 4.17: Sources of drinking water 4-57
Table 4.18: Principal Mode of Transport.....4-58
Table 4.19: Knowledge about the project 4-59
Table 4.20: Perceived Positive Impacts of the Project 4-59
Table 4.21 Summary of Key Findings of the Gender Analysis 4-65
Table 4.22: Findings and Proposed actions for Gender Analysis.....4-66
Table 4.23:Strategic Recommendations for KP Health Systems Strengthening Program.....4-67
Table 6.1: Comparison of Alternatives.....6-4
Table 7.1: List of Government Officials Consulted 7-2
Table 7.2: Detail of Issues/Points Raised/Discussed during Departmental Consultations.....7-4
Table 7.3: Consultation Participants at each location.....7-8
Table 7.4: Major Concerns and suggestions of the respondents in the Project Area.....7-8
Table 8.1: Formation of Gender Based Violence Committee 8-5
Table 8.2: Steps in the Grievance Resolution Process.....8-6
Table 9.1: Periodic Reporting Mechanism.....9-8
Table 9.2: Environmental Mitigation and Management Matrix.....9-10
Table 9.3: Environmental Monitoring Schedule 9-50
Table 9.4: Instrumental Monitoring and Lab Testing 9-52
Table 9.5: Environmental Management Cost.....9-60
Table 9.6: HSE Management Cost 9-60
Table 9.7: Break Up of PPEs 9-61
Table 9.8: Corrective Action Plan 9-62

LIST OF FIGURES

Figure 3.1: Project Location Map 3-4
Figure 4.1: Topography Map of Proposed Project Area 4-4
Figure 4.2: Geological Map of the Study Area 4-7
Figure 4.3: Surface Water Hydrology Near Study Area 4-10
Figure 8.1: Three-Tier Grievance Redress Mechanism 8-7
Figure 9.1: Organizational Setup for Implementation of EMP at Construction Phase 9-2

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 seven (07) secondary healthcare facilities in DHQ Hospital Khar, Bajaur**,** DHQ Hospital Parachinar , Kurram, DHQ Hospital Landi kotal, Khyber, DHQ Hospital Ghallanai, Mohmand, DHQ Hospital Miran Shah, North Waziristan, DHQ Hospital Wana, South Waziristan and DHQ Mishti Mela, Orakzai 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. The project will be implemented over 24 months with an estimated cost of Rs. 4886.703 million involving about 175 personnel across sites. Construction activities will use standard equipment and temporary arrangements in line with applicable codes and specifications.

DESCRIPTION OF THE ENVIRONMENT

4. 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 published literature, previous environmental studies, field observations, and stakeholder consultations to ensure a reliable and comprehensive environmental impact assessment

5. The hospital project sites are located across seven districts of Khyber Pakhtunkhwa, namely Bajaur (Khar), Kurram (Parachinar), Khyber (Landi Kotal), Mohmand

(Ghallanai), North Waziristan (Miran Shah), South Waziristan (Wana), and Orakzai (Mishti Mela).

6. The physical environment of the proposed project areas varies considerably in terms of topography, geology, soils, and surface water resources. Khar and Parachinar are located in relatively broad valleys surrounded by mountains, whereas Landi Kotal, Ghallanai, Wana, Miran Shah, and Orakzai are predominantly rugged and mountainous with limited flat land. Geological conditions comprise metamorphic, igneous, sedimentary, and ophiolitic formations, while soils range from fertile alluvial and loamy deposits in valley areas to shallow, rocky, gravelly, and calcareous soils in upland regions. Surface water availability also varies, with Khar and Parachinar possessing relatively well defined river systems, whereas Waziristan and Orakzai rely on major rivers and seasonal streams, and Landi Kotal, Ghallanai, and Wana depend largely on seasonal runoff and ephemeral watercourses.

7. The project areas exhibit marked climatic variation due to differences in elevation and topography. Khar and Ghallanai experience hot semi-arid to subtropical continental climates, while Miran Shah has similar but comparatively milder conditions. Parachinar and Wana, located at higher elevations, experience colder winters, whereas Landi Kotal and Orakzai have comparatively moderate climates influenced by both western disturbances and the summer monsoon. Rainfall patterns, relative humidity, and wind conditions also vary across the project districts, reflecting their diverse physiographic settings.

8. The sanitation and solid waste management systems across the proposed project areas are generally underdeveloped, with considerable variation in service coverage and infrastructure. Khar, Parachinar, Landi Kotal, Ghallanai, Wana, and Miran Shah largely rely on open drains, septic tanks, informal wastewater disposal, or natural drainage systems, while Orakzai depends mainly on natural drainage, open channels, and seasonal watercourses due to its hilly terrain. The absence of comprehensive sewerage networks and wastewater treatment facilities increases the risk of wastewater stagnation and contamination of soil and water resources. Similarly, solid waste management remains limited, with inadequate collection systems and widespread open dumping. Overall, improvements are required in sewerage coverage, wastewater management, organized waste collection, and environmentally sound disposal facilities.

9. The project districts are predominantly mountainous, with narrow valleys and seasonal drainage networks, making them vulnerable to flash floods, hill torrents, debris flows, and localized riverine flooding. Flood hazards are mainly associated with intense monsoon rainfall, cloudbursts, and rapid runoff through ephemeral streams, while localized flooding also occurs along major rivers such as the Kurram and Tochi (Gambila) Rivers. Historical flood events, particularly those of 2010 and 2022, caused widespread damage to infrastructure, agricultural land, utilities, and settlements. Climate change is expected to further increase the intensity of extreme rainfall and associated flood, erosion, and sedimentation risks, highlighting the need to incorporate flood resilience and adequate drainage measures into project planning and implementation.

10. Baseline environmental monitoring for the proposed hospital project was conducted in April 2026 by M/s PakGreen Laboratories, an EPA-KP certified laboratory, covering ambient air, noise, wastewater, and groundwater quality at all project sites. Results, assessed against the NEQS (2010), showed increased $PM_{2.5}$ levels at Khar, Parachinar, Miran Shah, and Wana, mainly due to traffic, road dust, dry climatic conditions, and dust-prone environments. Noise levels exceeded the NEQS limits for silence zones during daytime at Khar, Parachinar, Ghallanai, Miran Shah, Wana, and Mishti Mela, and during nighttime at Khar, Parachinar, Ghallanai, Wana, and Mishti Mela. The exceedances were primarily associated with traffic, commercial activities, and public movement. Landi Kotal remained within the NEQS limits during both day and night, while Miran Shah remained within the nighttime limit. Wastewater quality indicated elevated BOD, COD, and TSS at Parachinar, Landi Kotal, and Ghallanai, while increased arsenic and manganese were also recorded at Parachinar and Ghallanai, highlighting the need for improved wastewater management. Groundwater/drinking-water quality was generally satisfactory and remained within applicable NEQS limits.

11. 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.

12. 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

13. The proposed hospital sites are located in urban and semi-urban environments with modified ecological settings. Vegetation is dominated by common native and planted tree species, ornamental plants, shrubs, and grasses, while no rare, threatened, endemic, or ecologically significant flora were recorded. Aquatic habitats are absent within the project sites, with nearby rivers and other water bodies located outside the project areas. Faunal diversity is limited to common urban bird species, rodents, and domestic animals, and no endangered or protected wildlife species were observed. None of the project sites are located within or adjacent to protected areas, critical habitats, forests, wetlands, or other environmentally sensitive areas.

SOCIO-ECONOMIC ENVIRONMENT

14. The project districts are predominantly rural and administratively organized into districts and tehsils, with district headquarters serving as key urban and service centres. The population is generally young and growing, while literacy rates remain relatively low and vary across the districts. Pashto is the predominant language, with Urdu also widely understood in some areas. Local livelihoods are primarily based on

agriculture, livestock rearing, trade, mining, small businesses, public-sector employment, daily wage labour, and remittances, with cross-border trade also contributing to the economies of selected districts. Population growth and the predominantly rural nature of the project areas continue to increase demand for healthcare, education, water supply, sanitation, transport, and other essential public infrastructure and services.

15. A total of 116 respondents were surveyed across selected healthcare facilities to understand the demographic characteristics, socio-economic conditions, access to basic amenities, existing hospital accessibility conditions, awareness levels, and community perceptions regarding the proposed hospital revamping project. The survey also highlighted community expectations regarding improved healthcare services, better hospital facilities, enhanced accessibility, and effective management of potential construction-related impacts. Overall, the assessment provides baseline socio-economic information to support inclusive project planning and the implementation of appropriate environmental and social management measures.

ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

16. 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.

17. 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.

18. 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.

19. Overall, with effective implementation of these mitigation and management measures, the project's long-term benefits will substantially outweigh its temporary adverse impacts.

ANALYSIS OF ALTERNATIVES

20. 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

21. 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

22. 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), Project Management Implementation Unit (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

23. 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. 64.86 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.

CONCLUSION AND RECOMMENDATION

24. 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

25. 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.

26. 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

27. 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

28. The project will be implemented in four phases. This Report covers Hospital locations of Phase IV, which includes DHQ Hospital Khar, Bajaur, DHQ Hospital Parachinar, Kurram, DHQ Hospital Landi kotal, Khyber, DHQ Hospital Ghallanai, Mohmand, DHQ Hospital Miran Shah, North Waziristan, DHQ Hospital Wana, South Waziristan and DHQ Hospital Mishti Mela, Orakzai.

29. 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

30. The Initial Environmental Examination (IEE) for the proposed upgradation of hospitals under Phase IV 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.

31. 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.

32. 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.

33. 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.

34. 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.

35. 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

36. 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

2.1 GENERAL

37. 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.

2.2 SUMMARY OF RELEVANT STRATEGIES, POLICIES, ACTS AND LEGISLATION

38. 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	This policy is applicable for the proposed project Phase-IV hospitals during

Sr. No.	Policy/Strategy	Brief Coverage	Relevance to Project
		safe drinking water to the people. Drinking water is the constitutional responsibility of the 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.	construction and 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-IV 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;	The proposed Project Phase-IV 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
		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 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-IV 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-IV. 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 proposed Project Phase-IV.

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.	
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	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.

Sr. No.	Act	Brief Coverage	Relevance to Project
		monitoring and evaluation systems. 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).	Similarly, the provisions of section 17 are also 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-IV 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

Sr. No.	Act	Brief Coverage	Relevance to Project
			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 spearhead provincial climate resilience—bridging policy, data, finance, and cooperation under a unified framework.	Proposed Project, will be expected to comply with the latest environmental standards and integrate low-carbon design, green building codes, and 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-IV 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	This act might be trigged as the proposed Project Phase-IV may involves the cutting of trees/bushes.

Sr. No.	Act	Brief Coverage	Relevance to Project
		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 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-IV.
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-IV 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-IV 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	These constitutional provisions and applicable labour laws are relevant to the proposed Project Phase-IV during construction and operational activities to ensure fair employment practices,

Sr. No.	Act	Brief Coverage	Relevance to Project
		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 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.	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 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-IV 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-IV where the cutting of tree will be involved.
15.	The Khyber Pakhtunkhwa	This act was enforced in 1949 to protect the trees and brushwood	This act will be applicable to the subject project Phase-IV where the

Sr. No.	Act	Brief Coverage	Relevance to Project
	Protection of Trees and Brushwood Act, 1949	belonging to the Government and Local bodies.	cutting of tree will be involved.
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-IV 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 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-IV, 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.
19.	Khyber Pakhtunkhwa Minimum Wages	This Act provides for the establishment of minimum wage rates for workers through the	This Act will apply to all contracted and hired labor engaged under Project Phase-IV to ensure

Sr. No.	Act	Brief Coverage	Relevance to Project
	Act, 2013	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.	compliance with provincial minimum wage requirements and fair labor practices during construction and operational activities.
20.	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-IV to ensure implementation of occupational health and safety measures, provision of PPE, emergency preparedness, and safe working conditions for workers and staff.
21.	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-IV to ensure compensation and legal protection for workers in case of work-related accidents, injuries, or occupational incidents.

2.3 ASIAN DEVELOPMENT BANK REQUIREMENTS

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

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

40. 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".

41. 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.

42. 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.

43. 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.

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

44. 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."

2.3.3 ADB's Accountability Mechanism Policy 2012

45. 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.

2.3.4 ADB's Safeguard Policy Statement, 2009

46. 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.

47. 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.

48. 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.

49. 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 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	As of now, no involuntary resettlement is envisaged for the proposed project therefore, this policy does not apply to the proposed project.
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.

2.3.5 Implications of ADB's safeguard policies on proposed project

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.

51. 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 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	Provide workers with safe and healthy working conditions and

Sr. No.	Policy principle	Summary
	Community safety.	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.

2.3.6 Comparison of International and Local Environmental Legislations

52. 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.

53. 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.

54. 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

55. 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.*

56. 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.*

57. 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
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

Sr. No	Parameter	Units	Pak. NEQS	WHO Standards
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	--	--
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	--

Sr. No.	Parameter	Units	NEQS (National)	WHO Class V (Agriculture)	FAO Standards
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.*

58. 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.

2.4 INTERNATIONAL PROTOCOL / CONVENTIONS

59. 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-ratification/status-of-ratification-of-the-convention	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 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.

Sr. No.	Agreement/ Convention	Ratification	Description/Relevance
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.

60. 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

3.1 GENERAL

61. 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.

62. 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.

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

3.2 OBJECTIVES OF THE PROJECT

64. 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.

65. 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 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, improving 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.

3.3 LOCATION OF THE PROJECT

66. 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-IV. Following is **Table 3.1** showing names of hospitals assessed and their respective locations under Phase-IV are shown in **Figure 3.1.**

Table 3.1:-Locations of Hospitals Assessed under Phase IV

Sr. No.	Phase	Name of the Hospital	Coordinates
1.	IV	DHQ Hospital, Khar (Bajaur)	34°43'29.59"N, 71°30'19.58"E
2.		DHQ Hospital, Ghalanai (Mohmand)	34°19'9.51"N, 71°24'42.45"E
3.		DHQ Hospital, Landi Kotal (Khyber)	34° 5'32.07"N, 71° 8'44.43"E
4.		DHQ Hospital, Mishti Mela (Orakzai)	33°44'22"N, 70°52'18"E
5.		DHQ Hospital, Parachinar (Kurram)	33°53'16.38"N, 70° 6'40.06"E

Sr. No.	Phase	Name of the Hospital	Coordinates
6.		DHQ Hospital, Miran Shah (North Waziristan)	33°00'10" N, 70°03'59" E
7.		DHQ Hospital, Wana (South Waziristan)	32°18'44" N, 69°34'40" E

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

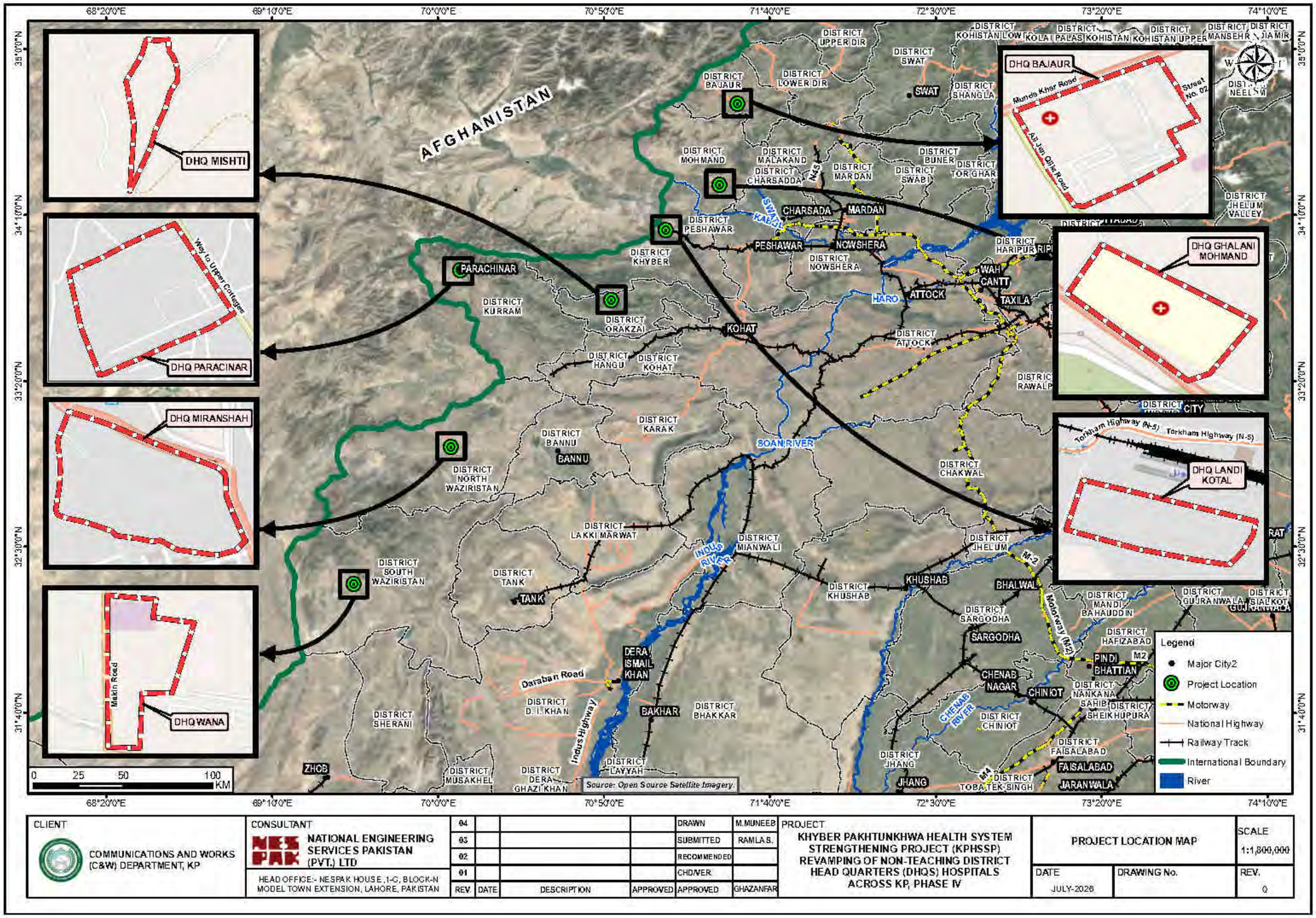


Figure 3.1: Project Location Map

3.4 ACCESSIBILITY OF THE PROJECT

68. The Phase IV 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.

3.4.1 District Headquarter (DHQ) Hospital, Khar (Bajaur)

69. DHQ Bajaur is situated on the Main Munda Khar Road and is directly accessible from the road network in District Bajaur. The surrounding area comprises urban and semi-urban settlements, commercial activities, and public service facilities. The DHQ Bajaur coordinates are 34°43'29.59"N, 71°30'19.58"E.

3.4.2 District Headquarter (DHQ) Hospital, Ghalanai (Mohmand)

70. DHQ Hospital Ghalanai (Mohmand) is situated along the Main Mohmand Road with direct access through the main entrance. The surrounding area consists predominantly of administrative buildings, residential settlements, and commercial establishments. The geographical coordinates of the site are 34°19'9.51"N, 71°24'42.45"E.

3.4.3 District Headquarter (DHQ) Hospital, Landi Kotal (Khyber)

71. DHQ Hospital Landi Kotal is situated on the Main Khyber Pass Highway near Landi Kotal Bazaar. The surrounding environment is characterized by commercial activities, residential areas, and public facilities. The site coordinates are 34° 5'32.07"N, 71° 8'44.43"E.

3.4.4 District Headquarter (DHQ) Hospital, Mishti Mela (Orakzai)

72. The hospital is situated adjacent to the Main National Highway, providing easy access to the facility. The surrounding area mainly comprises residential settlements, public infrastructure, and open land. The geographical coordinates of the site are 33°44'22"N, 70°52'18"E.

3.4.5 District Headquarter (DHQ) Hospital, Parachinar (Kurram)

73. The proposed project site is situated in Parachinar city, the district headquarters of Kurram. The hospital is easily accessible through the existing urban road network. The surrounding area includes residential neighborhoods, commercial markets, and public institutions. The geographical coordinates are 33°53'16.38"N, 70° 6'40.06"E.

3.4.6 District Headquarter (DHQ) Hospital, Miran Shah (North Waziristan)

74. The project site is located at DHQ Hospital Miran Shah in District North Waziristan. The hospital is situated on the Main Bannu Road and the surrounding land use

consists of residential areas, commercial activities, and public service facilities. The geographical coordinates of the site are 33°00'10" N, 70°03'59" E.

3.4.7 Headquarter (DHQ) Hospital, Wana (South Waziristan)

75. DHQ Hospital Wana is located on the Main Makin Road and is accessible through the existing road infrastructure. The surrounding area comprises residential settlements, commercial establishments, and public sector facilities. The geographical coordinates are 32°18'44" N, 69°34'40" E.

3.5 COMPONENTS OF THE PROJECT

76. 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 **Annexure-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.

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

3.5.1 Internal Upgrades

78. 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.

3.5.2 External Works and Services

79. 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.

3.5.3 Specialized Units

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

81. 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.

3.6 SALIENT FEATURES OF THE PROJECT

82. 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:

3.6.1 Civil and Building Works

83. 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.

84. 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.

3.6.2 WATSAN and Fire-Fighting Works

85. 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.

86. 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.

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

3.6.3 Electrical and Information and Communication Technology (ICT) Works

88. 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.

3.6.4 Mechanical Works

89. 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.

3.6.5 Climate-Responsive Design:

90. 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.

3.7 LAND ACQUISITION

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

3.8 PROJECT ADMINISTRATIVE JURISDICTION

92. The proposed project falls under administrative jurisdiction of Bajaur, Mohmand, Khyber, Orakzai, Kurram, North Waziristan and South Waziristan Khyber Pakhtunkhwa.

3.9 PROJECT IMPLEMENTATION SCHEDULE

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

3.10 COST OF THE PROJECT

94. Total Cost of infrastructure improvement along with revenue component for phase-IV has been estimated Rs. 4886.703 million.

3.11 CONSTRUCTION MATERIAL

95. 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.

96. 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),

Sr. No.	Category	Sub-Category	Materials Included
			Plain Cement Concrete (PCC), Reinforced Cement Concrete (RCC), Brick Masonry, Stone Masonry
2		Finishing Materials	Cement Plaster, Gypsum Plaster / POP, Ceramic Tiles, Porcelain Tiles, 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,

Sr. No.	Category	Sub-Category	Materials Included
			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, 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

3.12 EXPECTED EQUIPMENT FOR CONSTRUCTION

97. Construction and renovation activities will require various types of machinery and equipment including excavators, backhoe loaders, concrete mixers, concrete vibrators, water pumps, diesel generators, air compressors, welding machines, steel cutting machines, drilling machines, scaffolding systems, dump trucks, and mobile cranes. In addition, smaller tools such as tile cutters, grinders, measuring instruments, and electrical testing equipment will be used during construction and installation activities.

98. The list of the machinery and the equipment expected to be used for the propose project are provided in **Table 3.3.**

Table 3.3: Machinery and Equipment Requirement for the Proposed 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

3.13 CONSTRUCTION CAMPS

99. 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.

3.14 WORKFORCE REQUIREMENTS

100. Manpower demand estimation is an essential component to facilitate deployment of manpower. The total manpower required for Phase-IV is 175 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-IV hospitals.

3.15 SOURCE OF WATER

Construction Phase

101. 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 Supervision Consultant (SC), based on technical verification and compliance with applicable environmental requirements and safeguard standards.

Operation Phase

102. 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.

3.16 WATER REQUIREMENT

Construction Phase

103. The water consumption for phase-IV is estimated to be 1250 gallons/day at each site and for phase-IV it will be 8,750 gallons/day for 175 workers during construction phase of the proposed project.[1]

Operational Phase

104. The water consumption during operation phase for the existing Phase-IV hospitals has been estimated based on a standard requirement of 250 gallons per bed per day. Accordingly, the daily water demand is estimated at 83,750 gallons for DHQ Bajaur, 27,500 gallons for DHQ Ghalanai, 87,500 gallons for DHQ Landi Kotal, 52,500 gallons for DHQ Miran Shah, 27,500 gallons for DHQ Mishti Mela, 55,500 gallons for DHQ Parachinar and 52,500 gallons for DHQ Wana, resulting in a cumulative demand of approximately 386,750 gallons per day.[1]

3.17 WASTEWATER GENERATION

Construction Phase

105. During construction phase, 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-IV (Seven sites), the total wastewater generation is estimated at approximately 7,000 gallons per day, to be managed through appropriate on-site sanitation facilities.[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).

Operation Phase

106. The wastewater generation during operation phase for the existing Phase-IV hospitals has been estimated based on the anticipated operational water use. Accordingly, the daily wastewater discharge is estimated at 67,000 gallons for DHQ Bajaur, 22,000 gallons for DHQ Ghalanai, 70,000 gallons for DHQ Landi Kotal, 42,000 gallons for DHQ Miran Shah, 22,000 gallons for DHQ Mishti Mela, 44,400 gallons for DHQ Parachinar and 42,000 gallons for DHQ Wana, with a cumulative generation of approximately 309,400 gallons per day.[2]

3.18 SOLID WASTE ESTIMATION

Construction Phase

107. The solid waste generation for phase-IV is estimated to be 113.75 kg/day, this includes 78.75 kg/day waste for 175 construction workers and 35 kg/day as general construction waste during construction phase of the proposed Project.[3]

Operational Phase

108. The operational solid waste generation for Phase-IV hospitals has been estimated based on a standard rate of 2 kg/bed/day. Accordingly, the daily solid waste generation is estimated at 670kg for DHQ Bajaur, 220kg for DHQ Ghalanai, 700kg for DHQ Landi Kotal, 420kg for DHQ Miran Shah, 220kg for DHQ Mishti Mela, 444kg for DHQ Parachinar and 420kg for DHQ Wana, resulting in a cumulative solid waste generation of approximately 3094 kg/day.[4]

3.19 POWER REQUIREMENT/ POWER SOURCE

Construction Phase

109. 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

110. During Operational Phase power would be supplied through temporary electrical connections from the local utility network or portable diesel generators where

[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. General construction waste was considered 5kg/day/hospital.
[4] A waste generation rate of 2 kg/bed/day has been adopted based on WHO guidelines and regional studies for developing countries.

necessary. Proper wiring, Earthing, and safety arrangements will be ensured to prevent electrical accidents.

4 DESCRIPTION OF THE ENVIRONMENT

4.1 GENERAL

111. 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.

4.2 PROJECT STUDY AREA

112. 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.

113. 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.

114. 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 **Annexure-II**

4.3 FIELD VISIT

115. 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.

4.4 PHYSICAL ENVIRONMENT

116. 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.

4.4.1 Physiography and Topography

Khar, Bajaur

117. Bajaur district is exceedingly wild. The main topographic feature is an endless maze of dry ravines, flanked by row upon row of rocky hills and mountains which make up around forty percent of the total area. The valley area is mostly broad, open and used as agricultural land. The most important plains in Bajaur are those of Nawagai, Loesam, Khar, Jar, Lal, and Wara Mamand.

Parachinar, Kurram

118. Kurram is mostly hilly and mountainous. The Sufaid Koh Mountain forms the territorial boundary between Kurram-MD and Afghanistan. The other famous mountains are the Sur-Ghar and Spin-Ghar mountains, which used to be dense with forests, but now there is limited forest cover in these mountains. The notable valleys and streams include: Peiwar, Shalozan, Shian, Zeran, and Daradar. The other important feature is the Kurram valley. The valley is well irrigated, highly populated, and crowded with small fortified villages, orchards and groves, with dark pine forests and alpine snows of the Sufaid Koh Range. After that the valley opens up into the Parachinar Plateau, which is a large oval shaped plain sloping towards southeast.

Landi Kotal, Khyber

119. Major part of the Khyber is barren, rocky and dry for a large proportion of its area with the very notable exception of the beautiful valley of Tirah. The cultivable land of Khyber is mostly Barani and in case of sufficient rains gives good agriculture production.

Ghallanai, Mohmand

120. Mohmand district is dry and barren. Most of the relief of this area is mountainous and those mountains themselves are brown and rocky with little vegetation. There are patches of flat plains and during the spring time, the region becomes somewhat greener for a time. This region has no rivers, canals nor rich underground water reservoirs. In recent decades, many inhabitants of the agency have migrated southwards to more fertile regions.

Miran Shah, North Waziristan

121. North Waziristan is a hilly area with deep and rugged valleys. The average height of the Waziristan hills is about 1,500 to 2,500 meters above sea level. The mountains do not belong to regular mountain alignments, and the hills appear to run zig-zag in every direction and are geographically apart from the larger Koh-e-Sufaid mountain range in the north and the Sulaiman Range in the south. The main valleys include: Kaitu, Tochi, Kurram and Khaisora. The main plains are: Dandi, Sheratala and Dana kiwi.

Wana, South Waziristan

122. South Waziristan is mostly a mass of rugged and complex rocky terrains and ridges. There are no regular mountain alignments like the northern part and hills appear to be zig-zag in every direction. The hills for the most part are barren and treeless. There is very limited land available for agriculture in these valleys, as little water flows in the streams of South Waziristan. The key plains or valleys are the Wana plain, the Zarmilan, which lies northeast of Domandi, the Bermand, and the Spin.

Orakzai

123. Orakzai is a hilly region with a fertile valley. Its territory comprises of a mountainous tract, dissected by numerous dry water courses, especially in the south-western part of the Agency. The elevation of the hills varies from over 10,000 ft. in the west and to less than 6,650 ft. in the east, while that of the plain area varies from 5,200 to 5,500 ft. above sea level. Important peaks are Sangla (6,325) and Chara Kandaco (5,643).

124. Topography of Project Area is presented in **Figure 4.1.**

4.4.2 Geology

Khar, Bajaur

125. Geologically, Khar lies within the western extension of the Peshawar Basin tectonic zone, specifically impacting the Suture Zone dynamics. The rock formations are predominantly metamorphic and igneous, consisting of heavily fractured schists, phyllites, marble, and significant ophiolitic massifs (ultramafic rocks). The valley floor is composed of thick, unconsolidated Quaternary alluvial and colluvial deposits made of gravel, sand, and silt washed down from the surrounding slopes. The topsoil in the plains is loamy to sandy clay but contains low organic matter, making it highly vulnerable to sheet and gully erosion during intense cloudbursts.[5]

Parachinar, Kurram

126. The geology of Parachinar is dominated by the sedimentary and metamorphic formations of the Koh-e-Sufaid range. The area sits on a complex tectonic zone where the Indian plate interacts with the Eurasian plate, leading to a landscape rich in limestone, shale, and sandstone. The soil is largely composed of alluvial deposits brought down from the mountains, which, combined with the presence of mineral resources like magnesite and soapstone in the wider Kurram region, defines its economic and geological character.[6]

[5] *Badshah, M. S., & Ahmed, Z. (1979). Geology of Bajaur and northern part of Mohmand. Journal of Himalayan Earth Sciences, 12(1).*
[6] *Shahzaib Hussain1, Muhammad Raza Hadi2, Sher Shah hilResearch Scholar, Area Study Centre, University of Peshawar, KP, Pakistan. Ph.D. Scholar, Department of Social Work, Kohat University of Science and Technology (KUST), KP, Pakistan.*

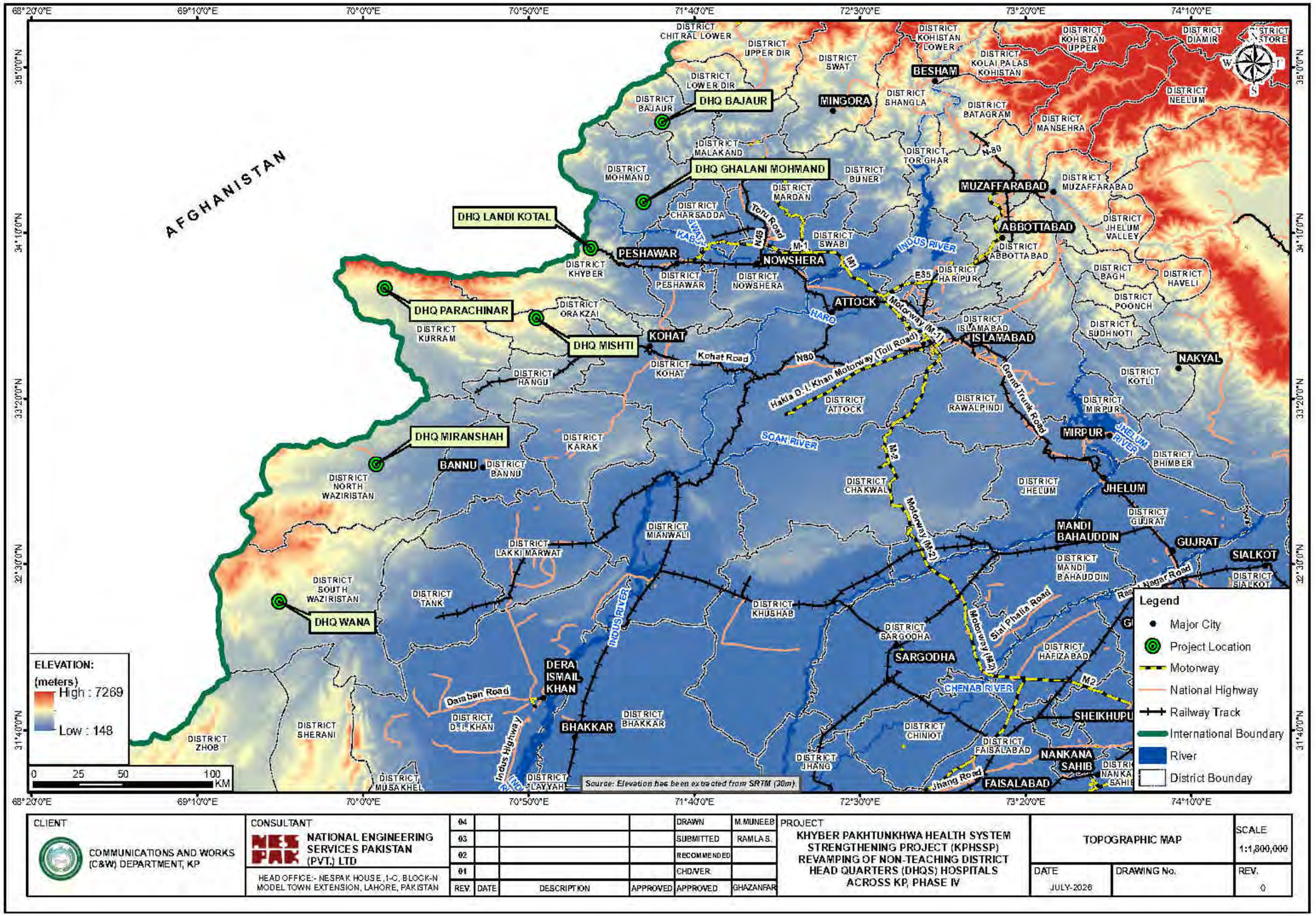


Figure 4.1: Topography Map of Proposed Project Area

Landi Kotal

127. The local geological structure of Landi Kotal is complex and characterized by diverse lithological formations that include the well-documented Carboniferous-to-Permian Landi Kotal Slate. The area features extensive deposits of the heavy Khyber Limestone, interspersed with fault lines and beds of ancient shales, sandstones, and quartzites that document intense tectonic uplift. Borehole log data from the region highlights a surface layer consisting primarily of sandy loam, which transitions into an ill-sorted subsurface mixture of clay, dense gravels, and fractured rock. The structural grain of the town is heavily shaped by major east-west trending thrust faults where older rock sequences have historically shifted over younger strata.[7]

Ghallanai, Mohmand

128. The local geology of Ghallanai is highly complex, sitting within a region heavily influenced by tectonic plate boundaries and rich in metamorphic and igneous rocks. The area features notable mineralized formations containing major deposits of high-grade marble, dolomite, and silica sand, which heavily drive the local extraction industry. It is located in close proximity to the broader Warsak and Sakhakot-Quila ophiolite complexes, making its rock formations structurally diverse with localized faulting. The surface layers consist of rugged rocky outcrops interspersed with thin layers of alluvial and colluvial soils in the valley floor.[8]

Miran Shah, North Waziristan

129. The geology of the Waziristan region is characterized by high mineralization and complex tectonic structures. The area is closely connected to the Razmak highly mineralized zone, known for its diverse geological composition. The mountains are generally rugged and composed of rock formations that have historically limited agricultural productivity; only about 4% of the total geographic area is considered productive or arable land, while the remaining 96% consists of non-cultivated, rocky, or mountainous terrain.[9]

Wana, South Waziristan

130. The district lies within a geologically complex mountain belt associated with the Waziristan region and the broader India-Asia collision zone. Its rocks include folded and faulted sedimentary units, along with the Waziristan ophiolite complex, which reflects intense tectonic activity and a long geological history.

[7] *United States Geological Survey (USGS) Geology of the Khyber Pass Area; Pakistan Soil Survey & Borehole Lithological Datasets.*
[8] *Geological Survey of Pakistan (GSP) Hydrogeology & Tectonics Division; DAWN News Urban Master Plan Report (August 2023).*
[9] *Rehmat Ullah, M.Phil Scholar,Nazim Rahim,Assistant Professor,2022, Department of Political Science & IR, Qurtuba University of Science & Technology, Peshawar and Department of Political Science, University of Chitral, Chitral Lower*

Orakzai

131. The geology of Orakzai District is characterized by mountainous rocky terrain with important mineral resources, including coal, limestone, marble, iron ore, and oil and gas prospects. Geological information from the district and FATA sources shows that Orakzai has a rugged landform with dry watercourses, while reports also mention coal deposits in Orakzai and broader mineral exploration potential in the tribal belt.[10]

132. Geology of project area is presented in **Figure 4.2.**

4.4.3 Soil[11]

Khar, Bajaur

133. The soils of the Bajaur are fertile, varying from silty loam to loam, containing a moderate degree of organic material, allowing cultivation.

Parachinar, Kurram

134. The plains of Parachinar have hard and rocky soil, with a large component of grit and gravel. Terraced piedmont alluvium soils are medium and fine textured (loam and clay loam), deep calcareous, well drained, and slightly eroded.

Landi Kotal

135. The soils of the Khyber are mainly from the local weathering of bedrock, deposited by streams and rivers. Landforms in the area are varied, and include piedmont plains, valleys, gravel fans, rough broken land, and gullied land. Level areas are loamy, while lowlands are calcareous.

Ghallanai, Mohmand

136. The soils of the Mohmand are shallow to moderately deep, slightly to moderately calcareous, coarse-textured (sand, loamy sand, sandy loam, fine sandy loam to loam) and slightly eroded. These occur on lower mountain slopes. Piedmont alluvium plains consist of moderately deep, well-drained, moderately calcareous, and slightly eroded soils.

Miran Shah, North Waziristan

137. Loamy and humus rich alluvial soil predominates the South Waziristan. The soil of Wana Plain consists of rich loam, sandy loam, and silty plain. The soils of Spin Plain are clay loam and loam, whereas the Birmal Plain consists of loam and sandy loam soil. The hilly areas of Sarwakai and Ladha Subdivisions of the TD are composed of clay loam and loam.

[10] *THE geological surveys of 85 per cent of the tribal belt have revealed immense prospects of mineral exploration in FATA, 2006, Dawn e-paper Minerals in FATA.*
[11] *District Soil Survey Reports, Soil Survey of Pakistan*

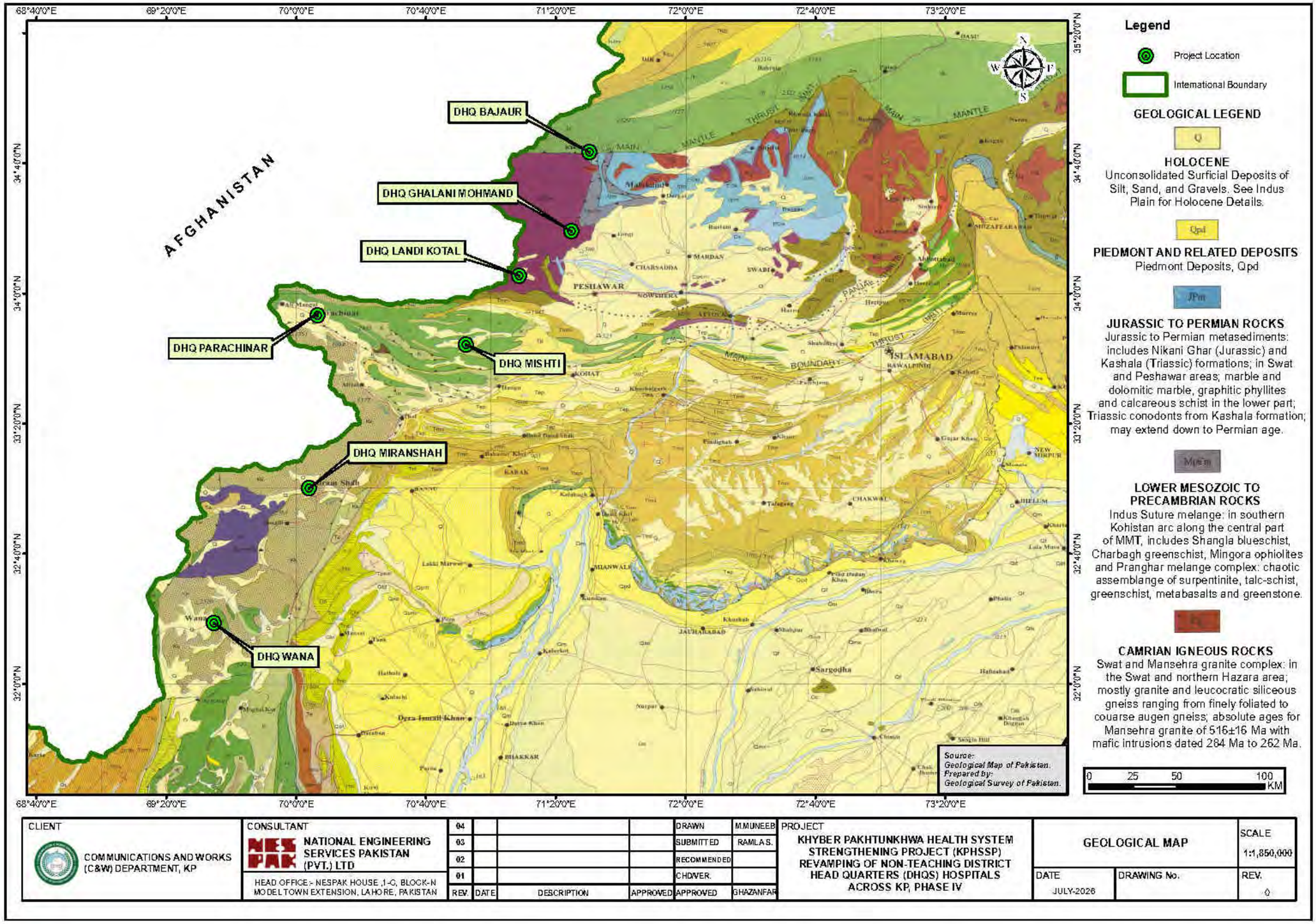


Figure 4.2: Geological Map of the Study Area

Wana, South Waziristan

138. The soils of the Wana are variable, and consist of clay, clay loam, clay gravel, and loam soil. The Tochi/ Gambila River valley is composed of rich alluvial soil and is very productive.

Orakzai

139. The soils of the Orakza are residuum colluvium from shale, limestone, and sandstone. The soils are shallow/ moderately deep, well-drained, moderately to strongly calcareous, coarse to medium textured (gravelly sandy loam, and clay loam) and moderately eroded. These occur on lower to middle mountain slopes. Piedmont soils are gravelly loam.

4.4.4 Surface Water Resources

Khar, Bajaur

140. The hydrological framework of Khar is dominated by the Bajaur Khwar and its numerous seasonal streams (Algads), which drain into the Rud River and eventually join the Swat River basin. The area has highly seasonal surface water flow, depending primarily on winter snowmelt from higher altitudes and heavy rainfall during the summer monsoon. Baseline records from 2010 to 2025 indicate a highly sensitive hydrological cycle; extreme weather events have caused sudden, high energy flash floods across the Khar plain that erode agricultural banks, followed by rapid dry spells that leave the surface streams completely parched.[12]

Parachinar, Kurram

141. The hydrology of Parachinar is dictated by the Kurram River and its numerous tributaries, such as the Kirman and Shalozan streams. These water bodies are fed by snowmelt from the Koh-e-Sufaid peaks. Surface water is abundant during the spring and summer months due to melting glaciers and seasonal monsoon rains. This river system is the lifeblood of the valley, supporting both human consumption and the extensive fruit orchards for which Parachinar is famous.[13]

Landi Kotal

142. Hydrologically, Landi Kotal sits within a high-stress watershed zone where surface water channels are almost entirely seasonal and dependent on rain fed mountain torrents. The groundwater table is deeply confined to localized fractured rock aquifers, showing very low transmissivity and hydraulic conductivity due to the dense mix of subterranean clay and gravels. Natural recharge occurs primarily through sporadic monsoon rains and high-altitude precipitation runoff, though much of this flash water rapidly drains away down the mountainous slopes. Because the local water table

[12] Khan, D., Ahmad, I., & Marwat, G. S. (2021). Assessment of drinking water sources for water quality, human health risks, and pollution sources: A case study of the District Bajaur, Pakistan. ResearchGate.
[13] Urban Policy Unit. (2020). Spatial/Structure Plan, Parachinar, Kurram: Final Report. Planning and Development Department, Government of Khyber Pakhtunkhwa

experiences steady depletion, finding reliable, high-yield groundwater extraction nodes requires detailed deep-bore geophysical mapping.[14]

Ghallanai, Mohmand

143. Hydrologically, Ghallanai relies on a fragile watershed system where groundwater resources are deeply confined to fractured rock aquifers and thin alluvial pockets. Surface water availability is highly seasonal, dictated by flash torrents during sporadic monsoon rains and dry winter spells that severely deplete local catchments. Due to changing climatic patterns, the local water table has experienced steady stress, requiring detailed geophysical and borehole mapping to identify sustainable extraction sites. The natural drainage of the town follows the slope of the valleys, leading down toward the primary river basins of the wider district [9]

Miran Shah, North Waziristan

144. Surface water resources in Miran Shah and the wider North Waziristan region are predominantly influenced by the Tochi River (Gambila River), which is the primary water source for the Tochi Valley. Additional important hydrological features include the Kaitu, Kurram, and Khaisora streams. Despite the presence of both perennial and seasonal watercourses, agricultural water availability remains limited. Only about 2% of cultivated land is served by formal irrigation infrastructure, while the remaining agricultural area largely depends on seasonal rainfall for crop production.[15]

Wana, South Waziristan

145. Surface water in South Waziristan is scarce and mostly seasonal, with flow depending on rainfall, runoff, and small local streams. Because of the dry climate and rugged relief, the district has limited dependable surface-water sources and many communities rely on groundwater or temporary water flows.[16]

Orakzai

146. Orakzai District's hydrology is mainly based on two major surface-water streams, the Mastura and Khanki Toi rivers, which originate in the western hills and flow eastward. The district is also dissected by numerous dry watercourses and seasonal streams, so surface water is limited and much of it is available only during rainfall or seasonal flow.[16]

147. Surface water hydrology Area is presented in **Figure 4.3.**

[14] *Urban Policy Unit Peshawar (Hydrological & Aquifer Assessment Data); Creative Engineering Consultants Spatial Master Planning.*

[16] *Technical Studies of Water Resources in FATA, IUCN, 2019. FATA Water Governance Project, FATA Environment Cell. 130 pp.*

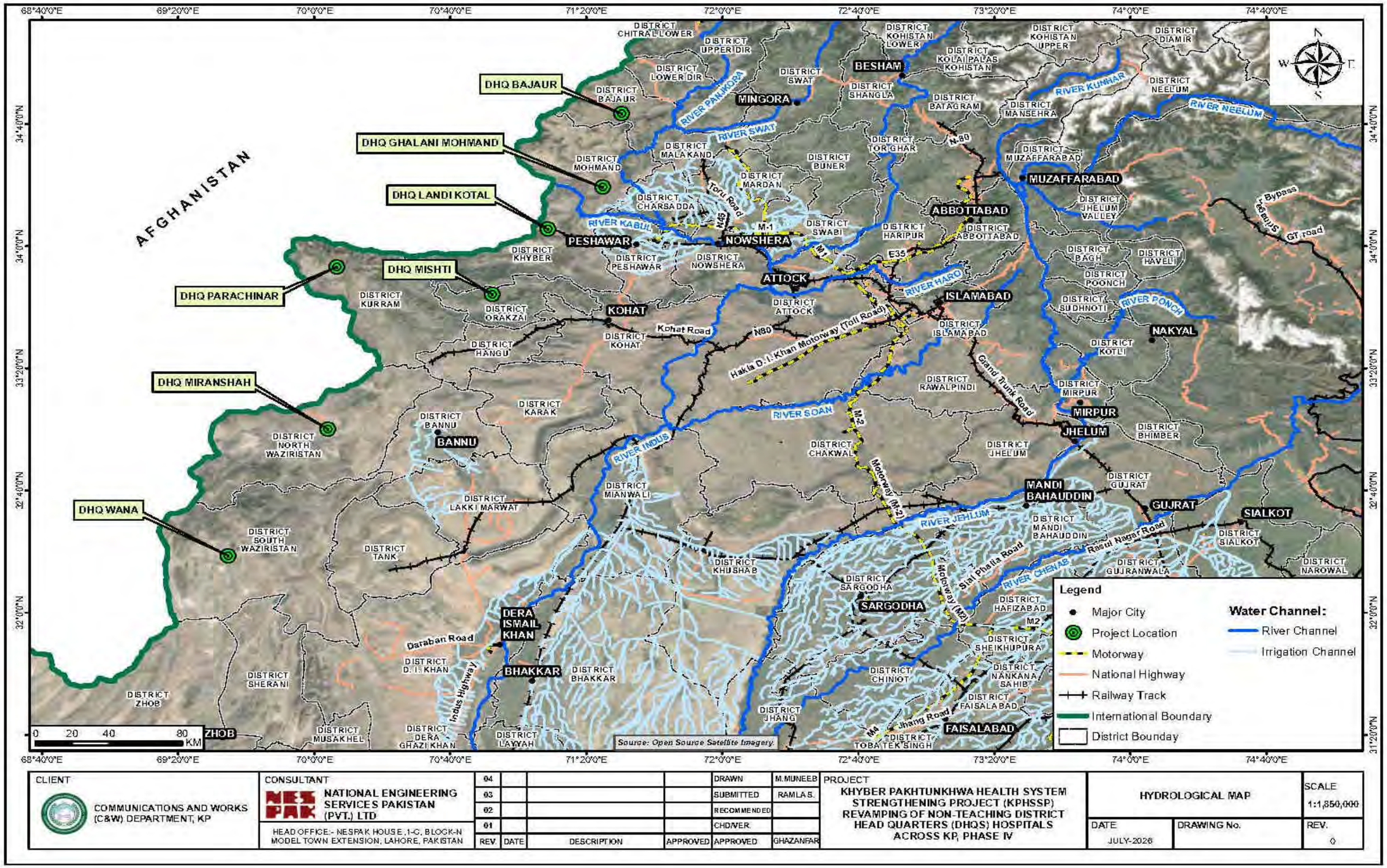


Figure 4.3: Surface Water Hydrology Near Study Area

4.4.5 Seismology

Khar, Bajaur

148. The project area is located in the Kohistan Island Arc physiographic province, a seismically active region which is sandwiched between the converging Indian and the Eurasian tectonic plates. Kohistan Island Arc is bounded by Main Karakorum Thrust (MKT) in the north and Main Mantle Thrust (MMT) in the south. The project area is located in the southwestern part of the Kohistan Island Arc close to the Kohistan Fault and MMT zone.

149. This region has been subjected to severe shaking in the past due to crustal earthquakes in Kohistan and western Himalayas and also deep earthquakes in the most active Hindukush seismic zone. Kohistan Island Arc itself shows low to moderate level of seismicity. The active tectonic features on the southern boundary of Kohistan Island Arc are the Main Mantle Thrust (MMT) zone and the strike Slip type Kohistan fault which pass at a closest distance of less than 4 km south of the project area. These features are considered active and are capable of producing damaging earthquakes.

Parachinar, Kurram

150. The project area falls in seismically active zone due to its proximity to the collisional zone between the Indian and Eurasian tectonic plates. The project area is located in western-most side of Himalayan Crystalline zone (Western Himalayas) where Main Boundary Thrust (MBT) joins the north-south extending Kurram Fault near the northern tip of the Zhob-Kurram Ophiolite belt. Transpressional plate boundary running almost north-south along Pak-Afghan border is also near the project area.

151. This region has been subjected to severe shaking in the past due to shallow earthquakes and also due to deep earthquakes of the Hindukush Seismic Zone which are felt frequently in the project area. The most important active crustal tectonic feature of regional extent is the Main Boundary Thrust (MBT) which is oriented almost east to west, dipping towards north and passes at a closest distance of about 12 km south of the project area. Gardez fault and Spinghar/Sarobi faults in Transpressional plate boundary area along Pak-Afghan border also pass within 30-40 km radius of the project area. All these features are considered active and are capable of producing damaging earthquakes.

Landi Kotal

152. The project area falls in the western part of Western Himalayas zone which is seismically active zone due to its proximity to the collisional zone between the two tectonic plates. The Project area is located in the Proterozoic meta-sedimentary rock bordering the western boundary of the Peshawar basin which is bounded by Panjal-Khairabad Fault in the south and Main Mantle Thrust in the north.

153. 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, moderate level of seismicity is present around the Peshawar basin which may be related to faults of the project region. The active crustal tectonic features of the project region are Khairabad fault which passes at a closest distance of about 15 km south of the project area, Main Boundary Thrust (MBT) which passes at a closest distance of about 50 km south of the project area and Main Mantle Thrust (MMT) zone which passes at a closest distance of about 32 km north of the project area. All these features are considered active and are capable of producing damaging earthquakes.

Ghallanai, Mohmand

154. The project area falls in the western part of Western Himalayas zone which is seismically active zone due to its proximity to the collisional zone between the two tectonic plates. The project area is located in the Proterozoic meta-sedimentary rocks bordering the northwestern boundary of the Peshawar basin which is bounded by Panjal-Khairabad Fault in the south and Main Mantle Thrust in the north.

155. 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, moderate level of seismicity is present around the Peshawar basin which may be related to faults of the project region. The active crustal tectonic features of the project region are Khairabad fault which passes at a closest distance of about 50 km south of the project area, Main Boundary Thrust (MBT) which passes at a closest distance of about 75 km south of the project area and the southern-most part of Main Mantle Thrust (MMT) zone which passes at a closest distance of about 12 km north of the project area. All these features are considered active and are capable of producing damaging earthquakes.

Miran Shah, North Waziristan

156. The project area falls in Bela-Zhob-Kurram Zone and Ophiolite belt, extending almost north-south along Chaman fault, which represents the transform boundary between Indian and Eurasian plate in western part of Pakistan. The project area is located in Parachinar-Waziristan ophiolite belt which is bounded on the east by Kohat Plateau and Bannu Basin and on the west by Katwaz Basin along border area of Afghanistan and Pakistan.

157. This region has been subjected to severe shaking in the past due to shallow earthquakes associated with active crustal tectonic features and also including the deep earthquakes of the Hindukush Seismic Zone which are felt frequently in the project area. The project region itself shows low to moderate level of seismic activity; however, high level of seismic activity is observed south of the project region.

158. The active crustal tectonic features around the Project area are the Kurram Thrust and the Chaman Fault. The north-south running Kurram Thrust dipping towards west

passes at a closest distance of about 19 km east of the project area. The north-south running Chaman faults, representing transform fault along plate boundary, passes at a closest distance of about 180 km west of the project area. Another un-named fault running nearly along Pak-Afghan border is passing at a closest distance of about 44 km west of the project area. All these features are considered active and are capable of producing damaging earthquakes.

Wana, South Waziristan

159. The project area falls in Bela-Zhob-Kurram Zone and Ophiolite belt, extending almost north-south along Chaman fault, which represents the transform boundary between Indian and Eurasian plate in western part of Pakistan. The project area is located in Parachinar-Waziristan ophiolite belt which is bounded on the east by Kohat Plateau and Bannu Basin and on the west by Katwaz Basin along border area of Afghanistan and Pakistan.

160. This region has been subjected to severe shaking in the past due to shallow earthquakes associated with active crustal tectonic features and also including the deep earthquakes of the Hindukush Seismic Zone which are felt frequently in the project area. The project region itself shows low to moderate level of seismic activity; however, high level of seismic activity is observed south of the project region.

161. The active crustal tectonic features around the Project area are the Kurram Thrust and the Chaman Fault. The north-south running Kurram Thrust dipping towards west passes at a closest distance of about 45 km east-northeast of the project area. The north-south running Chaman faults, representing transform fault along plate boundary, passes at a closest distance of about 160 km west of the project area. Another un-named fault running nearly along Pak-Afghan border is passing at a closest distance of about 28 km west of the project area. All these features are considered active and are capable of producing damaging earthquakes.

Mishti Mela, Orakzai

162. The project area falls in seismically active zone due to its proximity to the collisional zone between the two tectonic plates. The project area is located in western side of Himalayan Crystalline zone (Western Himalayas) north of the Kohat plateau which is bounded by Main Boundary Thrust (MBT) in the north.

163. 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. Kohat plateau itself shows low to moderate level of seismicity. The most important active crustal tectonic feature of regional extent is the Main Boundary Thrust (MBT) which is oriented almost east to west and dipping towards north and passes at a closest distance of about 20 km south of the project area. Khairabad fault passes at a closest distance of about 25 km north of the project area. All these features are considered active and are capable of producing damaging earthquakes.

Table 4.1: Spectral Horizontal Acceleration Values

Sr. No.	Spectral Horizontal Acceleration Values	Unit	Khar	Parachinar	Landi Kotal	Ghallanai,	Miran Shah	Wana	Orakzai
1.	Short Period Spectral Acceleration (Ss)	g	0.9993	0.7915	0.7649	0.9738	1.0188	1.0201	0.7771
2.	Long Period Spectral Acceleration (S1)	g	0.3639	0.2444	0.2662	0.3421	0.1934	0.2100	0.2441
3.	PGA (RP 2475 Years)	g	0.4629	0.3791	0.3677	0.4543	0.4754	0.4740	0.3748
4.	RP 475 Years	g	0.2697	0.1978	0.2024	0.2620	0.2681	0.2720	0.1959

4.4.6 Water Supply System

Khar, Bajaur

164. The main source of water supply in khar is the underground and sub soil water, extracted by means of shallow wells and tube wells.

Parachinar, Kurram

165. The water supply in Parachinar city is a hybrid of gravity-based systems and groundwater extraction. Much of the drinking water is diverted from mountain springs (locally known as *Chashmas*) via pipelines to storage tanks. In recent years, the Increasing population has led to the installation of several tube wells to supplement the gravity-fed supply. However, the maintenance of the aging pipe network remains a challenge for the local Water and Sanitation Services (WSSP) and the municipal administration (Government of Khyber Pakhtunkhwa, 2023).[17]

Landi Kotal, Khyber

166. The municipal water supply framework in Landi Kotal is severely strained, leaving the vast majority of the population without access to reliable, piped utility connections. Inhabitants secure daily water through a fragmented mix of community tube wells, private domestic boreholes, and traditional open dug wells, all of which face severe stress from declining water tables and chronic grid power outages. This structural deficit forces a heavy reliance on expensive commercial water tankers to meet primary household needs, a historical issue that has occasionally affected local military and civil outposts since the early colonial era. Modern infrastructure development projects are focused on introducing solar-powered extraction pumps and structured transmission pipelines to bridge the daily distribution gap.[18]

[17] Urban Policy Unit, Planning and Development Department, Government of Khyber Pakhtunkhwa. (2020). Final Parachinar report
[18] *Imperial Gazetteer of India (Khyber & Landi Kotal Historical Infrastructure Records); Urban Policy Unit Peshawar (Service Delivery Cluster Analysis).*

Ghallanai, Mohmand

167. The existing water supply infrastructure in Ghallanai is highly inadequate, marked by a severe lack of centralized utility pipelines for its scattered residential zones. The local population relies on a combination of private boreholes, open wells, and community tube wells, which face regular energy disruptions and fluctuating water tables. This shortage forces many residents to fetch water manually or buy it from commercial tankers, as the current municipal framework cannot meet basic daily water requirements. To resolve this, recent infrastructure master plans have initialized projects to implement solar-powered pumping systems and multi-stage water distribution networks to meet the growing daily demand.[19]

Miran Shah, North Waziristan

168. The water supply infrastructure in Miran Shah has historically faced significant challenges due to both the terrain and past periods of unrest. While official rehabilitation frameworks have prioritized the provision of basic services, the community remains heavily reliant on traditional water sources and localized schemes. In rural and mountainous parts of the district, indigenous communities often depend on natural springs and rainfall-fed sources for daily necessities.[20]

Wana, South Waziristan

169. Water supply in South Waziristan mainly depends on groundwater, wells, tubewells, and local schemes, rather than a fully developed piped network. Access to safe drinking water has remained a major issue in the region, especially in rural and underserved communities.

Orakzai

170. Water supply in Orakzai District is supported through government and public health engineering schemes, with many areas relying on local sources such as springs, small water supply systems, and pumping facilities. Official records show that water supply and sanitation schemes have been launched in the district, indicating ongoing efforts to improve access to safe drinking water.

4.4.7 Sewerage System

Khar, Bajaur

171. In Khar town underground sewerage system does not exist. Soakage pits and septic tanks have been made in the houses. On streets and main roads, open CC drains are constructed and these drains are serving both open and sewers and storm water drains. These drains finally fall into the tributaries of Panjkora River. These drains are

[19] DAWN News Master Plan to Resolve Civic Issues of Ghalanai; Creative Engineering Consultants / Public Health Engineering Department KP Water Supply Master Plan.
[20] Draft Master Plan – Miran Shah / Mir Ali Cities Master Plan 2043,2022- SS/UND/MP/2021-40 Local Government, Elections & Rural Development Department Government of Khyber Pakhtunkhwa (GoKP) United Nations Development Programme (UNDP)

functional but are mostly full of garbage and vegetation, indicating lack of maintenance [21]

Parachinar, Kurram

172. Parachinar lacks a centralized, modern sewage treatment plant. The drainage system consists primarily of open drains alongside streets that carry domestic wastewater. Most of these drains eventually discharge into local streams or the Kurram River without prior treatment, leading to localized environmental contamination. In residential areas, septic tanks are the most common method for managing household sewage, though their efficacy varies based on soil permeability and construction quality (Environmental Protection Agency, KP, 2024).[22]

Landi Kotal

173. There is no underground or covered municipal sewerage system operational anywhere in the main urban zones or residential clusters of Landi Kotal. Domestic wastewater and graywater from households flow freely into open-surface roadside drains or directly saturate the soil adjacent to residential compounds. A significant portion of the older town infrastructure still functions without standardized flush latrines or properly engineered septic tanks, leading to persistent ponding of raw sewage in low-lying valley pockets. This total absence of containment or treatment plants creates major sanitation hazards, risking the cross-contamination of shallow drinking water wells during sudden rainfall events.[23]

Ghallanai, Mohmand

174. Ghallanai lacks any underground or covered municipal sewerage network, forcing wastewater to flow through primitive open-surface drains. A large percentage of local households do not have access to standardized flush latrines, resulting in domestic graywater and human waste discharging directly into open areas, streets, or nearby garbage heaps. This severe structural deficiency creates localized standing pools of wastewater, resulting in persistent sanitation problems and high dissatisfaction among residents. Urban planning datasets indicate that the city will require specialized networks to safely manage and treat an estimated 0.3 million gallons of daily wastewater as the urban population expands.[24]

Miran Shah, North Waziristan

175. Miran Shah has a very limited and underdeveloped sewerage infrastructure. The city lacks a comprehensive underground sewerage network and centralized wastewater treatment system. Domestic wastewater from residential, commercial, and institutional

[21] Structure-Plan-MC-Khar-Final-Report-JAN-2013
[22] Urban Policy Unit. (2020). Spatial/Structure Plan, Parachinar, Kurram: Final Report. Planning and Development Department, Government of Khyber Pakhtunkhwa, Peshawar, Pakistan
[23] Urban Policy Unit Peshawar (Municipal Infrastructure Sector Profiling); Creative Engineering Consultants FATA Urban Centers Program.
[24] Urban Policy Unit Peshawar (Structure Planning Infrastructure Report); Creative Engineering Consultants Feasibility & Design of Sewerage Systems in Merged Areas.

areas is primarily discharged through open surface drains (nullahs), roadside channels, and informal drainage networks.[25]

Wana, South Waziristan

176. Wana has a limited sewerage network and no centralized wastewater treatment facility. Domestic wastewater is primarily disposed of through septic tanks, soak pits, and open surface drains, which ultimately discharge untreated effluent into natural drainage channels. The existing sewerage infrastructure is inadequate to meet current and future urban demands, resulting in localized sanitation and environmental issues.[26]

Orakzai

177. The sewerage and drainage system in Orakzai District is not fully developed and is mainly dependent on natural drainage patterns, open channels, and seasonal watercourses. In hilly terrain, runoff generally moves through slopes and dry nullahs, so drainage is more natural than engineered in many areas.[27]

4.4.8 Climate of Khar, Bajaur

178. Khar (Bajaur) experiences a hot semi-arid to subtropical continental climate characterized by mild winters, very hot summers, and a rainfall regime influenced by both the summer monsoon and occasional western disturbances. Based on meteorological baseline data (2010–2025), mean monthly maximum temperatures generally range from a winter low of 23°C in January (2012/2014) to summer highs of 45°C in May (2010, 2022 and 2024), while mean monthly minimum temperatures vary from 11°C in January (2011, 2021 and 2023) to 31°C in July (2024). The average annual maximum temperature ranges between 33.92°C and 36.00°C, whereas the average annual minimum temperature varies from 22.25°C to 23.83°C. Rainfall is highly seasonal, with most precipitation occurring during the summer monsoon (July–September), although occasional pre-monsoon and winter rainfall is also observed. The highest monthly rainfall reached 449.87 mm in September 2011, followed by 443.68 mm in August 2011, while exceptionally heavy monsoon events also occurred in August 2022 (307.5 mm) and July 2015 (241.52 mm). Mean relative humidity generally remains moderate, declining to 18% in February 2015 during the dry season and increasing to 66% during August–September in the monsoon period, with average annual humidity ranging from 32.50% to 38.17%. Wind conditions are generally moderate, with annual average wind speeds ranging from 11.64 to 18.93 km/h, and the strongest monthly winds recorded during the late spring and early summer, reaching 29.1 km/h in August 2023.

[25] Draft Master Plan – Miran Shah / Mir Ali Cities Master Plan 2043,2022- SS/UND/MP/2021-40 Local Government, Elections & Rural Development Department Government of Khyber Pakhtunkhwa (GoKP) United Nations Development Programme (UNDP)
[26] Local Government, Elections & Rural Development Department, Government of Khyber Pakhtunkhwa (GoKP) and United Nations Development Programme (UNDP), Draft Master Plan – Wana City, Task C, 2022.
[27] Kalaya Master Plan 2040, 2024 – Volume II: Draft Master Plan of Kalaya Master Plans for the Urban Centres of Merged Areas in Khyber Pakhtunkhwa

4.4.9 Climate of Parachinar, Kurram

179. Parachinar experiences a temperate continental highland climate characterized by cold winters, mild to warm summers, and a precipitation regime influenced by both western disturbances and the South Asian summer monsoon. Based on meteorological baseline data (2010–2025), mean monthly maximum temperatures generally range from a winter daytime low of 1°C in January (2020) to summer peaks of 30°C in July (2012) and June (2011), while mean monthly minimum temperatures decline to -9°C in January (2012) and rise to 18°C during July (2016, 2017, 2021 and 2022) and August (2017, 2018 and 2020). The average annual maximum temperature ranges between 16.80°C and 19.20°C, whereas the average annual minimum temperature varies from 5.00°C to 7.90°C. Precipitation is controlled by late winter and spring western disturbances together with summer monsoon activity, resulting in two distinct wet periods during the year. The highest monthly precipitation reached 280.61 mm in July 2010, followed by 255.07 mm in August 2013, 254.87 mm in May 2018, 230.57 mm in April 2024, 229.08 mm in April 2019, and 223.12 mm in March 2016. Mean relative humidity exhibits pronounced seasonal variation, decreasing to a dry-season low of 18% in November 2025 and increasing to a peak of 76% in February 2011, while average annual humidity generally ranges between 42.10% and 55.00%. Wind conditions remain light to moderate throughout the year, with annual average wind speeds ranging from 4.60 to 7.18 km/h, while the strongest monthly winds occur during late spring and early summer, reaching 8.7 km/h in May 2010 and 8.1 km/h in May 2022.

4.4.10 Climate of Landi Kotal

180. Landi Kotal experiences a subtropical continental climate characterized by cool winters, warm to hot summers, and a bimodal precipitation regime influenced by both western disturbances and the South Asian summer monsoon. Based on meteorological baseline data (2010–2025), mean monthly maximum temperatures generally range from a winter daytime low of 10°C in January (2012, 2017, 2019 and 2020) to summer peaks of 38°C in June (2024 and 2025), while mean monthly minimum temperatures vary from 2°C in January and February (2012) to 26°C during July (2012, 2013, 2020 and 2024) and June (2025). The average annual maximum temperature ranges between 23.08°C and 26.50°C, whereas the average annual minimum temperature varies from 14.17°C to 16.83°C. Precipitation is influenced by both western disturbance systems during late winter and spring and the summer monsoon, with exceptionally heavy rainfall occurring during July and August. The highest monthly precipitation reached 539.37 mm in July 2010, followed by 349.17 mm in August 2010, while other notable rainfall events included 319.80 mm in August 2013, 301.18 mm in July 2017, and 283.29 mm in August 2015. Mean relative humidity exhibits considerable seasonal variation, declining to a dry-season low of 16% in November 2025 and increasing to a monsoon peak of 67% in February 2011 and 66% in August 2010, with average annual humidity generally ranging between 32.17% and 44.17%. Wind conditions remain generally light to moderate throughout the year, with annual average wind speeds ranging from 6.54 to 7.83 km/h, while the strongest monthly winds occur during late spring and summer, reaching 11.0 km/h in May 2024.

4.4.11 Climate of Ghallanai, Mohmand

181. Ghallanai experiences a hot semi-arid to subtropical continental climate characterized by mild winters, extremely hot summers, and a rainfall regime influenced by both western disturbances and the South Asian summer monsoon. Based on meteorological baseline data (2010–2025), mean monthly maximum temperatures generally range from a winter daytime low of 9°C in December (2017) to summer peaks of 47°C in August (2018) and 43°C in June (2024), while mean monthly minimum temperatures vary from 5°C in January (2011, 2012, 2013 and 2023) to 32°C in October (2013) and 31°C in June (2025). The average annual maximum temperature ranges between 28.50°C and 30.92°C, whereas the average annual minimum temperature varies from 18.00°C to 19.58°C. Precipitation is governed by winter and spring western disturbances together with intense summer monsoon activity, producing highly variable rainfall throughout the year. The heaviest monthly rainfall occurred in July 2013 (1,443.55 mm), followed by July 2010 (646.92 mm), while other significant monsoon events included August 2024 (367.30 mm), August 2017 (362.73 mm), July 2015 (346.85 mm) and August 2013 (326.43 mm). Mean relative humidity shows marked seasonal variability, declining to a dry-season low of 18% in June 2014 and increasing to a peak of 67% in February 2011, while average annual humidity generally ranges from 31.33% to 40.25%. Wind conditions are generally light to moderate, with annual average wind speeds ranging from 5.51 to 7.70 km/h (excluding the anomalous 2021 annual value, which appears inconsistent with the monthly data), while the strongest monthly winds occur during late spring and summer, reaching 11.6 km/h in May 2024 and 11.5 km/h in July 2025.

4.4.12 Climate of Miran Shah, North Waziristan

182. Miran Shah experiences a hot semi-arid to subtropical continental climate characterized by mild winters, hot summers, and a rainfall regime influenced by both western disturbances and the South Asian summer monsoon. Based on meteorological baseline data (2010–2025), mean monthly maximum temperatures generally range from a winter daytime low of 11°C in January (2012 and 2020) to summer peaks of 40°C in February (2011) and 38°C in June (2024 and 2025), while mean monthly minimum temperatures vary from 1°C in January (2012) to 27°C in July (2024). The average annual maximum temperature ranges between 24.00°C and 27.40°C, whereas the average annual minimum temperature varies from 14.20°C to 17.10°C. Precipitation is governed by late winter and spring western disturbances together with summer monsoon activity, with the majority of rainfall occurring during July and August. The highest monthly precipitation reached 354.58 mm in August 2010, closely followed by 354.11 mm in August 2013, while other notable rainfall events included 298.20 mm in July 2016, 230.63 mm in July 2010, 218.48 mm in August 2024, 209.80 mm in August 2012, and 204.47 mm in February 2013. Mean relative humidity exhibits marked seasonal variation, decreasing to a dry-season low of 13% in November 2025 and increasing to a peak of 62% in March 2020, while average annual humidity generally ranges between 29.90% and 39.10%. Wind conditions remain light to moderate throughout the year, with annual average wind speeds ranging from 7.20 to 9.30 km/h, while the strongest monthly winds occur during late

spring and early summer, reaching 12.4 km/h in June 2025 and 11.4 km/h in August 2025.

4.4.13 Climate of Wana, South Waziristan

183. Wana, South Waziristan experiences a semi-arid to temperate mountain climate characterized by cool winters, warm to hot summers and variable precipitation throughout the year. Based on available data (2010–2025), mean monthly maximum temperatures generally range from about -3°C in winter to 29°C in peak summer, with the highest temperatures commonly recorded during June and July. Mean monthly minimum temperatures vary from around -12°C in February to 20°C during July. Average annual maximum temperature ranges between 14.6°C and 18.0°C, while annual minimum temperature varies from 5.8°C to 9.3°C. Rainfall is variable and occurs throughout the year, with relatively higher precipitation during late winter, spring and selected summer months; the highest monthly rainfall recorded was about 172.7 mm in April 2019, while August 2022 also recorded substantial rainfall of about 165.2 mm. Mean relative humidity generally ranges from 24% to 91%, with higher humidity during winter and spring and lower values during summer and early autumn. Average wind speed remains moderate to relatively strong, ranging from approximately 19.6 to 22.5 km/h annually, with comparatively higher wind speeds during winter and spring months.

4.4.14 Climate of Orakzai

184. Mishti Mela, located in Orakzai District, experiences a warm temperate climate characterized by hot summers, cool winters, and a pronounced monsoon season. Based on climate records for 2010–2025, the mean annual maximum temperature ranges from 23.1°C to 26.3°C, while the mean annual minimum temperature varies between 14.2°C and 16.8°C. The hottest months are May to July, when maximum temperatures typically reach 35–38°C, whereas the coldest period occurs during December to February, with minimum temperatures falling to 2–7°C. Annual precipitation ranges from approximately 44 mm to 127 mm, with the majority of rainfall occurring during the monsoon season (July–September), when intense rainfall events are common. Mean annual relative humidity varies between 31.9% and 43.9%, increasing during the monsoon months and remaining comparatively lower during late autumn and early summer. Average annual wind speeds range from approximately 6.5 to 7.8 km/h, indicating generally light to moderate winds throughout the year. Overall, the climate is characterized by hot summers, cool winters, seasonal monsoon rainfall, and moderate humidity, which collectively influence local hydrology, vegetation, and agricultural activities.

4.4.15 Floods

185. The project districts of Bajaur (Khar), Kurram (Parachinar), Khyber (Landi Kotal), Mohmand (Ghallanai), North Waziristan (Miran Shah), South Waziristan (Wana), and Orakzai (Mishti Mela) are predominantly characterized by rugged mountainous terrain, narrow valleys, and seasonal drainage networks, making them highly susceptible to flash floods, hill torrents, debris flows, and localized riverine flooding. Flooding is

primarily triggered by intense monsoon rainfall, cloudburst events, and rapid runoff through ephemeral streams (nullahs), while localized flooding also occurs along the Kurram River, Tochi River (Gambila), and Kabul River tributaries. Historical flood events, particularly those during the 2010 and 2022 monsoon floods, caused significant damage to road infrastructure, bridges, irrigation channels, agricultural land, public utilities, and settlements across the merged districts. Climate change is expected to increase the intensity and frequency of extreme rainfall events, resulting in greater flash flood risks, accelerated soil erosion, and sediment transport in these mountainous catchments. Consequently, flood resilience, adequate drainage design, and protection of natural watercourses should be incorporated into project planning and implementation.

4.4.16 Climate Change

186. The project districts are located in Khyber Pakhtunkhwa and exhibit diverse climatic conditions due to differences in elevation, terrain, and geographic setting. Parachinar and Mishti Mela (Orakzai) experience relatively cooler conditions due to their higher elevations but are vulnerable to heavy snowfall, intense rainfall, flash floods, and landslides. Khar (Bajaur), Landi Kotal (Khyber), and Ghalanai (Mohmand) are exposed to increasing temperatures, intense rainfall, flash flooding, landslides, and water stress. Miran Shah (North Waziristan) and Wana (South Waziristan) are comparatively warmer and drier and are particularly susceptible to extreme heat, prolonged dry periods, drought, water scarcity, and dust storms, while intense rainfall may also result in flash flooding. Climate change may further increase the frequency and intensity of extreme heat, heavy rainfall, flooding, drought, and associated water and environmental stresses across these districts.

4.4.17 Solid Waste System

Khar, Bajaur

187. Solid waste management in Khar is significantly underdeveloped and relies on basic municipal setups with no engineered sanitary landfills. Following its administrative merger into Khyber Pakhtunkhwa, waste generation has outpaced handling capacities due to rapid commercial growth in Khar Bazar. Municipal teams collect only a fraction of daily refuse, leading to open-air dumping on vacant plots, hillsides, and directly into the banks of the Bajaur Khwar. Between 2015 and 2025, plastic pollution has emerged as a major threat, leading to blocked water channels, soil degradation, and open-air burning of toxic waste.

Parachinar, Kurram

188. Solid waste management in Parachinar is handled by the local municipal committee. While waste collection has improved since the merger of the tribal areas into Khyber Pakhtunkhwa, the city still struggles with the absence of a scientific sanitary landfill. Waste is generally collected from designated points and transported to open dumping sites located on the outskirts of the city. Efforts are currently underway through

provincial development programs to establish more sustainable "Integrated Resource Recovery Centers" to manage the increasing urban waste (UNDP Pakistan, 2023).

Landi Kotal, Khyber

189. Landi Kotal generates an increasing volume of municipal solid waste daily, yet it entirely lacks an integrated, council-run collection, transportation, and sanitary disposal network. Commercial refuse from the bustling local bazaars and household garbage are routinely dumped onto open hillsides, dry seasonal streams, or designated communal plots near roadsides. These scattered, open-air dumps create prominent ecological and visual blight, causing secondary issues such as blocked stormwater conduits and localized burning of plastic waste. Current urban infrastructure master plans for the town are targeting the establishment of proper sorting facilities and sanitary landfills to handle the expanding waste footprint safely.[28]

Ghallanai, Mohmand

190. There is no formal, municipal-run system for the collection and disposal of solid waste within the Ghallanai urban center and its surrounding villages. Inhabitants historically rely on traditional disposal methods, dumping household and commercial garbage into designated open spaces or roadside heaps known locally as *Deran*. These scattered dumps are highly visible across the main bazaar area, causing severe aesthetic and environmental challenges due to the lack of intermediate sorting or recycling infrastructure. Projections show that solid waste generation is expected to rise to approximately 15 tons per day within the coming decade, prompting authorities to design new integrated collection and safe transportation frameworks.[29]

Miran Shah, North Waziristan

191. The solid waste management system in Miran Shah is currently undergoing a transition from informal practices to a structured municipal framework following the merger of the Tribal Areas into Khyber Pakhtunkhwa. Historically, the region lacked formal collection and disposal sites, leading to the accumulation of waste in open spaces or local water bodies. Under the post-rehabilitation socio-economic frameworks, the local government has initiated the installation of waste bins and designated disposal points within Miran Shah's urban center. These efforts aim to mitigate environmental degradation and prevent the clogging of local drainage channels, though the implementation of advanced waste treatment facilities remains a long-term developmental goal.[25]

Wana, South Waziristan

192. Solid waste management in Wana is limited, with waste collection services covering only parts of the urban area. Municipal solid waste is generally collected through

[28] *Urban Policy Unit Peshawar (Final Structure Plan for Landi Kotal); Creative Engineering Consultants Municipal Infrastructure Review.*
[29] *Urban Policy Unit Peshawar (FATA Urban Centers Project: Structure Plan for Ghalanai); DAWN News Urban Structure Plan Infrastructure Review.*

conventional methods and disposed of at open dumping sites, while waste segregation, recycling, and sanitary disposal practices are largely absent. Inadequate collection coverage and improper disposal contribute to environmental degradation and public health concerns.[26]

Orakzai

193. Solid waste management in Orakzai District is limited and largely handled through basic local arrangements rather than a fully developed municipal collection system. Like many rural and tribal districts in Khyber Pakhtunkhwa, waste disposal is still a developing service area, with improvements needed in collection, transport, and safe disposal.[30]

4.4.18 Environmental Monitoring

194. Environmental monitoring, sampling, and testing of the proposed project were carried out in April 2026 by a third-party laboratory, M/s PakGreen Laboratories, certified by EPA-KP. Results of Air, Noise and Water are provided in **Table 4.2 to 4.5.** Detailed environmental monitoring, sampling and testing results have been provided as **Annexure-III** of this report.

Ambient Air

195. 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 $PM_{2.5}$ exceeded at Khar Bajaur, Parachinar Kurram, Miran Shan North Waziristan and Wana South Waziristan. 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 Wana, the area's dry climatic conditions and dust-prone environment may contribute to comparatively higher $PM_{2.5}$ concentrations.

Noise Level

196. 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. Noise levels exceeded the applicable standards at Khar, Parachinar, Ghallanai, Wana, and Mishti Mela during both daytime and nighttime, while Miran Shah exceeded the daytime limit only. Landi Kotal remained within the applicable NEQS limits during both periods. The elevated levels are mainly attributed to traffic, commercial activities, and public movement.

[30] Kalaya Master Plan 2040, 2024 – Volume II: Draft Master Plan of Kalaya Master Plans for the Urban Centres of Merged Areas in Khyber Pakhtunkhwa

Wastewater

197. 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, COD and TSS was observed at Parachinar Kurram, Landi Kotal Khyber and Ghallanai Mohammad and AS and Mn at Parachinar Kurram and Ghallanai Mohammad.

Groundwater / Drinking Water

198. 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. All parameters were within the NEQS limits.

Table 4.2: Ambient Air Monitoring Results

Sr. No.	Parameters	Monitoring Duration	NEQS, 2010	Average Concentration						
				DHQ Hospital Khar, Bajaur	DHQ Hospital Parachinar	DHQ Hospital Landi kotal	DHQ Hospital Ghallanai	DHQ Hospital Miran Shah	DHQ Hospital Wana	DHQ Mishti Mela
1.	Nitrogen Dioxide (NO_2)	24 Hours	80 µg/m^3	29.95	36.08	31.25	32.55	24.05	37.62	25.06
2.	Nitrogen Oxide (NO)	24 Hours	40 µg/m^3	12.04	14.37	14.18	11.74	12.78	11.81	11.44
3.	Sulphur Dioxide (SO_2)	24 Hours	120 µg/m^3	38.2	40.33	41.03	40.20	34.63	43.78	32.47
4.	Carbon Monoxide (CO)	8 Hours	5.0 mg/m^3	1.6	1.68	1.25	1.48	0.99	1.66	0.92
5.	Ozone (O_3)	1 Hour	130 µg/m^3	65.7	69.1	63.8	62.5	57.6	70.3	63.7
6.	Particulate Matter (PM_{10})	24 Hours	150 µg/m^3	148.2	147.4	125.1	146.3	**90.6**	147.9	148.6
7.	Particulate Matter ($PM_{2.5}$)	24 Hours	35 µg/m^3	**46.9**	**49.3**	28.7	29.8	26.4	**46.3**	**42.7**
8.	Lead	24 Hours	1.5 µg/m^3	0.01	0.02	0.01	0.01	0.01	0.01	0.01
9.	SPM	24 Hours	500 µg/m^3	451.3	448.6	413.6	435.4	413.9	459.8	436.5

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	DHQ Hospital Khar,	34.725063 °N	71.50653 °E	24 Hours	Day Time	**52.5**	50
					Night Time	**48.1**	45
2	DHQ Hospital Parachinar	33.531657°N	70.064003°E	24 Hours	Day Time	**61.8**	50
					Night Time	**52.4**	45
3	DHQ Hospital Landi kotal	34.053224°N	71.084441°E	24 Hours	Day Time	48.7	50
					Night Time	44.5	45
4	DHQ Hospital Ghallanai	34.190991°N	71.244241°E	24 Hours	Day Time	**59.4**	50
					Night Time	**50.2**	45
5	DHQ Hospital Miran Shah	33.000937°N	70.040104°E	24 Hours	Day Time	**52.8**	50
					Night Time	44.6	45
6	DHQ Hospital Wana	32.175560°N	69.354922°E	24 Hours	Day Time	**63.3**	50
					Night Time	**52.5**	45
7	DHQ Mishti Mela	33.442239°N	70.521929°E	24 Hours	Day Time	**62.3**	50
					Night Time	**50.4**	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	DHQ Hospital Khar	DHQ Hospital Parachinar	DHQ Hospital Landi kotal	DHQ Hospital Ghallanai	DHQ Hospital Miran Shah	DHQ Hospital Wana	DHQ Mishti Mela
Field Analysis										
1	Temperature	°C	40	22.9	22.5	23.9	22.6	23.1	23.8	23
Laboratory Analysis										
2	pH**		6 - 9	6.969 at 23.9°C	7.420 at 23.6°C	6.913 at 23.9ºC	7.420 at 23.6°C	8.375 at 23.8°C	7.438 at 23.8°C	7.476 at 23°C
3	Biochemical Oxygen Demand (BOD_5) *	mg/L	80	20	**1725**	**378**	**1724**	68	18	28
4	Chemical Oxygen Demand (COD)**	mg/L	150	32	**2816**	**608**	**2785**	127	28	40
5	Total Suspended Solids (TSS)**	mg/L	200	12	**1535**	**300**	**1550**	75	10	15
6	Total Dissolved Solids (TDS)**	mg/L	3500	350	770	780	740	964	890	320
7	Phenolic Compounds (as Phenols) *	mg/L	0.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL
8	Grease and Oil**	mg/L	10	BDL	BDL	BDL	BDL	BDL	BDL	BDL
9	Chloride (Cl^-)**	mg/L	1000	20	45	105	50	130	125	5
10	Fluoride (F^-)**	mg/L	10	0.6	0.7	1	0.6	0.8	0.9	0.4
11	Cyanide (CN)*	mg/L	1.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL
12	An-ionic Detergents (as MBAs) *	mg/L	20.0	0.025	0.488	0.246	0.488	0.027	0.038	0.042

Sr. No.	Parameter	Units	NEQS 2010	DHQ Hospital Khar	DHQ Hospital Parachinar	DHQ Hospital Landi kotal	DHQ Hospital Ghallanai	DHQ Hospital Miran Shah	DHQ Hospital Wana	DHQ Mishti Mela
13	Sulfate ($SO_4^{-2)}$ **	mg/L	600	20	BDL	85	BDL	127	110	30
14	Sulfide (S^{-2}) *	mg/L	1.0	BDL	BDL	**1.8**	BDL	BDL	BDL	BDL
15	Ammonia (NH_3) *	mg/L	40	2.5	**89.3**	**68.9**	**78.8**	9.5	1.1	2.9
16	Cadmium (Cd)	mg/L	0.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17	Chromium (Cr)	mg/L	1.0	0.1376	0.2177	0.1949	0.2170	BDL	BDL	0.1249
18	Copper (Cu)	mg/L	1.0	BDL	0.3439	0.0708	0.3442	0.0247	0.0219	BDL
19	Lead (Pb)	mg/L	0.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20	Mercury (Hg)	mg/L	0.01	BDL	BDL	BDL	BDL	BDL	BDL	BDL
21	Selenium (Se)	mg/L	0.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL
22	Nickel (Ni)	mg/L	1.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL
23	Silver (Ag)	mg/L	1.0	BDL	0.0333	BDL	0.0333	BDL	BDL	BDL
24	Total Toxic Metals	mg/L	2.0	0.1376	0.5940	0.2657	0.5849	0.0247	0.0219	0.1249
25	Zinc (Zn)	mg/L	5.0	0.0105	0.5949	0.4971	0.5949	0.0862	0.0855	BDL
26	Arsenic (As)	mg/L	1.0	BDL	**1.8518**	BDL	**1.8544**	BDL	BDL	BDL
27	Barium (Ba)	mg/L	1.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL
29	Iron (Fe)	mg/L	8.0	0.1806	BDL	6.8709	BDL	2.3650	1.6671	0.1312
30	Manganese (Mn)	mg/L	1.5	0.0618	**115.8854**	0.3804	**115.8740**	0.0992	0.0219	0.0462
31	Boron (B)	mg/	6.0	BDL	1.7820	BDL	1.7822	BDL	BDL	BDL

Sr. No.	Parameter	Units	NEQS 2010	DHQ Hospital Khar	DHQ Hospital Parachinar	DHQ Hospital Landi kotal	DHQ Hospital Ghallanai	DHQ Hospital Miran Shah	DHQ Hospital Wana	DHQ Mishti Mela
		L								
32	Residual Chlorine (Cl_2)	mg/L	1.0	BDL	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	Hospital Khar	DHQ Hospital Parachinar	DHQ Hospital Landi kotal	DHQ Hospital Ghallanai	DHQ Hospital Miran Shah	DHQ Hospital Wana	DHQ Mishti Mela
Field Analysis										
1	Temperature	°C	---	23.9°C	23.4°C	23.9°C	23.4°C	23°C	23.8°C	23°C
Laboratory Analysis										
2	Color*	TCU	≤ 15	0.000	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	Non-Objectionable
4	Odor*	---	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable
5	Turbidity*	NTU	< 5	0.30	0.35	0.42	0.34	0.27	0.20	0.32
6	Total Hardness (as CaCO3) **	mg/L	< 500	180	260	300	265	169	180	250
7	Total Dissolved Solids (TDS)**	mg/L	< 1000	270	350	505	390	615	630	332
8	pH**	---	6.5- 8.5	8.215 at 23.4ºC	8.080 at 23.4ºC	7.890 at 23.9ºC	7.081 at 23.4ºC	7.650 at 23.0ºC	7.770 at 23.9ºC	7.496 at 23.9ºC
9	Aluminum (Al)	mg/L	≤ 0.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL
10	Antimony (Sb)	mg/L	≤ 0.005	BDL	BDL	BDL	BDL	BDL	BDL	BDL
11	Arsenic (As)	mg/L	≤ 0.05	BDL	BDL	BDL	BDL	BDL	BDL	BDL
12	Barium (Ba)	mg/L	0.7	BDL	BDL	BDL	BDL	BDL	BDL	BDL
13	Boron (B)	mg/L	0.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL
14	Cadmium (Cd)	mg/L	0.01	BDL	BDL	BDL	BDL	BDL	BDL	BDL

Sr. No.	Parameter	Units	NEQS Limits	Hospital Khar	DHQ Hospital Parachinar	DHQ Hospital Landi kotal	DHQ Hospital Ghallanai	DHQ Hospital Miran Shah	DHQ Hospital Wana	DHQ Mishti Mela
15	Chloride (Cl^-) **	mg/L	< 250	10	25	45	15	55	60	5
16	Chromium (Cr)	mg/L	≤ 0.05	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17	Copper (Cu)	mg/L	2.0	BDL	0.0289	BDL	0.0289	BDL	BDL	BDL
18	Cyanide (CN^-)*	mg/L	≤ 0.05	BDL	BDL	BDL	BDL	BDL	BDL	BDL
19	Fluoride (F^-)**	mg/L	≤ 1.5	0.2	0.7	0.5	0.4	0.6	0.6	0.3
20	Lead (Pb)	mg/L	≤ 0.05	BDL	BDL	BDL	BDL	BDL	BDL	BDL
21	Manganese (Mn)	mg/L	≤ 0.5	0.0200	BDL	0.0087	BDL	BDL	BDL	0.0132
22	Mercury (Hg)	mg/L	≤ 0.001	BDL	BDL	BDL	BDL	BDL	BDL	BDL
23	Nickel (Ni)	mg/L	≤0.02	BDL	BDL	BDL	BDL	BDL	BDL	BDL
24	Nitrate (NO^{-3}) **	mg/L	≤ 50	BDL	BDL	BDL	BDL	0.689	0.684	BDL
25	Nitrite (NO^{-2}) *	mg/L	≤ 3.0	BDL	BDL	BDL	BDL	0.237	0.244	BDL
26	Selenium (Se)	mg/L	0.01 mg/L	BDL	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	BDL
28	Phenolic Compounds (as Phenols)	mg/L	NGVS	BDL	BDL	BDL	BDL	BDL	BDL	BDL
29	Zinc (Zn)	mg/L	5.0	BDL	0.0069	0.0456	0.0067	BDL	BDL	BDL
30	Iron (Fe)	mg/L	-	BDL	0.2757	BDL	0.2856	BDL	BDL	BDL
Microbiological Analysis										
31	E. Coli	Number/100 mL	Must not be detectable in any 100ml sample	NIL	NIL	NIL	NIL	NIL	NIL	NIL
32	Total Coliforms	Number/100 mL		NIL	NIL	NIL	NIL	NIL	NIL	NIL
33	Fecal Coliforms	Number/100 mL		NIL	NIL	NIL	NIL	NIL	NIL	NIL

NEQS = National Environmental Quality Standards **BDL=** Below detective Level **NO =** Non-Objectionable

4.4.19 Land Use Pattern

199. 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 proportion of Land use in Project boundary.

Table 4.6: Landuse land use characteristics within hospital premises

Landuse Type	DHQ Hospital Khar	DHQ Hospital Parachinar	DHQ Hospital Landi Kotal	DHQ Hospital Ghallanai	DHQ Hospital Miran Shah	DHQ Hospital Wana	DHQ Hospital Mishti Mela
	Acres						
Barren / Open Land	11.038	17.704	6.632	5.048	7.663	40.351	11.372
Built-up Area	24.115	18.278	9.835	6.936	13.619	19.928	4.122
Parking	-	-	0.724	-	1.180	-	-
Road / Track	6.796	6.053	2.181	3.023	5.025	5.792	1.706
Cultivated Land	17.665	-	-	-	-	2.024	-
Graveyard	-	-	-	-	-	-	-
Park	1.085	-	-	-	2.278	0.304	-
Stream / Nullah	-	-	-		-	-	-
Trees / Bushes	-	-	-	-	-	-	-

4.4.20 Environmental Sensitive Receptors

200. 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.

201. 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.

202. Land use and Sensitive receptors map is attached as **Annexure-IV**

4.4.21 Environmental Compliance Status

Environmental Compliance Status of Hospital facilities in Phase IV 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).

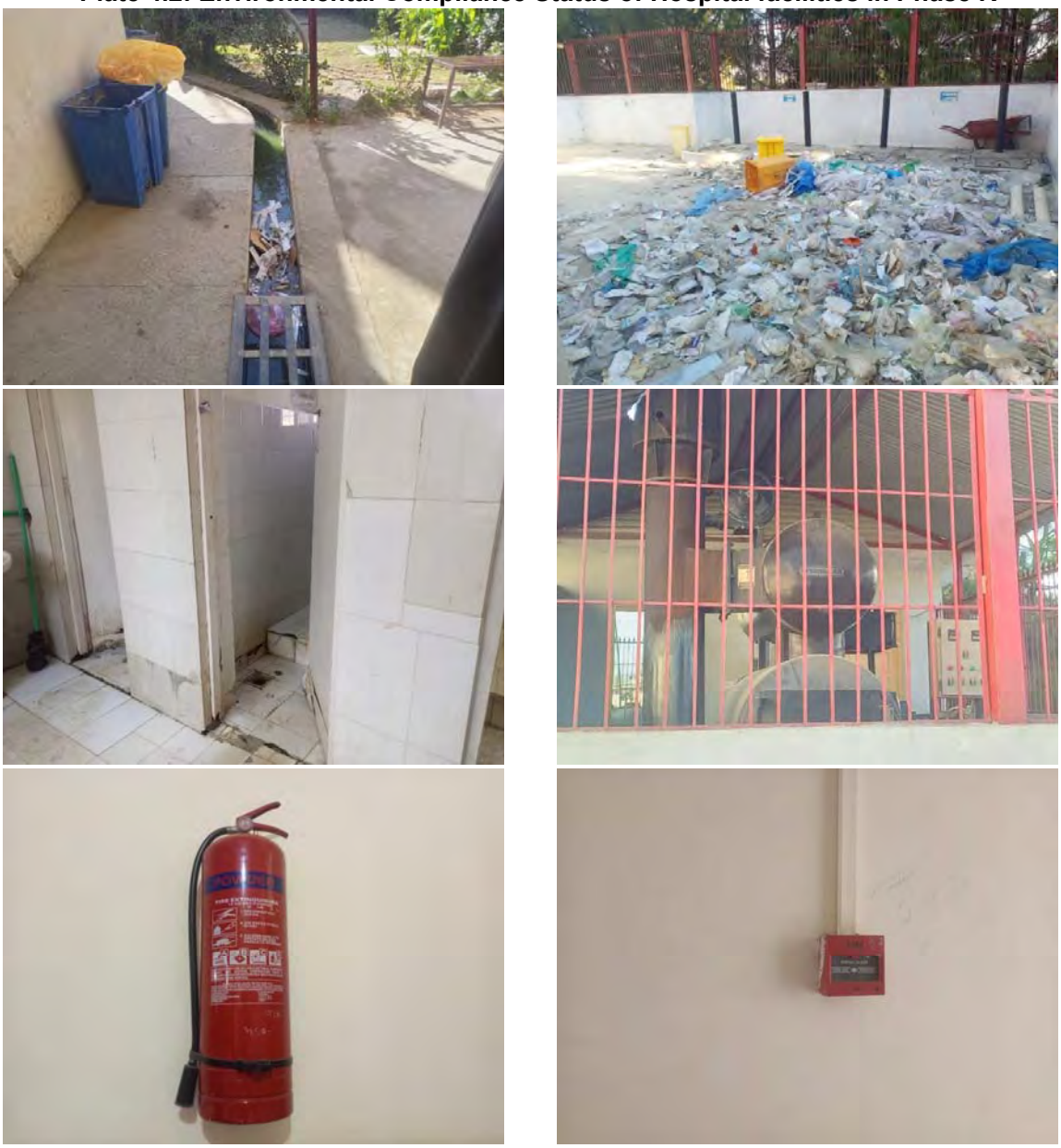
Table 4.7: Environmental Compliance Status of Hospital facilities in Phase IV

Environmental Aspect	DHQ Hospital Khar	DHQ Hospital Parachinar	DHQ Hospital Landi kotal	DHQ Hospital Ghallanai	DHQ Hospital Miran Shah	DHQ Hospital Wana	DHQ Mishti Mela, Orakzai
Permit Requirements	Existing hospital;						
	No environmental approval required for rehabilitation works.						
Healthcare Waste Management	For generation rates refer section 3.18						
	• No segregation; • No colour coded Bins • Open Dumping of waste • No on-site treatment; • Incinerator available but not functional; • Poor record keeping;	• No segregation practiced; • Inadequate colour coded Bins • Open Dumping of waste • No on-site treatment; • Incinerator available but not functional; • Poor record keeping;	• No segregation; • No colour coded Bins • Open Dumping of waste • No on-site treatment; • Poor waste records.	• No segregation; • No colour coded bins; • Open dumping of waste; • Incinerator available but not functional; • No waste records.	• No segregation; • No colour coded bins; • Open dumping of waste; • Incinerator available but not functional; • No waste records.	• No segregation practiced; • Inadequate colour coded bins • Open dumping of waste; • No on-site treatment; • Incomplete records.	• No segregation practiced; • Inadequate colour coded bins • Incinerator available but not functional; • Open dumping of waste; • No on-site treatment; • Incomplete records.
Wastewater Management	For generation rates refer section 3.17						
	• 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. • Direct discharge to municipal sewer	• No on-site treatment. • Direct discharge to municipal sewer	• 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						

Environmental Aspect	DHQ Hospital Khar	DHQ Hospital Parachinar	DHQ Hospital Landi kotal	DHQ Hospital Ghallanai	DHQ Hospital Miran Shah	DHQ Hospital Wana	DHQ Mishti Mela, Orakzai
Occupational Health and Safety	Partial compliance with Occupational Health and Safety (OHS) requirements. Gaps were observed in: • Availability and proper use of PPE; • Electrical safety, including exposed wiring and inadequate protection of electrical installations; • Poor Housekeeping practices, resulting in slip, trip, and fall hazards • Safe storage and handling of hazardous materials and chemicals • Safety Signage and hazard communication • Biological exposure, Sharps handling and infection prevention and control						
Emergency Preparedness	• Inadequate Fire extinguishers and fire alarm coverage; • lacked evidence of periodic inspection and calibration. • No Emergency escape routes, assembly points, • No documented emergency response procedures, staff training, or mock drills.	• Inadequate Fire extinguishers and fire alarm coverage; • lacked evidence of periodic inspection and calibration. • No Emergency escape routes, assembly points, • No documented emergency response procedures, staff training, or mock drills.	• Inadequate Fire extinguishers and inconsistently calibrated • Inadequate Fire extinguishers and fire alarm coverage; • lacked evidence of periodic inspection and calibration. • No Emergency escape routes, assembly points, • No documented emergency response procedures,	• No fire extinguishers ; • No fire detection and alarm system or fixed firefighting system. • No Emergency escape routes, assembly points, and fire safety signage. • No documented emergency response procedures, staff training, or mock drills.	• No fire extinguishers ; • No fire detection and alarm system or fixed firefighting system. • No Emergency escape routes, assembly points, and fire safety signage. • No documented emergency response procedures, staff training, or mock drills	• Inadequate Fire extinguishers and inconsistently calibrated • Inadequate Fire extinguishers and fire alarm coverage; • lacked evidence of periodic inspection and calibration. • No Emergency escape routes, assembly points, • No documented emergency response procedures, staff training, or mock drills.	• Inadequate Fire extinguishers and inconsistently calibrated • Inadequate Fire extinguishers and fire alarm coverage; • lacked evidence of periodic inspection and calibration. • No Emergency escape routes, assembly points, • No documented emergency response procedures, staff training, or mock drills.

Environmental Aspect	DHQ Hospital Khar	DHQ Hospital Parachinar	DHQ Hospital Landi kotal	DHQ Hospital Ghallanai	DHQ Hospital Miran Shah	DHQ Hospital Wana	DHQ Mishti Mela, Orakzai
			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 IV



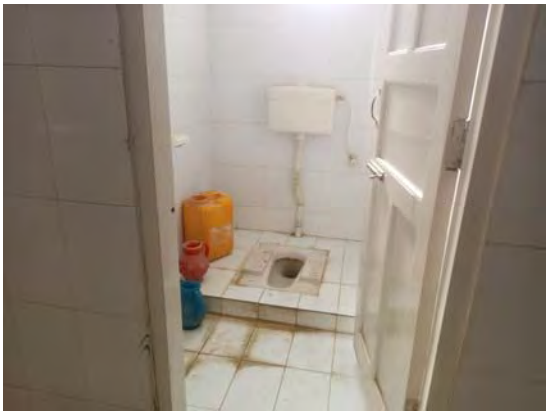
DHQ HOSPITAL KHAR, BAJAUR








DHQ HOSPITAL PARACHINAR KURRAM





DHQ HOSPITAL LANDIKOTAL, KHYBER









DHQ HOSPITAL GHALLANAI, MOHMAND






DHQ HOSPITAL MIRAN SHAH, NORTH WAZIRISTAN













DHQ HOSPITAL WANA, SOUTH WAZIRISTAN





4.4.22 Existing Environmental Liabilities and Associated Risks

203. 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 IV. 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.**

204. 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

Sr. No.	Hospital	Existing Environmental Liability	Associated Environmental, Health and Safety Risks / Impacts
1.	**DHQ Hospital Khar**	• No healthcare waste segregation or colour-coded bins; open dumping; no on-site treatment; incinerator available but non-functional; poor waste records. • No on-site wastewater treatment; direct discharge to municipal sewer. • Gaps in PPE, electrical safety, housekeeping, hazardous-material handling, safety signage, sharps handling and biological exposure controls. • Inadequate fire extinguishers and fire alarm coverage; routine inspection and maintenance not evidenced; inadequate emergency escape routes and assembly points; no documented emergency response procedures, staff training or mock drills. • No structured environmental monitoring program and limited institutional capacity.	• Increased risk of infectious and sharps exposure and inappropriate handling and disposal of healthcare waste. • Potential environmental contamination and pathogen exposure associated with untreated wastewater discharge. • Increased occupational injury and chemical and biological exposure risks. • Elevated fire, life-safety and evacuation risks due to inadequate firefighting and emergency preparedness arrangements. • Weak monitoring and institutional capacity may delay identification and correction of environmental deficiencies.
2.	**DHQ Hospital Parachinar**	• No healthcare waste segregation; inadequate colour-coded bins; open dumping; no on-site treatment; incinerator available but non-functional; poor waste records. • No on-site wastewater treatment; direct discharge to municipal sewer. • Gaps in PPE, electrical safety, housekeeping, hazardous-material handling, safety signage, sharps handling and biological exposure controls. • Inadequate fire extinguishers and fire alarm coverage; routine inspection and maintenance not evidenced; inadequate emergency escape routes and assembly points; no documented emergency response procedures, staff training or mock drills. • No structured environmental monitoring program and limited institutional capacity.	• Increased risk of infectious and sharps exposure and uncontrolled disposal of healthcare waste. • Potential environmental contamination and pathogen exposure from untreated wastewater discharge. • Increased occupational injury and biological/chemical exposure risks. • Elevated fire and life-safety risks and potentially delayed evacuation during emergencies. • Weak monitoring may allow environmental deficiencies to persist without timely corrective action.
3.	**DHQ Hospital Landi Kotal**	• No healthcare waste segregation or colour-coded bins; open dumping; no on-site treatment; poor waste records. • No on-site wastewater treatment; direct discharge to	• Increased risk of infectious and sharps exposure and inappropriate healthcare waste disposal. • Potential environmental contamination and pathogen exposure associated with untreated wastewater

Sr. No.	Hospital	Existing Environmental Liability	Associated Environmental, Health and Safety Risks / Impacts
		municipal sewer. Gaps in PPE, electrical safety, housekeeping, hazardous-material handling, safety signage, sharps handling and biological exposure controls. • Fire extinguishers are inadequate and inconsistently calibrated; inadequate fire alarm coverage; routine inspection and maintenance not evidenced; inadequate emergency escape routes and assembly points; no documented emergency response procedures, staff training or mock drills. • No structured environmental monitoring program and limited institutional capacity.	discharge. Increased occupational injury and chemical and biological exposure risks. • Elevated fire and evacuation risk due to inadequate firefighting and emergency preparedness arrangements. • Weak monitoring and institutional arrangements may delay corrective action.
4.	**DHQ Hospital Ghallanai**	• No healthcare waste segregation or colour-coded bins; open dumping; incinerator available but non-functional; no waste records. • No on-site wastewater treatment; direct discharge to municipal sewer. Gaps in PPE, electrical safety, housekeeping, hazardous-material handling, safety signage, sharps handling and biological exposure controls. • No fire extinguishers, fire detection/alarm system or fixed firefighting system; no designated emergency escape routes, assembly points or fire-safety signage; no documented emergency response procedures, staff training or mock drills. • No structured environmental monitoring program and limited institutional capacity.	• Increased risk of infectious/sharps exposure and uncontrolled healthcare waste disposal. • Potential environmental contamination and pathogen exposure from untreated wastewater discharge. • Increased occupational injury and biological/chemical exposure risks. • High fire and life-safety risk due to the absence of basic firefighting, fire detection and emergency evacuation arrangements. • Lack of environmental monitoring may delay identification and correction of deficiencies.
5.	**DHQ Hospital Miran Shah**	• No healthcare waste segregation or colour-coded bins; open dumping; incinerator available but non-functional; no waste records. • No on-site wastewater treatment; direct discharge to municipal sewer. Gaps in PPE, electrical safety, housekeeping, hazardous-material handling, safety signage, sharps handling and biological exposure controls. • No fire extinguishers, fire detection/alarm system or	• Increased risk of infectious/sharps exposure and inappropriate healthcare waste disposal. • Potential environmental contamination and pathogen exposure associated with untreated wastewater discharge. • Increased occupational injury and biological/chemical exposure risks. • High fire, life-safety and evacuation risk due to the absence of basic fire protection and emergency

Sr. No.	Hospital	Existing Environmental Liability	Associated Environmental, Health and Safety Risks / Impacts
		fixed firefighting system; no designated emergency escape routes, assembly points or fire-safety signage; no documented emergency response procedures, staff training or mock drills. • No structured environmental monitoring program and limited institutional capacity.	preparedness systems. • Weak monitoring and institutional capacity may result in deficiencies remaining unaddressed.
6.	**DHQ Hospital Wana**	• No healthcare waste segregation; inadequate colour-coded bins; open dumping; no on-site treatment; incomplete waste records. • No on-site wastewater treatment; direct discharge to municipal sewer. • Gaps in PPE, electrical safety, housekeeping, hazardous-material handling, safety signage, sharps handling and biological exposure controls. • Fire extinguishers are inadequate and inconsistently calibrated; inadequate fire alarm coverage; routine inspection and maintenance not evidenced; inadequate emergency escape routes and assembly points; no documented emergency response procedures, staff training or mock drills. • No structured environmental monitoring program and limited institutional capacity.	• Increased risk of infectious and sharps exposure and inappropriate disposal of healthcare waste. • Potential environmental contamination and pathogen exposure from untreated wastewater. • Increased occupational injury and chemical and biological exposure risks. • Elevated fire and life-safety risks due to inadequate firefighting and emergency preparedness arrangements. • Weak monitoring may delay implementation of necessary corrective measures.
7.	**DHQ Mishti Mela**	• No healthcare waste segregation; inadequate colour-coded bins; open dumping; no on-site treatment; incinerator available but non-functional; incomplete waste records. • No on-site wastewater treatment; direct discharge to municipal sewer. • Gaps in PPE, electrical safety, housekeeping, hazardous-material handling, safety signage, sharps handling and biological exposure controls. • Fire extinguishers are inadequate and inconsistently calibrated; inadequate fire alarm coverage; routine inspection and maintenance not evidenced; inadequate emergency escape routes and assembly points; no documented emergency response procedures, staff	• Increased risk of infectious and sharps exposure and uncontrolled healthcare waste disposal • Potential environmental contamination and pathogen exposure associated with untreated wastewater discharge. • Increased occupational injury and biological/chemical exposure risks. • Elevated fire, life-safety and evacuation risks due to inadequate fire protection and emergency preparedness arrangements. • Weak environmental monitoring and institutional capacity may delay identification and correction of environmental deficiencies.

Sr. No.	Hospital	Existing Environmental Liability	Associated Environmental, Health and Safety Risks / Impacts
		training or mock drills. • No structured environmental monitoring program and limited institutional capacity.	

4.5 ECOLOGICAL ENVIRONMENT DISTRICT BAJAUR

4.5.1 Regional Ecological Setting

205. The proposed DHQ Khar is situated in Bajaur District, which is dominated by mountainous terrain, dry valleys, and a semi-arid climate. Rainfall is generally low and erratic, which limits the development of dense vegetation. The broader area supports scrub forests and scattered tree cover, particularly on hill slopes. The project site, however, lies within Khar town, where land has been extensively modified due to urbanization and commercial activities.

4.5.2 Flora Vegetation

206. Vegetation in the surrounding area includes drought-tolerant species such as *Acacia modesta*, *Olea* ferruginea, and scattered *Pinus roxburghii* on elevated slopes. Shrubs like Dodonaea *viscosa* and *Berberis lycium* are also common. Within the hospital boundary, vegetation is limited to planted trees and small landscaped patches, which provide shade and aesthetic value. No natural forest stands or rare plant species are present within the site.

4.5.3 Fauna (Wildlife)

207. Wildlife diversity is relatively low and consists mainly of species adapted to human presence. Common birds include sparrows, mynas, pigeons, and crows. Small mammals such as rodents and occasional bats are present, while reptiles like lizards may occur in undisturbed corners. No endangered or protected species have been recorded.

4.6 ECOLOGICAL ENVIRONMENT LANDI KOTAL (DISTRICT KHYBER)

4.6.1 Ecological Context

208. Landi Kotal is positioned within a mountainous belt of the Khyber District, characterized by rocky slopes and a dry temperate climate. The natural environment supports sparse vegetation adapted to water scarcity. The DHQ site lies within a densely inhabited town, reducing ecological integrity.

4.6.2 Vegetation Profile

209. The area supports species such as Olea ferruginea, Acacia spp., and scattered grasses. Vegetation inside the project site is artificially maintained, consisting of ornamental plants and shade trees. There are no ecologically sensitive plant communities.

4.6.3 Faunal Elements

210. Fauna includes common urban bird species, small mammals, and reptiles. Wildlife is limited due to habitat disturbance and human activity.

4.7 ECOLOGICAL ENVIRONMENT GHALLANAI (DISTRICT MOHMAND)

4.7.1 Environmental Setting

211. Ghallanai lies in a dry, rocky landscape with sparse vegetation, typical of Mohmand District. The project site is located within an already developed administrative area, where natural ecological conditions are minimal.

4.7.2 Flora (Vegetation)

212. Vegetation consists mainly of xerophytic species such as *Acacia nilotica*, *Prosopis juliflora*, and shrubs like *Calotropis procera*. Inside the hospital premises, vegetation is limited and managed.

4.7.3 Fauna (Wildlife)

213. Wildlife includes small birds, rodents, and reptiles adapted to arid conditions. No protected species are present.

4.8 ECOLOGICAL ENVIRONMENT WANA (SOUTH WAZIRISTAN DISTRICT)

4.8.1 Regional Context

214. Wana is located in a semi-arid mountainous region with relatively better vegetation compared to other tribal districts. The area includes patches of forest and cultivated land, although the project site itself is urban.

4.8.2 Vegetation

215. Vegetation includes *Acacia*, *Olea*, and scattered *Pinus* species on nearby hills. The hospital site contains limited planted greenery.

4.8.3 Faunal Characteristics

216. Fauna includes birds, small mammals, and reptiles typical of semi-arid area No endangered species are present within the site.

4.9 ECOLOGICAL ENVIRONMENT MIRAN SHAH (NORTH WAZIRISTAN DISTRICT)

4.9.1 Ecological Setting

217. Miran Shah lies in a dry plain interspersed with low hills, characterized by sparse vegetation and high temperatures. The hospital site is fully urbanized.

4.9.2 Flora (Vegetation)

218. Vegetation includes *Prosopis juliflora*, *Acacia nilotica*, and seasonal grasses. Inside the hospital, vegetation is minimal and planted.

4.9.3 Fauna (Wildlife)

219. Wildlife is limited to urban-adapted birds and small mammals. Reptiles may be present in open areas.

4.10 ECOLOGICAL ENVIRONMENT PARACHINAR (DISTRICT KURRAM)

4.10.1 Regional Ecology

220. Parachinar is located in a fertile valley with relatively higher rainfall, supporting dense vegetation and agriculture. However, the hospital site is within an urbanized setting.

4.10.2 Vegetation

221. The surrounding area includes *Populus*, *Salix*, *Morus*, and *Pinus* species. Within the site, vegetation is managed and non-natural.

4.10.3 Fauna

222. Bird diversity is relatively higher compared to other districts, but mostly consists of common species. No protected fauna is present.

4.11 ECOLOGICAL ENVIRONMENT MISHTI MELA (DISTRICT ORAKZAI)

4.11.1 Ecological Setting

223. Mishti Mela is located in a hilly region of Orakzai District, where natural vegetation includes pine and scrub forests. The project site is already disturbed

4.11.2 Flora and Vegetation

224. Nearby vegetation includes *Pinus roxburghii*, *Olea ferruginea*, and shrubs. Within the hospital, vegetation is sparse and planted.

4.11.3 Faunal Resources

225. Fauna includes birds, rodents, and reptiles typical of hilly area No endangered species recorded.

4.11.4 Conservation Status

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

4.12 SOCIOECONOMIC ENVIRONMENT

227. 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.

228. A key initial step involved delineating the AOI and identifying respondents through a random sampling methodology during the baseline survey conducted in February 2026.

229. 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.

4.13 METHODOLOGY

230. 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.

231. 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-IV 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.

232. 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 interviews and subsequently digitized and analyzed to establish the baseline conditions.

233. 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.

4.13.1 Task Specific Approach

234. 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.

4.13.2 Discussion with Officials

235. 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.

4.13.3 Data Collection and Field Survey

236. 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.

237. 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 **Annexure-V.**

4.13.4 Community/Stakeholders' Participation

238. 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.

4.13.5 Khar, Bajaur

239. Bajaur District falls under the administrative jurisdiction of Khyber Pakhtunkhwa, Pakistan. According to the 2023 Population Census, the district has a total population

of approximately 1.32 million, with the vast majority residing in rural areas. The district comprises 7 tehsils, with Khar serving as the district headquarters. The overall literacy rate is about 31%. Pashto is the predominant language spoken throughout the district. The local economy is primarily based on agriculture, livestock rearing, cross-border trade, small businesses, daily wage labour, and remittances from overseas employment.

4.13.6 Parachinar, Kurram

240. Kurram District is located in the Kohat Division of Khyber Pakhtunkhwa and covers an area of approximately 3,380 km². According to the 2023 Population Census, the district has a population of approximately 0.79 million, with most of the population living in rural areas. The district comprises 3 tehsils, with Parachinar serving as the district headquarters. The overall literacy rate is about 43%. Pashto is the principal language, while Urdu is widely understood. The district's economy mainly depends on agriculture, horticulture, livestock, cross-border trade, government services, and remittances.

4.13.7 Landi Kotal, Khyber

241. Khyber District falls under the administrative jurisdiction of Khyber Pakhtunkhwa, Pakistan. According to the 2023 Population Census, the district has a population of approximately 1.08 million, with the majority residing in rural areas. The district comprises 5 tehsils, with Landi Kotal being one of the major urban centres and tehsil headquarters. The overall literacy rate is about 39%. Pashto is the dominant language spoken in the district. The economy is primarily based on trade, transport, agriculture, livestock, small-scale businesses, government services, and remittances.

4.13.8 Ghallanai, Mohmand

242. Mohmand District is located in Khyber Pakhtunkhwa and covers an area of approximately 2,296 km². According to the 2023 Population Census, the district has a population of approximately 0.61 million, with an overwhelmingly rural population. The district comprises 7 tehsils, with Ghallanai serving as the district headquarters. The overall literacy rate is about 31%. Pashto is the predominant language spoken throughout the district. The local economy mainly depends on agriculture, livestock, marble mining, small businesses, daily wage labour, and remittances.

4.13.9 Miran Shah, North Waziristan

243. North Waziristan District falls under the administrative jurisdiction of Khyber Pakhtunkhwa, Pakistan. According to the 2023 Population Census, the district has a population of approximately 0.69 million, with the majority living in rural areas. The district comprises 3 tehsils, with Miran Shah serving as the district headquarters. The overall literacy rate is about 29%. Pashto is the principal language spoken in the district. The local economy is primarily based on agriculture, livestock, trade, government services, small businesses, and remittances.

4.13.10 Wana, South Waziristan

244. South Waziristan District is located in Khyber Pakhtunkhwa and covers an area of approximately 6,620 km². According to the 2023 Population Census, the district has a population of approximately 0.82 million, with most residents living in rural areas. The district comprises 4 tehsils, with Wana serving as the district headquarters. The overall literacy rate is about 30%. Pashto is the dominant language spoken throughout the district. The economy mainly depends on agriculture, livestock rearing, trade, public services, daily wage labour, and remittances.

4.13.11 Mishti Mela, Orakzai

245. Orakzai District falls under the administrative jurisdiction of Khyber Pakhtunkhwa, Pakistan. According to the 2023 Population Census, the district has a population of approximately 0.46 million, with almost the entire population residing in rural areas. The district comprises 3 tehsils, with Mishti Mela located within the district. The overall literacy rate is about 38%. Pashto is the predominant language spoken throughout the district. The local economy is mainly based on agriculture, livestock rearing, coal mining, small businesses, government services, and remittances.[31]

4.14 SOCIOECONOMIC PROFILE OF STUDIED HOUSEHOLDS

4.14.1 Gender Distribution of the Respondents

246. The gender distribution of respondents across the surveyed Phase IV hospitals was predominantly male, with 99% of respondents being male and 1% being female. This distribution is likely attributable to prevailing socio-cultural norms, women's limited availability during the survey, and varying levels of willingness to participate, rather than reflecting actual healthcare utilization patterns. The only female respondent was recorded at Mishti Mela Orakzai, while no female respondents were interviewed at the remaining hospitals. Among the male respondents, Khar Bajaur recorded the highest proportion (22%), followed by Landi Kotal (18%), Wana (17%), Mishti Mela Orakzai (16%), Ghalanai Mohmand (15%), Miran Shah (10%), and Parachinar (1%).

247. **Table 4.9** presents the hospital-wise distribution of respondents by gender.

Table 4.9 Gender Distribution of Respondents

Sr. No.	Hospital	Male		Female	
		Number	%	Number	%
1	DHQ Hospital Khar, Bajaur	25	22	0	0
2	DHQ Hospital Parachinar, Kurram	1	1	0	0
3	DHQ Hospital Landi kotal, Khyber	21	18	0	0
4	DHQ Hospital Ghallanai, Mohmand	17	15	0	0

[31] *Pakistan Bureau of Statistics (PBS). 2024. 2023 Population and Housing Census, District Wise Results. Government of Pakistan, Islamabad.*

Sr. No.	Hospital	Male		Female	
		Number	%	Number	%
5	DHQ Hospital Miran Shah, North Waziristan	12	10	0	0
6	DHQ Hospital Wana, South Waziristan	20	17	0	0
7	DHQ Mishti Mela, Orakzai	19	16	1	1
	Total	**115**	**99**	**1**	**1**

4.14.2 Population and Family Size

248. The socio-economic survey covered 116 respondents, representing 116 households with a total population of 980 individuals. Of the total household population, 51% were male and 49% were female, indicating a balanced gender composition. At the hospital level, the male population exceeded the female population in Khar Bajaur, Ghalanai Mohmand, Miran Shah, Wana, and Mishti Mela Orakzai, whereas the female population was higher in Parachinar and Landi Kotal. Khar Bajaur accounted for the largest share of the surveyed household population (28%), followed by Landi Kotal (20%), Wana (18%), Mishti Mela Orakzai (16%), Ghalanai Mohmand (11%), Miran Shah (6%), and Parachinar (1%).

249. The hospital-wise distribution of the surveyed population and family size is presented in **Table 4.10.**

Table 4.10 Population and Family Size

Sr. No.	Hospital	Respondents	Male Population		Female Population		Total Population
			No.	%	No.	%	No.
1	DHQ Hospital Khar, Bajaur	25	143	15	131	13	274
2	DHQ Hospital Parachinar, Kurram	1	3	0	6	1	9
3	DHQ Hospital Landi kotal, Khyber	21	87	9	106	11	193
4	DHQ Hospital Ghallanai, Mohmand	17	59	6	51	5	110
5	DHQ Hospital Miran Shah, North Waziristan	12	33	3	28	3	61
6	DHQ Hospital Wana, South Waziristan	20	88	9	87	9	175
7	DHQ Mishti Mela, Orakzai	20	82	8	76	8	158
	Total	**116**	**495**	**51**	**485**	**49**	**980**

4.14.3 Age Composition of the Respondents

250. The age composition of respondents indicates that the survey primarily captured individuals from the economically active population. Of the 116 respondents, the largest proportion (46%) belonged to the 26–35 years age group, followed by the 36–45 years and 45 years and above age groups, each accounting for 18% of respondents. Respondents aged 19–25 years represented 16%, while those up to 18 years comprised only 3% of the sample. The 26–35 years age group was the most represented across the surveyed hospitals, particularly in Khar Bajaur, Landi Kotal, Miran Shah, Wana, and Mishti Mela Orakzai, whereas respondents aged 36–45 years were more prominent in Ghalanai Mohmand. Overall, the findings indicate that the survey predominantly reflects the perspectives of adults in the economically active age groups.

Table 4.11: Age Composition of the Respondents

Sr. No.	Hospital	Up to 18		19–25		26–35		36–45		45+	
		No.	%	No.	%	No.	%	No.	%	No.	%
1	DHQ Hospital Khar, Bajaur	1	1	3	3	13	11	4	3	5	4
2	DHQ Hospital Parachinar , Kurram	0	0	0	0	0	0	0	0	1	1
3	DHQ Hospital Landi kotal, Khyber	0	0	1	1	12	10	4	3	4	3
4	DHQ Hospital Ghallanai, Mohmand	0	0	1	1	2	2	8	7	6	5
5	DHQ Hospital Miran Shah, North Waziristan	0	0	0	0	10	9	1	1	1	1
6	DHQ Hospital Wana, South Waziristan	2	2	7	6	8	7	2	2	1	1
7	DHQ Mishti Mela, Orakzai	0	0	6	5	8	7	2	2	3	3
Total		**3**	**3**	**18**	**16**	**53**	**46**	**21**	**18**	**21**	**18**

4.14.4 Literacy

251. The educational profile of respondents indicates a relatively high level of educational attainment across the surveyed hospitals. Of the 116 respondents, 88% had received formal education, while 12% were illiterate. The largest proportion of respondents (33%) had attained graduation-level education, followed by those with intermediate education (18%). Respondents with matriculation and postgraduate qualifications each accounted for 12%, while 9% had completed middle-level education and 4% had attained primary-level education. Graduate-level education was the most common qualification across the surveyed hospitals, whereas illiteracy was more prevalent in Khar Bajaur and Landi Kotal. The educational profile of respondents is presented in **Table 4.12.**

Table 4.12: Educational Level of the Respondents

Sr. No.	Hospital	Illiterate		Primary		Middle		Matric		Intermediate		Graduation		Post-Graduation	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1	DHQ Hospital Khar, Bajaur	4	3	0	0	2	2	1	1	6	5	10	9	2	2
2	DHQ Hospital Parachinar , Kurram	0	0	0	0	0	0	0	0	0	0	1	1	0	0
3	DHQ Hospital Landi kotal, Khyber	4	3	2	2	2	2	5	4	3	3	3	3	2	2
4	DHQ Hospital Ghallanai, Mohmand	1	1	0	0	0	0	3	3	4	3	4	3	5	4
5	DHQ Hospital Miran Shah, North Waziristan	0	0	2	2	1	1	0	0	1	1	7	6	1	1
6	DHQ Hospital Wana, South Waziristan	3	3	0	0	2	2	4	3	4	3	3	3	4	3
7	DHQ Mishti Mela, Orakzai	2	2	1	1	3	3	1	1	3	3	10	9	0	0
Total		**14**	**12**	**5**	**4**	**10**	**9**	**14**	**12**	**21**	**18**	**38**	**33**	**14**	**12**

4.15 ECONOMIC ASPECTS

4.15.1 Occupations

252. The occupational profile of respondents indicates that formal employment was the primary source of livelihood, with government employment (42%) and private employment (30%) accounting for the largest shares. Business activities represented 9%, followed by unemployment (7%), while labour and other occupations each accounted for 4%, and agriculture for 3%. Government employment was most common in Khar Bajaur, Landi Kotal, and Ghalanai Mohmand, whereas private employment was concentrated in Mishti Mela Orakzai. Business activities were mainly reported in Khar Bajaur, agriculture in Ghalanai Mohmand, and unemployment in Miran Shah and Wana. Overall, formal employment was the dominant livelihood across the surveyed hospitals.

Table 4.13: Occupation of the Respondents

Sr. No.	Hospital	Govt. Job		Private Job		Business		Labour		Agriculture		Unemployed		Others	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1	DHQ Hospital Khar, Bajaur	14	12	2	2	7	6	2	2	0	0	0	0	0	0
2	DHQ Hospital Parachinar, Kurram	1	1	0	0	0	0	0	0	0	0	0	0	0	0
3	DHQ Hospital Landi kotal, Khyber	13	11	6	5	0	0	0	0	0	0	1	1	0	0
4	DHQ Hospital Ghallanai, Mohmand	12	10	1	1	0	0	0	0	4	3	0	0	0	0
5	DHQ Hospital Miran Shah, North Waziristan	3	3	3	3	2	2	1	1	0	0	3	3	0	0
6	DHQ Hospital Wana, South Waziristan	5	4	6	5	1	1	2	2	0	0	3	3	3	3
7	DHQ Mishti Mela, Orakzai	1	1	17	15	0	0	0	0	0	0	1	1	2	2
Total		**49**	**42**	**35**	**30**	**10**	**9**	**5**	**4**	**4**	**3**	**8**	**7**	**5**	**4**

4.15.2 Monthly Household Income

253. The monthly household income distribution indicates a diverse socioeconomic profile among the surveyed households. The largest proportion of respondents (31%) reported monthly household incomes of PKR 40,001–60,000, followed by PKR 40,000 or below (29%). Households earning above PKR 100,000 accounted for 16%, while 15% and 9% reported incomes of PKR 60,001–80,000 and PKR 80,001–100,000, respectively.

254. Overall, 60% of respondents reported monthly household incomes of PKR 60,000 or below, indicating that low- to middle-income households predominate in the surveyed areas. Higher-income households (above PKR 100,000) were more common in Khar Bajaur, while lower-income households (up to PKR 40,000) were concentrated in Wana, Mishti Mela Orakzai, and Landi Kotal. **Table 4.14** presents the average monthly income distribution of the respondents.

Table 4.14: 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	DHQ Hospital Khar, Bajaur	6	5	6	5	4	3	1	1	8	7
2	DHQ Hospital Parachinar, Kurram	0	0	0	0	0	0	0	0	1	1
3	DHQ Hospital Landi kotal, Khyber	7	6	6	5	3	3	3	3	2	2
4	DHQ Hospital Ghallanai, Mohmand		0	6	5	3	3	4	3	4	3

Sr. No.	Hospital	≤40,000		40,001–60,000		60,001–80,000		80,001–100,000		>100,000	
		No.	%	No.	%	No.	%	No.	%	No.	%
5	DHQ Hospital Miran Shah, North Waziristan	4	3	3	3	4	3	0	0	1	1
6	DHQ Hospital Wana, South Waziristan	9	8	5	4	2	2	2	2	2	2
7	DHQ Mishti Mela, Orakzai	8	7	10	9	1	1		0	1	1
Total		**34**	**29**	**36**	**31**	**17**	**15**	**10**	**9**	**19**	**16**

4.15.3 Monthly Household Expenditures

255. The monthly household expenditure pattern indicates varying consumption levels among the surveyed households. The largest proportion of respondents (27%) reported monthly expenditures of PKR 40,000 or below, followed by PKR 40,001–60,000 (23%). Expenditures of PKR 60,001–80,000 and above PKR 100,000 each accounted for 21%, while 9% reported expenditures of PKR 80,001–100,000.

256. Overall, 51% of respondents reported monthly household expenditures exceeding PKR 60,000, indicating moderate household consumption levels. Higher expenditure households were more common in Khar Bajaur and Wana, while lower expenditure households were concentrated in Mishti Mela Orakzai, Khar Bajaur, Landi Kotal, and Miran Shah. **Table 4.15** presents the average monthly expenditure distribution of the respondents.

Table 4.15: 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	DHQ Hospital Khar, Bajaur	6	5	8	7	2	2	2	2	7	6
2	DHQ Hospital Parachinar, Kurram	0	0	0	0	0	0	0	0	1	1
3	DHQ Hospital Landi kotal, Khyber	6	5	5	4	5	4	2	2	3	3
4	DHQ Hospital Ghallanai, Mohmand	0	0	3	3	6	5	4	3	4	3
5	DHQ Hospital Miran Shah, North Waziristan	6	5	2	2	3	3	1	1	0	0
6	DHQ Hospital Wana, South Waziristan	4	3	4	3	5	4	1	1	6	5
7	DHQ Mishti Mela, Orakzai	9	8	5	4	3	3	0	0	3	3
Total		**31**	**27**	**27**	**23**	**24**	**21**	**10**	**9**	**24**	**21**

4.15.4 Family System

257. The family system of respondents indicates that the joint family structure predominates among the surveyed households, accounting for 67% of respondents, while 33% belonged to nuclear families. Joint families were most prevalent in Landi Kotal,

followed by Khar Bajaur and Ghalanai Mohmand, whereas nuclear families were most common in Mishti Mela Orakzai, followed by Wana and Miran Shah.

258. Overall, the findings indicate that the joint family system remains the dominant household structure across the surveyed hospitals, although a considerable proportion of respondents also reported living in nuclear families. **Table 4.16** presents the family system statistics of the respondents.

Table 4.16: Family System Statistics

Sr. No.	Hospital	Joint		Nuclear	
		No.	%	No.	%
1	DHQ Hospital Khar, Bajaur	19	16	6	5
2	DHQ Hospital Parachinar, Kurram	0	0	1	1
3	DHQ Hospital Landi kotal, Khyber	20	17	1	1
4	DHQ Hospital Ghallanai, Mohmand	15	13	2	2
5	DHQ Hospital Miran Shah, North Waziristan	7	6	5	4
6	DHQ Hospital Wana, South Waziristan	11	9	9	8
7	DHQ Mishti Mela, Orakzai	6	5	14	12
Total		**78**	**67**	**38**	**33**

4.15.5 Sources of Drinking Water

259. Access to safe drinking water is a basic human necessity and an important determinant of public health and well-being. The survey findings indicate that respondents rely on a range of drinking water sources across the surveyed hospitals. Hand pumps were the most common source, used by 50% of respondents, followed by public water supply (36%) and other/bore water sources (13%), while only 1% relied on filtration plants.

260. At the hospital level, hand pumps were the predominant source in Khar Bajaur, Ghalanai Mohmand, Mishti Mela Orakzai, and Miran Shah, whereas public water supply was the main source in Wana and Landi Kotal. Reliance on other/bore water sources was highest in Landi Kotal, while filtration plants were reported only in Wana.
261. **Table 4.17** presents the distribution of drinking water sources in the surveyed hospitals.

Table 4.17: Sources of drinking water

Sr. No.	Hospital	Public Water Supply		Filtration Plant		Hand Pump		Other/Bore	
		No.	%	No.	%	No.	%	No.	%
1	DHQ Hospital Khar, Bajaur	6	5	0	0	18	16	1	1
2	DHQ Hospital Parachinar, Kurram	1	1	0	0		0	0	0
3	DHQ Hospital Landi kotal, Khyber	9	8	0	0	5	4	7	6

Sr. No.	Hospital	Public Water Supply		Filtration Plant		Hand Pump		Other/Bore	
		No.	%	No.	%	No.	%	No.	%
4	DHQ Hospital Ghallanai, Mohmand	2	2	0	0	11	9	4	3
5	DHQ Hospital Miran Shah, North Waziristan	6	5	0	0	5	4	1	1
6	DHQ Hospital Wana, South Waziristan	14	12	1	1	3	3	2	2
7	DHQ Mishti Mela, Orakzai	4	3	0	0	16	14	0	0
Total		**42**	**36**	**1**	**1**	**58**	**50**	**15**	**13**

4.15.6 Mode of Transportation

262. The survey findings indicate that respondents rely on both public and private modes of transport. Public transport was the most commonly used mode (46%), followed by private transport (30%), while 24% of respondents reported using both public and private transport.

263. At the hospital level, public transport was most commonly used in Mishti Mela Orakzai and Wana, whereas private transport was more prevalent in Khar Bajaur and Landi Kotal. The use of both public and private transport was highest in Khar Bajaur and Landi Kotal, indicating greater flexibility in travel options.

264. **Table 4.18** presents the principal modes of transport used by the respondents.

Table 4.18: Principal Mode of Transport

Sr. No.	Hospital	Public		Private		Both	
		No.	%	No.	%	No.	%
1	DHQ Hospital Khar, Bajaur	5	4	11	9	9	8
2	DHQ Hospital Parachinar, Kurram	0	0	1	1	0	0
3	DHQ Hospital Landi kotal, Khyber	6	5	8	7	7	6
4	DHQ Hospital Ghallanai, Mohmand	7	6	5	4	5	4
5	DHQ Hospital Miran Shah, North Waziristan	4	3	3	3	5	4
6	DHQ Hospital Wana, South Waziristan	14	12	4	3	2	2
7	DHQ Mishti Mela, Orakzai	17	15	3	3	0	0
Total		**53**	**46**	**35**	**30**	**28**	**24**

4.16 AWARENESS & IMPLEMENTATION OF PROPOSED PROJECT

4.16.1 Awareness about the Project

265. The survey findings indicate a relatively low level of awareness of the proposed project among respondents. Overall, 25% of respondents reported being aware of the project, while 75% indicated no prior knowledge. Awareness was highest in Mishti Mela Orakzai, whereas only limited awareness was reported in Khar Bajaur, Parachinar, Landi Kotal, Ghalanai Mohmand, Miran Shah, and Wana. These findings highlight the

need for continued stakeholder engagement and dissemination of project information. **Table 4.19** presents respondents' knowledge of the proposed project.

Table 4.19: Knowledge about the project

Sr. No.	Hospital	Yes		No	
		No.	%	No.	%
1	DHQ Hospital Khar, Bajaur	1	1	24	21
2	DHQ Hospital Parachinar, Kurram	1	1	0	0
3	DHQ Hospital Landi kotal, Khyber	4	3	17	15
4	DHQ Hospital Ghallanai, Mohmand	1	1	16	14
5	DHQ Hospital Miran Shah, North Waziristan	1	1	11	9
6	DHQ Hospital Wana, South Waziristan	2	2	18	16
7	DHQ Mishti Mela, Orakzai	19	16	1	1
Total		**29**	**25**	**87**	**75**

266. The survey findings indicate that respondents generally perceive the proposed project positively and expect multiple benefits from its implementation. Employment opportunities (85%) were identified as the most significant expected benefit, followed by improved healthcare services (84%), improved drinking water and sanitation (80%), improved accessibility for persons with disabilities (77%), and reduced travel time (69%).

267. At the hospital level, improved healthcare services was the most frequently identified benefit in Khar and Mishti Mela, while employment opportunities were particularly highlighted in Khar, Landi Kotal, and Mishti Mela. Improved drinking water and sanitation was most commonly reported in Khar, Wana, and Landi Kotal, whereas improved accessibility for persons with disabilities was also widely expected across the surveyed hospitals. **Table 4.20** summarizes the respondents' perceptions of the project's expected benefits.

Table 4.20: Perceived Positive Impacts of the Project

Sr. No.	Hospital	Improved Healthcare		Improved Drinking Water & Sanitation		Improved Accessibility for persons with Disabilities		Employment Opportunities		Reduced Travel	
		No.	%	No.	%	No.	%	No.	%	No.	%
1	DHQ Hospital Khar, Bajaur	23	20	21	18	21	18	21	18	22	19
2	DHQ Hospital Parachinar, Kurram	1	1	1	1	1	1	1	1	1	1
3	DHQ Hospital Landi kotal, Khyber	14	12	17	15	16	14	21	18	15	13
4	DHQ Hospital Ghallanai, Mohmand	14	12	14	12	10	9	7	6	9	8
5	DHQ Hospital	11	9	11	9	10	9	12	10	9	8

Sr. No.	Hospital	Improved Healthcare		Improved Drinking Water & Sanitation		Improved Accessibility for persons with Disabilities		Employment Opportunities		Reduced Travel	
		No.	%	No.	%	No.	%	No.	%	No.	%
	Miran Shah, North Waziristan										
6	DHQ Hospital Wana, South Waziristan	16	14	18	16	15	13	17	15	15	13
7	DHQ Mishti Mela, Orakzai	18	16	11	9	16	14	20	17	9	8
	Total	**97**	**84**	**93**	**80**	**89**	**77**	**99**	**85**	**80**	**69**

268. Overall, respondents expressed strong support for the proposed hospital revamping project and viewed it as a positive initiative to improve healthcare infrastructure and service delivery. At the same time, they anticipated temporary construction-related impacts, including dust, noise, traffic disruption, overcrowding, and inconvenience to patients, attendants, and hospital staff. To minimise these impacts, respondents recommended phased construction, restricting noisy activities to appropriate working hours, effective patient and traffic management, adequate waiting areas, and clear demarcation of construction zones to ensure safety and continuity of hospital services.

269. Respondents also identified key infrastructure and service improvements to be incorporated into the project, including safe drinking water, improved sanitation facilities, separate waiting areas for male and female visitors, enhanced staff facilities, wheelchair accessibility, solar energy systems, improved transport access, and additional hospital wards. Overall, the findings demonstrate broad community support for the project while highlighting the need to address existing facility gaps and implement effective environmental and social management measures throughout the construction phase.

4.17 GENDER SURVEY

270. A gender survey was conducted across all health facilities under Phase IV of the KP Health Systems Strengthening Program. A total of 21 women (patients, attendants, or female staff) were interviewed across these health facilities. The analysis presents their responses to identify key gender-related issues, existing service gaps, and priorities for strengthening gender-responsive healthcare services under the proposed hospital revamping project.

4.17.1 Decision-Making Autonomy and Household Dynamics

271. Women's ability to make independent health-related decisions is a key determinant of timely access to healthcare. The survey reveals predominant male control over major household and health-related decisions, with some local variations across the surveyed hospitals.

272. The survey findings indicate that women's participation in household and health-related decision-making varies across the project area but remains predominantly influenced by male household members. The gender survey findings indicate that household decision-making remains predominantly male-led across all the locations. Women's participation in decisions related to children's education, women's employment outside the home, the choice of healthcare facility, and major household purchases was generally limited, with men reported as the primary decision-makers in many households. However, the extent of women's participation varied across locations, with some respondents reporting greater joint decision-making between men and women in household and health-related matters. Despite these variations, major household purchases and other important household decisions remained more frequently dominated by men. Overall, the findings indicate that although women's participation in household decision-making varies across the Phase 4 locations, male authority continues to be a prevailing pattern. This highlights the need for gender-responsive interventions that promote women's meaningful participation in decisions affecting their health, livelihoods, education, and overall well-being.

4.17.2 Healthcare Access and Physical Barriers

273. Across the surveyed Phase IV hospital locations, most respondents reported that hospitals were easy to access, indicating generally adequate physical connectivity. However, some respondents identified location-specific barriers, including limited transport availability, long travel distances, lack of awareness, weather-related conditions, geographic obstacles such as rainwater and khwar crossings, and socioeconomic constraints.

274. The requirement for permission to visit a hospital varied across the surveyed locations. While some women reported that permission was always or sometimes required, others indicated that it was not required. This variation appears to reflect prevailing household and social norms rather than restrictions imposed by healthcare facilities. The findings do not indicate that hospitals formally restrict women from accessing healthcare services.

275. Overall, physical access to healthcare is broadly adequate across the Phase IV locations. Where barriers exist, they are primarily related to transport, distance, geographic and weather conditions, awareness, household decision-making norms, and socioeconomic circumstances rather than the absence of roads or basic physical connectivity. Gender-responsive interventions should therefore consider these location-specific factors to support women's timely access to healthcare services.

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

4.17.3.1 Toilets and Cleanliness

276. Female toilet facilities were reported to be present across most of the surveyed hospitals; however, their adequacy was not consistently satisfactory. Similarly, concerns were identified regarding the cleanliness and maintenance of these facilities,

indicating that the availability of toilets does not always ensure adequate or hygienic sanitation conditions for women. These gaps may affect the comfort, privacy, dignity, and safety of female patients, attendants, and staff.

4.17.3.2 Lighting

277. Respondents generally reported satisfactory lighting conditions within the surveyed hospitals. However, some concerns regarding inadequate lighting were reported at selected locations, indicating the need to ensure adequate illumination in patient areas, corridors, toilets, entrances, and other key hospital spaces to support safety and security.

4.17.3.3 Drinking water

278. The survey indicates that water supply infrastructure is available across the surveyed hospitals; however, the availability and adequacy of drinking water facilities vary. While many respondents reported access to drinking water, concerns regarding inadequate or unsatisfactory drinking water facilities were reported at several locations. Drinking water was also generally available for purchase from hospital canteens or nearby shops.

279. These findings highlight the need to ensure reliable access to safe drinking water within hospital premises, supported by adequate facilities, regular maintenance, and appropriate water quality monitoring.

Workplace Environment:

4.17.3.4 Clinical Service Quality and Staffing

280. The survey findings indicate that privacy during medical examinations is generally well maintained across the surveyed hospitals. Most respondents expressed satisfaction with the privacy provided, indicating generally respectful and confidential healthcare practices.

281. Most respondents reported receiving appropriate antenatal and postnatal care. The availability of female doctors and nurses was also generally reported as satisfactory,

282. Female sanitation facilities are available across the surveyed hospitals; however, concerns regarding their adequacy, cleanliness, and maintenance were reported in some locations. Addressing these gaps will support a safer, more hygienic, and gender-responsive healthcare environment.
283. Most respondents did not identify major health issues specifically affecting women in their communities. However, the findings may also reflect limited awareness or under-recognition of women's health concerns. Continued health awareness and community outreach are therefore important to promote early identification of health issues and timely healthcare-seeking.

4.17.3.5 Gender Equity and Facilities for Female Staff

284. The findings indicate generally positive perceptions regarding equal opportunities for male and female staff in most surveyed hospitals.

285. Overall, the findings suggest that gender equity is generally perceived positively, although some gaps may remain in ensuring consistent opportunities and equal treatment for female staff across all hospitals.

286. Basic facilities for female staff, including toilets, rest areas, and breastfeeding areas, were generally reported as available. However, some gaps were identified, particularly regarding rest areas and breastfeeding facilities at selected locations. Continued improvement of these facilities is important to support the dignity, wellbeing, and retention of female healthcare workers.

287. Most respondents reported feeling safe during night duty, although some concerns were identified at Parachinar, Wana and Miranshah. These concerns may be influenced by differences in security arrangements, lighting, transport availability, and the surrounding environment.

288. Awareness and availability of formal harassment reporting mechanisms varied across the surveyed hospitals. While some respondents confirmed their availability, many reported that such mechanisms were unavailable or were unaware of them. Strengthening and clearly communicating grievance and harassment reporting procedures, together with staff awareness and training, will help create a safer and more supportive workplace for female healthcare workers.

289. 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.

290. 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.

4.17.3.6 Economic Empowerment and Income-Related Patterns among Women

291. The survey findings indicate that women's participation in income-generating activities remains limited across the surveyed hospitals. Most women reported not being engaged in paid employment or other income-generating activities, while those who were economically active were primarily involved in formal employment and a limited range of other livelihood activities. The findings indicate that household responsibilities, social norms, and limited opportunities continue to influence women's economic participation.

292. Among women who earn an income, their earnings are primarily used to support household needs and other family-related expenses, including children's education. This highlights the important contribution of women's income to household welfare, although their financial independence and control over earnings may vary.

293. Respondents identified employment opportunities, skills development and vocational training, support for small businesses, improved access to savings and financial resources, and family support as important measures for enhancing women's economic participation. Overall, the findings suggest that expanding livelihood opportunities and strengthening skills and financial support can contribute to greater economic empowerment and financial independence among women.

4.17.3.7 Violence Against Women

294. The survey findings indicate that financially disadvantaged households were the most commonly identified vulnerable group across the surveyed hospitals. Elderly persons, persons with disabilities, widows, and minority groups were also identified by some respondents. However, most respondents reported that formal support programmes for vulnerable groups were not available.

295. Only a limited number of respondents reported having witnessed violence against women, while the majority had not observed such incidents. Among those who had, physical violence was the most commonly reported, followed by psychological and economic violence.

296. Overall, the findings highlight financial vulnerability as the primary concern across the surveyed locations. The limited availability of formal support programmes and the reported occurrence of violence against women underscore the need to strengthen social protection measures, improve awareness of available support services, and enhance referral and support mechanisms for vulnerable groups and survivors of violence.

297. Summary of key findings is presented in **Table 4.21 and 4.22** whereas key needs and priority improvements identified by women are given in **Table 4.23**

Table 4.21 Summary of Key Findings of the Gender Analysis

Domain	Key Finding	Pattern Across Facilities
Decision-making autonomy	Male participation remains significant in household decision-making	Male-led decision-making remains common across surveyed locations, although joint decision-making and greater female participation were reported by some respondents.
Healthcare access barriers	Healthcare facilities are generally physically accessible	Most respondents reported that hospitals are easy to access. Reported barriers mainly related to transport, traffic, financial constraints, and socioeconomic conditions. Permission requirements reflect household and social norms rather than restrictions imposed by health facilities.
Facility infrastructure	Sanitation facilities are available but require improvement in some locations	Female toilets are generally available, but concerns regarding adequacy, cleanliness, and maintenance were reported at selected hospitals.
Lighting and safety	Lighting is generally satisfactory, with some location-specific concerns	Most respondents reported adequate lighting, although some concerns were identified at selected facilities, indicating the need for continued attention to lighting and safety.
Drinking water	Water supply is available but drinking water facilities are not uniformly satisfactory	Drinking water was generally available, but concerns regarding adequacy and quality were reported at several locations.
Clinical services and staffing	Generally satisfactory privacy and maternal healthcare services	Privacy during examinations and antenatal/postnatal care were generally reported as satisfactory. Female doctors and nurses were generally available, although some gaps were reported at selected locations.
Women's health awareness	Limited identification of women's health concerns	Most respondents did not identify major women's health issues, which may indicate limited awareness or under-recognition of women's health concerns.
Female staff equity	Generally positive perceptions, but workplace support gaps remain	Equal opportunities were generally perceived positively, although some respondents reported unequal opportunities or were uncertain. Gaps in rest and breastfeeding facilities were identified at selected locations.
Safety and harassment mechanisms	Night-time safety concerns and limited awareness of reporting mechanisms	Most respondents generally felt safe during night duty, although some concerns were reported at selected locations. Awareness and availability of formal harassment reporting mechanisms varied across facilities.
Economic empowerment	Women's economic participation remains limited	Women engaged in income-generating activities were primarily involved in formal employment, with limited diversification of livelihood opportunities. Household needs and family-related expenses were the main uses of income.
Vulnerability and GBV	Financial vulnerability is the primary concern	Financially disadvantaged households were most commonly identified as vulnerable. Elderly persons, persons with disabilities, widows, and minorities were also identified. Formal support programmes were generally reported as limited, while physical violence was the most commonly reported form of violence against women.

Table 4.22: 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.
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 4.23: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.
Strategic Area	Recommended Action	Implementation Focus
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

298. This section presents the anticipated positive and adverse environmental and social impacts of the Khyber-Pakhtunkhwa Health System Strengthening Program (KPHSSP), Phase IV. 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).

299. 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.

300. 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

301. 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

302. 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.

303. 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.

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

305. 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

306. 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

307. 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 **Annexure-VI.**

b) Overlays

308. 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.**

309. 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

310. 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.

311. 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.

312. 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

313. 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.

314. 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

315. 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

316. 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 (SCP) 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

317. 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

318. 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

319. 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 Resource Conservation

Potential Impact

320. 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.

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

Mitigation Measures

322. 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.

323. Resources Conservation Plan is attached as **Annexure-VII.**

5.5.5 Flora

Potential Impact

324. The project involves rehabilitation and revamping works within existing hospital premises, and no major tree cutting or vegetation removal is anticipated. Minor impacts on planted vegetation and landscaped areas may occur due to temporary site mobilization, movement of machinery, dust deposition, and material storage if activities are not properly managed. However, impacts on flora are expected to be negligible to low, site-specific, short-term, and reversible in nature.

Mitigation Measures

- Avoid unnecessary cutting or trimming of trees and vegetation within hospital premises;
- Restrict material storage, temporary facilities, and construction activities to already paved or disturbed areas;
- Implement dust suppression measures such as regular water sprinkling to minimize dust deposition on vegetation;
- Compensate any unavoidable vegetation removal through plantation using native species;
- Maintain and enhance landscaping and green areas within hospital premises.

5.5.6 Fauna

Potential Impact

325. The project area comprises an already developed urban or semi-urban hospital environment with limited habitat value, mainly supporting urban-adapted fauna such as birds and small mammals. Construction activities, noise, machinery operation, and increased human presence may temporarily disturb local fauna within and around the hospital premises. However, as works are confined within existing developed areas, impacts on fauna are expected to be negligible to low, site-specific, short-term, and reversible in nature.

Mitigation Measures:

- Restrict construction activities to daytime hours to minimize disturbance to urban fauna;
- Ensure that no natural habitats or existing green areas are unnecessarily disturbed;
- Control noise, dust, and waste generation through appropriate site management practices;
- Incorporate native vegetation and landscaping within hospital premises to support local urban biodiversity;
- Ensure proper collection and disposal of construction and healthcare waste to avoid nuisance to birds and small animals.

5.5.7 Land Acquisition and Resettlement

Potential Impact

326. 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.

5.5.8 Temporary Acquisition of Land

Potential Impacts

327. 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.

5.5.9 Existing Utilities

Potential Impacts

328. 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

329. 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.

5.5.10 Physical and Cultural Resources

Mitigation Measures

330. 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.

331. 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

332. Small-scale excavation may be required for upgrading existing hospital utilities, including sewerage, drainage, water supply lines, and other minor external works. As the project focuses on rehabilitation rather than new construction, excavation activities will be localized, limited in extent, and short-term across all Phase IV project sites.

333. Potential impacts include temporary soil disturbance, spoil generation, dust emissions, restricted internal access, interference with ambulance and emergency movement, utility disruption, and occupational health and safety risks. These impacts may be relatively more pronounced at DHQ Hospital, Khar, DHQ Hospital, Landi Kotal, and DHQ Hospital, Ghallanai due to the rugged terrain, constrained access, and logistical challenges associated with material movement and construction activities. Dust-related impacts may be more noticeable at DHQ Hospital, Wana, and DHQ Hospital Miran Shah due to the relatively dry and semi-arid conditions and potential for wind-blown dust. Localized soil erosion, sediment runoff, and drainage-related impacts may occur at DHQ Hospital, Parachinar, and DHQ Hospital, Mishti Mela due to the mountainous terrain, steep slopes, seasonal rainfall, and, in some areas, cold-weather conditions, particularly where minor utility excavations are undertaken in external areas. The high elevation and remote location of these sites may also increase the difficulty of transporting excavated material, construction supplies, and waste. Across all project sites, there is also a possibility of encountering undocumented underground utilities and, in rare cases, physical cultural resources during excavation activities.

334. Impacts are expected to be moderate to high, site-specific, and temporary in nature.

Mitigation Measures

- Excavation will be carried out in small, phased sections, and works will be scheduled in coordination with hospital administration and, where feasible, during off-peak hours to maintain hospital operations and uninterrupted access to emergency services.
- Dust will be controlled through regular water sprinkling and covering of spoil piles and transport vehicles, with enhanced attention at the relatively dry and semi-arid sites of DHQ Hospital, Wana and DHQ Hospital, Miran Shah.
- Excavated material will be properly managed, and trenches will be backfilled and compacted promptly to minimize soil erosion, sediment runoff, and drainage obstruction, particularly at the mountainous and high-elevation sites of DHQ Hospital Parachinar and DHQ Hospital, Mishti Mela.
- Excavated material will be reused where feasible, while surplus spoil will be transported and disposed of at approved disposal locations, with due consideration to the logistical and access constraints of remote sites such as Wana, Miran Shah, Parachinar, and Mishti Mela.

- Temporary barriers, fencing, warning tape, and signage will be installed around excavation areas to protect patients, staff, attendants, visitors, and workers, particularly where hospital access is constrained by rugged or uneven terrain.
- Proper trench support, shoring, and safe excavation practices will be implemented to prevent trench collapse and ensure worker safety, with particular attention to excavations on sloping or uneven ground.
- Underground utilities and service lines will be identified and mapped prior to excavation to minimize accidental damage and disruption to essential hospital services, including water supply, sewerage, drainage, electricity, and communications.
- Controlled excavation methods will be adopted near existing and older hospital structures, and the Chance-Find Procedure will be implemented in case archaeological or culturally significant materials are encountered.
- Close coordination with hospital administration will be maintained to ensure continuous access to emergency units, ambulances, critical care areas, and essential hospital services. Particular attention will be given to access arrangements at remote and geographically constrained sites.
- Excavation and spoil management will be planned with consideration of seasonal rainfall, runoff, and possible flash-flood conditions, particularly at the mountainous sites of Parachinar and Mishti Mela, to prevent obstruction of natural or existing drainage pathways.
- Regular air quality, noise, and safety inspections will be conducted, particularly near sensitive hospital units such as ICUs, operation theatres, laboratories, isolation wards, and emergency departments.
- Workers will receive training on occupational health and safety, hazard identification, infection prevention and control, emergency response, safe excavation, working on uneven terrain, and safe waste and spoil handling procedures.

5.6.2 Construction campsites and Contractor Facilities

Potential Impact

335. The contractor's site office and temporary facilities will be established within the existing hospital premises at locations approved by the SC and PMIU, in coordination with the respective Hospital Administration, across all Phase IV project sites. Considering the limited scale of rehabilitation works, only small temporary areas will be utilized for site offices, material storage, equipment placement, and worker welfare facilities.

336. However, if such temporary facilities are located within or close to functional hospital areas, localized and short-term impacts may occur. These impacts may be relatively more noticeable at DHQ Hospital, Khar, DHQ Hospital, Landi Kotal, and DHQ Hospital, Ghallanai due to constrained space, rugged terrain, limited internal access, and the need to maintain continuous emergency and hospital access. At DHQ Hospital, Wana and DHQ Hospital, Miran Shah, relatively dry and semi-arid conditions may increase dust-related nuisance around temporary storage and material movement areas. At DHQ Hospital, Parachinar and DHQ Hospital, Mishti Mela, mountainous and high-

elevation terrain, seasonal rainfall, and potential runoff may increase the risk of localized erosion, drainage obstruction, and difficulties in establishing stable temporary facilities. The remoteness of several Phase IV sites may also create logistical challenges for material storage, waste removal, water supply, and worker welfare arrangements. Potential impacts include minor vegetation or surface disturbance, obstruction of internal movement, noise and visual intrusion, generation of solid waste and wastewater, sanitation issues, temporary water contamination risks, vector breeding, and disruption of hospital access routes, including ambulance and emergency pathways.

337. Considering the operational sensitivity of healthcare facilities, the continuous presence of patients, attendants, and critical medical services, as well as the terrain, climatic, access, and logistical constraints at some Phase IV locations, these impacts are assessed as moderate to high, site-specific, and temporary in nature.

Mitigation Measures

- The contractor's site office and temporary facilities will be located only within designated areas approved by the SC and Hospital Administration, avoiding sensitive zones such as wards, emergency units, ICUs, laboratories, operation theatres, and ambulance routes.
- The footprint of temporary facilities will be minimized, and unnecessary clearing of vegetation, paved areas, landscaped spaces, or natural ground surfaces will be avoided.
- Adequate sanitation arrangements, including clean toilets, safe drinking water, handwashing facilities, and proper wastewater disposal systems, will be provided and maintained at all temporary facilities. Direct discharge into drains, soil, or open areas will be strictly prohibited.
- Solid waste generated from contractor facilities will be properly segregated, collected, and disposed of through authorized municipal or other approved waste management systems. Fuel, lubricants, and maintenance activities will be managed in designated areas with appropriate spill prevention and response measures to avoid soil and water contamination.
- Dust, noise, and visual disturbance will be minimized through regular housekeeping, controlled material storage, water sprinkling where appropriate, covered transport, and scheduling of noisy activities during less sensitive hours. Additional attention will be given to DHQ Hospital, Wana and DHQ Hospital, Miran Shah due to their relatively dry and semi-arid conditions.
- At DHQ Hospital, Parachinar and DHQ Hospital, Mishti Mela, temporary facilities and material stockpiles will, wherever practicable, be located on stable and level surfaces. Drainage pathways will be kept clear, and suitable measures will be implemented to minimize localized runoff, erosion, and sediment movement during rainfall.
- At sites with rugged or uneven terrain, including Khar, Landi Kotal, Ghallanai, Parachinar, and Mishti Mela, temporary facilities, storage areas, and access routes will be arranged to maintain safe movement and minimize risks associated with slopes, unstable surfaces, and uneven ground.

- All internal access routes, emergency pathways, and ambulance movement corridors will remain open and unobstructed throughout the construction period. Any temporary restriction or diversion will be planned in advance and coordinated with the Hospital Administration.
- Vector control measures, including proper waste management, drainage of stagnant water, and routine site cleaning, will be implemented to prevent mosquito and pest breeding.
- Adequate worker welfare facilities, including food, rest, hygiene, drinking water, and first aid arrangements, will be provided in accordance with applicable national labour requirements and occupational health and safety standards. Workers will be trained and bound by a Code of Conduct under an approved Construction Camp Management Plan and Labour Management Plan.
- A Community Liaison Officer will be designated to coordinate with hospital administration and address complaints or grievances related to contractor activities.
- All temporary facilities, stockpiles, and storage areas will be dismantled immediately after completion of works, and disturbed areas will be restored to their original condition.
- Regular environmental, health, and safety monitoring and supervision will be conducted to ensure compliance with the approved EMP.

5.6.3 Air Quality

Potential Impact

338. Air quality may be temporarily affected during rehabilitation works due to dust generation from demolition, excavation, material handling, transportation of construction materials, and movement of vehicles and machinery within hospital premises. Demolition and dismantling of existing structures and finishes may generate fine particulate matter, while diesel-powered generators, machinery, and transport vehicles may emit pollutants such as PM, NO_x, SO_2, CO, and VOCs.

339. The magnitude of air quality impacts is expected to vary across project sites depending on climatic conditions, terrain, surrounding land use, traffic intensity, and the degree of exposure of work areas. Dust-related impacts may be relatively more pronounced at DHQ Hospital, Wana and DHQ Hospital, Miran Shah due to their relatively dry and semi-arid conditions, exposed surfaces, and potential for wind-blown dust. At DHQ Hospital, Khar (Bajaur), DHQ Hospital, Landi Kotal (Khyber), and DHQ Hospital, Ghallanai (Mohmand), rugged terrain, constrained access, and movement of construction materials and vehicles may result in localized dust emissions around active work areas. DHQ Hospital, Parachinar (Kurram) and DHQ Hospital, Mishti Mela (Orakzai) may generally benefit from cooler and more elevated environments; however, localized dust emissions may still occur during demolition, excavation, and material handling, particularly during dry periods.

340. Given the sensitivity of hospital environments, particularly around OPDs, ICUs, operation theatres, laboratories, emergency units, and isolation wards, even short-term

exposure to dust and air emissions may adversely affect patients, healthcare workers, attendants, and sensitive medical equipment.

341. The risk of exposure will depend on the location and duration of construction activities, prevailing wind conditions, proximity of work areas to sensitive hospital units, and the effectiveness of dust control measures. Particular attention will be required at Wana, Miran Shah, Khar, Landi Kotal, and Ghallanai, where dry conditions, exposed surfaces, constrained access, or material movement may increase localized dust exposure.

342. Impacts are expected to be moderate to high, site-specific, temporary, and reversible in nature.

Mitigation Measures

- Dust emissions from demolition, excavation, transportation, and material handling will be controlled through regular water sprinkling on exposed areas, covering of stockpiles, and covering of transport vehicles carrying fine materials, with enhanced dust suppression measures implemented at the relatively dry and dust-prone sites of DHQ Hospital, Wana and DHQ Hospital, Miran Shah.
- Only well-maintained and low-emission machinery and vehicles will be used. Open burning of waste will be strictly prohibited, and equipment engines will be turned off when not in use to minimize exhaust emissions.
- Temporary dust screens, barricades, or enclosures will be installed around demolition and other high dust-generating activities to limit dust dispersion into sensitive hospital areas.
- Dust-generating activities, including demolition, concrete cutting, and excavation, will be scheduled in coordination with hospital administration and, where practicable, during less sensitive or off-peak periods to minimize disturbance to patients, visitors, and medical staff.
- Demolition debris and excavated materials will be promptly collected, covered, and transported to approved disposal sites to reduce airborne dust.
- Construction materials prone to generating dust will be stored in covered areas or properly secured during transport and handling.
- Workers will be provided with appropriate PPE, including dust masks and respirators where necessary, and trained in their proper use.
- Regular air quality monitoring will be conducted near sensitive hospital units such as ICUs, operation theatres, laboratories, and isolation wards, where warranted, to ensure compliance with applicable NEQS and project requirements.
- Warning signage will be installed around active work areas, and continuous coordination with hospital administration will be maintained regarding demolition schedules and high dust-generating activities.
- Good housekeeping practices, including routine cleaning of access roads, pathways, and nearby hospital areas, will be implemented to minimize dust accumulation.
- Particular care will be taken during material transportation and equipment movement at sites with rugged or constrained access, including Khar, Landi Kotal, Ghallanai, Parachinar, and Mishti Mela, to minimize dust generation and disturbance to hospital users.

- All monitoring records, complaints, corrective actions, and inspection findings will be properly documented and addressed in a timely manner.

5.6.4 Noise

Potential Impact

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

344. Noise generated during rehabilitation works may disturb patients, healthcare staff, attendants, and visitors, particularly within sensitive hospital areas such as ICUs, operation theatres, emergency units, laboratories, and inpatient wards. Noise impacts may be relatively more pronounced at DHQ Hospital, Khar, DHQ Hospital, Landi Kotal and DHQ Hospital, Ghallanai where constrained hospital premises, rugged terrain, and limited space may bring construction activities closer to operational hospital areas. At DHQ Hospital, Wana and DHQ Hospital, Miran Shah, vehicle and equipment movement may generate localized noise impacts despite the relatively less dense surrounding environment. At DHQ Hospital, Parachinar and DHQ Hospital, Mishti Mela, the surrounding mountainous terrain may influence the propagation of noise, while vibration from drilling, demolition, and heavy equipment may pose localized risks to older or structurally sensitive hospital buildings if activities are not properly controlled.

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

Mitigation Measures

- Noisy activities, including demolition, drilling, concrete cutting, and operation of heavy machinery, will be scheduled in coordination with hospital administration and, where practicable, during less sensitive or off-peak periods.
- Noisy equipment and machinery will be properly maintained and fitted with appropriate silencers, mufflers, or other noise-control devices.
- Temporary acoustic barriers, screens, or enclosures will be installed where necessary to reduce noise transmission to sensitive hospital areas.
- Construction equipment and vehicles will not be allowed to idle unnecessarily, and unnecessary use of horns will be prohibited within and around hospital premises.
- Construction activities will be phased and conducted in small sections to limit the duration and extent of noise exposure.
- Particular care will be taken when undertaking drilling, demolition, or vibration-generating activities near older or structurally sensitive hospital buildings, particularly at mountainous and constrained sites such as Parachinar and Mishti Mela.
- Where required, pre-construction condition surveys of nearby sensitive structures will be undertaken before major demolition or vibration-generating activities.

- Noise levels will be monitored near sensitive receptors, including ICUs, operation theatres, emergency units, laboratories, and inpatient wards, where construction activities have the potential to generate significant noise.
- Workers exposed to elevated noise levels will be provided with appropriate hearing protection and trained in its proper use.
- Hospital administration will be informed in advance of particularly noisy activities, and complaints related to noise and vibration will be promptly recorded, investigated, and addressed.
- All noise monitoring records, complaints, corrective actions, and inspection findings will be properly documented and maintained.

5.6.5 Traffic Management

Potential Impact

346. Rehabilitation works within operational hospital premises, including transportation of construction materials, movement of machinery and equipment, temporary closure or diversion of internal pathways, and partial occupation of parking or circulation areas, may temporarily disrupt internal traffic circulation at all Phase IV project sites. Such disruptions may result in localized congestion and restricted movement for patients, visitors, ambulances, hospital staff, and service vehicles. These impacts may be relatively more pronounced at DHQ Hospital, Khar, DHQ Hospital, Landi Kotal, and DHQ Hospital, Ghallanai due to constrained hospital premises, rugged terrain, limited internal circulation space, and access challenges. At DHQ Hospital, Parachinar and DHQ Hospital, Mishti Mela, mountainous terrain, steep or uneven access routes, and logistical challenges associated with the movement of construction materials and equipment may create additional traffic and safety constraints. At DHQ Hospital, Wana and DHQ Hospital, Miran Shah, the remoteness of the sites and potential limitations in road and supply access may create additional challenges for the movement of construction vehicles and materials. Across all sites, the continuous need to maintain access to emergency services and ambulance routes will be a key consideration.

347. Given the operational sensitivity of healthcare facilities and the critical need for uninterrupted emergency access, any obstruction or delay in internal circulation may result in 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 departments, critical care units, hospital entrances, and other essential services.
- Coordination with hospital administration will be maintained to ensure uninterrupted ambulance and emergency access at all times, with particular attention to sites with constrained or uneven internal circulation.
- Alternate entry and exit routes within the hospital premises will be clearly demarcated and communicated to staff, patients, attendants, and visitors before any temporary route diversion is implemented.

- Advance notice 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, where practicable, to minimize congestion and avoid conflicts with peak patient and emergency movements.
- Dedicated and clearly marked pathways will be provided for pedestrians, while separate routes will be maintained for construction vehicles wherever practicable to avoid conflicts.
- Visible directional signage, safety barricades, lighting, and protective barriers will be installed along construction zones and temporary access routes.
- Trained personnel or traffic marshals will be stationed at key locations during material deliveries and other high-traffic construction activities to guide vehicles and pedestrians safely and ensure unobstructed access for ambulances and hospital staff.
- Construction materials, machinery, excavated material, and debris will not be stored in a manner that obstructs emergency routes, hospital entrances, ambulance access, fire access corridors, or pedestrian pathways.
- At DHQ Hospital, Khar, DHQ Hospital, Landi Kotal, DHQ Hospital, Ghallanai, DHQ Hospital, Parachinar, and DHQ Hospital, Mishti Mela, special attention will be given to the safe movement of construction vehicles and materials along constrained, uneven, sloping, or mountainous access routes to minimize traffic conflicts and accident risks.
- At DHQ Hospital, Wana and DHQ Hospital, Miran Shah material deliveries and construction vehicle movements will be carefully planned in view of the remote location and potential logistical and road access constraints.
- Vehicle speeds will be controlled within hospital premises, and all construction vehicles and drivers will comply with designated routes and hospital traffic safety requirements.
- All temporary traffic arrangements will be reviewed regularly in coordination with hospital management to ensure effectiveness and minimize disruption.

348. 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 **Annexure-VIII.**

5.6.6 Impact on Soil

Potential Impact

349. Soil impacts from the proposed rehabilitation works are expected to be localized, minor to moderate, and short-term in nature, as project activities will be confined to upgrading and rehabilitation within the existing premises of DHQ Hospitals across all sites. Temporary soil disturbance may occur during minor excavation for drainage systems, sewerage lines, water supply pipelines, underground utilities, equipment foundations, and external works such as paving, landscaping, parking improvements, boundary works, and other minor site improvements.

350. Potential impacts may include localized erosion of exposed soil, temporary disruption of surface drainage, dust generation, and minor soil contamination from accidental spills of fuel, lubricants, wastewater, or construction waste. These impacts may be relatively more noticeable at DHQ Hospital, Wana and DHQ Hospital, Miran Shah due to relatively dry and semi-arid conditions, exposed soil surfaces, and potential for wind-blown dust. At DHQ Hospital, Khar, DHQ Hospital, Landi Kotal, and DHQ Hospital, Ghallanai, rugged terrain, uneven ground, and constrained access may increase the potential for localized soil disturbance and difficulties in managing excavated material. At DHQ Hospital, Parachinar and DHQ Hospital, Mishti Mela, mountainous terrain, sloping ground, seasonal rainfall, and runoff may result in localized soil erosion and sediment movement from exposed excavated areas if not properly managed. Across all sites, improper stockpiling of excavated material or construction waste may obstruct drainage pathways and hospital access routes.

351. 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 and minor external works will be kept as small and short-term as practicable to minimize soil disturbance.
- Excavated materials will be managed within designated work areas and will not be placed in a manner that blocks access routes, drains, emergency pathways, or patient movement areas.
- Regular water sprinkling will be applied to exposed soil or loose material to control dust, with increased attention at the relatively dry sites of DHQ Hospital, Wana and DHQ Hospital, Miran Shah.
- Refueling and maintenance of machinery will be carried out on impermeable surfaces or using suitable drip trays and spill prevention measures to prevent soil contamination.
- Construction waste and debris will be collected promptly, segregated where practicable, and disposed of at approved locations to prevent soil contamination and obstruction of drainage or access routes.
- At DHQ Hospital, Khar, DHQ Hospital, Landi Kotal, and DHQ Hospital, Ghallanai, temporary stockpiles will be located on stable surfaces and managed to minimize disturbance to surrounding ground surfaces and internal access routes.
- At DHQ Hospital, Parachinar and DHQ Hospital, Mishti Mela, excavated material will be properly stockpiled, exposed excavated areas will be stabilized where necessary, and trenches will be backfilled and compacted promptly after completion of utility works to minimize soil erosion and sediment runoff during rainfall.
- Natural drainage pathways and existing drainage infrastructure will be kept clear of excavated material, construction waste, and other obstructions.
- Equipment movement will be restricted to designated routes and immediate work areas to avoid unnecessary damage to surrounding paved, landscaped, or undisturbed surfaces.

- Disturbed areas, including small patches of soil along access routes and work areas, will be restored promptly through paving, landscaping, compaction, or other appropriate surface treatment.
- Workers will be trained in dust control, spill prevention, safe handling of excavated material, and basic soil protection measures, and compliance will be monitored regularly.

5.6.7 Community Health and Safety

Potential Impact

352. During the hospital rehabilitation works at all Phase IV locations, minor excavation, demolition, material handling, and movement of equipment within operational hospital premises may pose risks to patients, visitors, hospital staff, attendants, nearby pedestrians, and other hospital users. Potential impacts include:
- Accidents resulting from the movement of construction vehicles, machinery, and equipment within hospital premises.
- Exposure to dust, noise, and minor vibrations, particularly affecting vulnerable patients, including children, elderly persons, and persons with pre-existing health conditions.
- Localized contamination from accidental spills of fuel, lubricants, wastewater, or construction materials.
- Increased risk of communicable disease transmission among hospital users, visitors, workers, and attendants if hygiene, sanitation, and infection prevention and control measures are not properly maintained.
- Slips, trips, falls, or collisions due to temporary obstacles, uneven surfaces, open excavations, construction debris, or changes in internal access routes.
- Additional movement and access constraints at DHQ Hospital, Khar, DHQ Hospital, Landi Kotal, and DHQ Hospital, Ghallanai due to rugged terrain, constrained hospital premises, uneven surfaces, and potentially limited internal circulation.
- Increased risks associated with sloping, uneven, or mountainous access routes at DHQ Hospital, Parachinar and DHQ Hospital, Mishti Mela, particularly during material transportation and adverse weather conditions.
- Enhanced dust exposure at relatively dry and semi-arid sites such as DHQ Hospital, Wana and DHQ Hospital, Miran Shah due to exposed surfaces and potential for wind-blown dust.
- Increased potential for pedestrian–vehicle interaction and access conflicts at all hospitals due to the continued operation of hospital services during rehabilitation works, with particular attention required at sites where internal circulation is constrained.

353. 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 maintained through appropriate barricades, fencing, warning tape, and signage.
- Safe and uninterrupted access for patients, hospital staff, attendants, visitors, and emergency vehicles will be maintained at all times through phased works and clearly designated routes.
- Construction vehicle and equipment movement within hospital premises will be strictly controlled, and low speed limits will be enforced to minimize accident risks. Particular attention will be given to sites with uneven, sloping, or constrained access, including Khar, Landi Kotal, Ghallanai, Parachinar, and Mishti Mela.
- Dust, noise, and minor vibration will be minimized through water sprinkling, proper equipment maintenance, dust suppression measures, and scheduling of works during less sensitive hours. Enhanced dust control will be implemented at DHQ Hospital, Wana and DHQ Hospital, Miran Shah due to their relatively dry and semi-arid conditions.
- Additional coordination with Hospital Administration will be maintained at all sites to safely manage pedestrian movement, emergency access, ambulance routes, and construction activities within operational hospital premises.
- All work areas near sensitive hospital units, including emergency departments, ICUs, operation theatres, laboratories, isolation wards, and inpatient areas, will be secured with suitable barriers and warning signs to prevent accidental exposure.
- Good housekeeping will be maintained, including timely removal of debris, proper waste management, safe management of excavated material, and prevention of stagnant water.
- Refuelling and storage of fuels, lubricants, and other potentially contaminating materials will be carried out only in designated and controlled areas with appropriate spill prevention and response measures.
- At DHQ Hospital, Parachinar and DHQ Hospital, Mishti Mela, additional measures will be implemented to maintain safe movement along sloping or uneven terrain and to reduce risks associated with runoff, slippery surfaces, and adverse weather conditions.
- Separate pedestrian pathways and construction access routes will be maintained wherever practicable to minimize interaction between hospital users and construction activities.
- Traffic control personnel or trained flaggers will be deployed during major material deliveries, equipment movement, and other activities with a potential to affect pedestrian or vehicle movement.
- Workers will be trained on site safety, infection prevention and control, hygiene practices, emergency response, and appropriate conduct within hospital premises.
- A site-specific Health, Safety, and Environment (HSE) Plan, Infection Prevention and Control (IPC) protocol, and GRM will be implemented at each hospital site to address safety concerns, complaints, and emergency situations.
- Prior information will be provided to hospital staff, patients, attendants, and visitors regarding construction activities that may affect access, movement, or the use of specific hospital areas.

Regular monitoring and supervision will be conducted to ensure compliance with environmental, health, safety, and infection prevention requirements throughout the rehabilitation period.

5.6.8 Occupational Health and Safety

Potential Impact

354. 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.

355. 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, 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.

356. 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 OHS Plan, 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 **Annexure-IX.**

5.6.9 Generation of Solid Waste

Potential Impact

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

358. 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.

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

Mitigation Measures

- 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.
- Healthcare waste generated by hospital operations will not be mixed with construction or domestic waste. Any healthcare waste encountered during rehabilitation activities will be managed in accordance with the hospital's approved healthcare waste management procedures and applicable requirements.
- Good housekeeping practices will be maintained to prevent accumulation of waste and debris within hospital premises.
- Loose waste, spoil, and demolition debris will be covered during transport and storage, with enhanced attention at the relatively dry and windy sites of DHQ Hospital, Wana and DHQ Hospital, Miran Shah.

- At DHQ Hospital, Parachinar and DHQ Hospital, Mishti Mela, special care will be taken to prevent the disposal or stockpiling of debris near drainage pathways, slopes, or areas susceptible to runoff and erosion.
- At remote locations, including Wana, Miran Shah, Parachinar, and Mishti Mela, waste collection and transportation arrangements will be planned in advance to avoid prolonged accumulation of waste within hospital premises.
- Waste storage areas will be located away from patient areas, food preparation areas, water sources, drainage channels, and emergency access routes.
- 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.

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

5.6.10 Generation of Wastewater

Potential Impact

361. 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.**

362. If not properly managed, wastewater generated during rehabilitation activities may lead to localized contamination of hospital grounds, drains, and surrounding surfaces; blockage of drainage systems; formation of stagnant water; odor generation; and increased risk of vector breeding, thereby affecting hygiene and sanitation conditions within hospital premises across all Phase IV project sites. At DHQ Hospital, Parachinar (Kurram) and DHQ Hospital Mishti Mela, mountainous terrain, sloping ground, and seasonal rainfall may increase the potential for localized runoff, erosion, and sediment transport from work areas if wastewater and drainage are not properly managed. At DHQ Hospital, Wana and DHQ Hospital, Miran Shah, dry and semi-arid conditions may increase the risk of wastewater stagnation, localized soil contamination, and unsanitary conditions around work areas if wastewater is not promptly collected and managed. At DHQ Hospital, Khar, DHQ Hospital, Landi Kotal, and DHQ Hospital, Ghallanai, rugged terrain and constrained drainage conditions may create localized challenges for the safe management of wastewater and runoff.

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

Mitigation Measures

- Existing hospital sanitation facilities will be utilized by workers where feasible and approved by Hospital Administration to avoid the need for unnecessary temporary sanitation arrangements.
- Construction-related wastewater, including concrete wash water, equipment cleaning wastewater, and wastewater potentially contaminated with oils or lubricants, will be collected and managed in designated areas and will not be discharged into hospital drains, open ground, or surrounding areas without appropriate treatment or approval.
- Designated equipment and vehicle cleaning areas will be established, where required, with appropriate containment measures, including sediment traps, collection systems, or oil-water separators as appropriate to the activity.
- Fuels, oils, lubricants, and chemicals will be stored on impermeable surfaces with suitable secondary containment to prevent leakage and contamination of soil, surface water, or drainage systems.
- Stormwater will be prevented from entering active work areas wherever practicable to avoid waterlogging, mixing with wastewater, and potential contamination.
- Special drainage and runoff management measures will be implemented at DHQ Hospital, Parachinar and DHQ Hospital, Mishti Mela to control wastewater movement on sloping terrain and minimize erosion and sediment transport.
- At DHQ Hospital, Khar, DHQ Hospital, Landi Kotal, and DHQ Hospital, Ghallanai, existing drainage pathways will be kept clear, and wastewater will be managed to avoid localized ponding and obstruction of hospital access routes.
- At DHQ Hospital, Wana and DHQ Hospital, Miran Shah, wastewater will not be allowed to accumulate in open areas or unlined depressions, and suitable measures will be implemented to prevent stagnant water, odour, and vector breeding.
- Non-potable water will be reused where feasible for dust suppression and minor construction activities, subject to suitability and applicable health and safety requirements.
- Good housekeeping practices will be maintained to prevent wastewater accumulation, drainage blockages, leakage, or stagnant water within hospital premises.
- Workers will be trained on water conservation, hygiene, spill prevention, and proper wastewater handling practices.
- Drainage systems and wastewater handling arrangements will be regularly inspected to identify and address leaks, blockages, overflows, or contamination risks.
- A site-specific wastewater management approach will be implemented in coordination with Hospital Administration, and records of wastewater generation, treatment, reuse, and disposal will be maintained where applicable.
- Any wastewater containing oils, chemicals, or other hazardous contaminants will be managed separately and will not be discharged into the hospital drainage system or surrounding environment.
- All wastewater management practices will comply with applicable environmental regulations, project requirements, and hospital sanitation standards.

5.6.11 Impact on Water Resources

Potential Impact

364. 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.
- At DHQ Hospital, Parachinar and DHQ Hospital, Mishti Mela, mountainous terrain, sloping ground, and seasonal rainfall may increase the risk of sediment transport, runoff, and localized drainage disturbance if exposed areas and excavated materials are not properly managed.
- At DHQ Hospital, Khar, DHQ Hospital, Landi Kotal, and DHQ Hospital, Ghallanai, rugged terrain and constrained drainage conditions may increase the potential for localized runoff and drainage obstruction during external works.
- At relatively dry sites such as DHQ Hospital, Wana and DHQ Hospital, Miran Shah, water demand for dust suppression and construction activities may be comparatively higher during active work periods, while limited water availability may create additional pressure on existing supplies.

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

Mitigation Measures

- Workers will utilize existing hospital sanitation facilities where feasible and approved by Hospital Administration, minimizing the need for temporary arrangements and preventing uncontrolled wastewater discharge.
- Construction-related wastewater, including wastewater from concrete works, equipment cleaning, and other construction activities, will be collected and managed in designated areas and will not be allowed to mix with hospital sewage or enter stormwater drains without appropriate management.
- Equipment and vehicles will be cleaned only in designated service areas, where required, with appropriate containment measures such as sediment traps and oil-water separators, as applicable.
- Fuels, oils, lubricants, and chemicals will be stored on impermeable, bunded surfaces and kept away from drainage lines, water supply infrastructure, and natural water pathways.

- Spill prevention and response procedures will be implemented, and workers will be trained in spill containment, cleanup, reporting, and safe handling of potentially contaminating substances.
- Runoff from minor excavation and disturbed areas will be controlled through good housekeeping, prompt backfilling and compaction of excavations, and protection of nearby drainage inlets to prevent sediment or contaminants from entering drainage systems.
- At DHQ Hospital, Parachinar and DHQ Hospital, Mishti Mela, excavated material will be properly stockpiled, exposed areas will be stabilized where necessary, and suitable runoff and erosion control measures will be implemented to minimize sediment movement during rainfall.
- At DHQ Hospital, Khar, DHQ Hospital, Landi Kotal, and DHQ Hospital, Ghallanai, drainage pathways will be kept clear, and excavated materials and construction debris will be managed to prevent localized blockage and runoff-related impacts.
- Construction materials, debris, fuel, chemicals, and excavated spoil will not be stored near drainage channels, water supply facilities, natural water pathways, or other areas where they could cause blockage or contamination.
- Water consumption for construction activities will be minimized, monitored, and managed efficiently. Water conservation practices will be promoted, particularly at DHQ Hospital, Wana and DHQ Hospital, Miran Shah, where relatively dry conditions and potential water supply constraints may occur.
- Existing hospital water supply and sewerage connections will be maintained and protected from damage during excavation and utility works.
- No direct discharge of wastewater, contaminated runoff, or construction-related pollutants into natural water bodies, open drains, or surrounding land will be permitted.
- Regular inspections will be carried out to ensure proper functioning of drainage systems, prevent blockages, identify leaks or contamination risks, and ensure compliance with applicable environmental requirements and hospital sanitation protocols.

5.6.12 Hazardous Waste Management

Potential Impact

366. 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. Presence of Asbestos Containing Materials (ACM) may also pose hazardous impacts if disturbed or removed during rehabilitation works.

367. 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.
- Asbestos exposure may release asbestos fibres, posing potential occupational and public health risks to workers, patients, hospital staff, and visitors.
- Blockage or damage to drainage infrastructure if hazardous residues (e.g., cement slurry or chemicals) enter the drainage system.

368. 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 NEQS and hospital safety protocols.
- Where ACMs are identified, an Asbestos Management Plan (AMP) will be implemented before commencement of work.
- ACMs will be removed, handled, and disposed of by licensed/authorized contractors and trained personnel, with appropriate PPE, fibre-control measures, and access controls in place.
- ACMs will not be broken, reused, or incorporated into the works. Asbestos waste will be securely packaged, transported, and disposed of at an authorized facility, with disposal records maintained.

5.6.13 Disturbance to Hospital Services and Shifting of Units

Potential Impact

369. The proposed rehabilitation and upgrading works within operational hospital settings may result in temporary disruption to routine healthcare services and may require the temporary relocation or phased shifting of certain functional units during construction activities. Such disruptions may affect patient flow, internal circulation, waiting areas, access to healthcare services, and operational efficiency within hospital premises. Disruptions may be relatively more pronounced at DHQ Hospital Khar, DHQ Hospital Landi Kotal, and DHQ Hospital, Ghallanai due to constrained hospital premises,

rugged terrain, limited space for temporary relocation arrangements, and challenges in maintaining safe internal access during rehabilitation works. At DHQ Hospital, Parachinar and DHQ Hospital, Mishti Mela, the remote and mountainous setting may create additional logistical challenges for the temporary relocation of services, movement of equipment, and maintenance of uninterrupted access to healthcare facilities. At DHQ Hospital, Wana and DHQ Hospital, Miran Shah, remoteness and potential limitations in alternative service arrangements may further increase the importance of careful construction phasing and service continuity planning.

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

Mitigation Measures

- A comprehensive SCP will be prepared in coordination with Hospital Administration, identifying affected units, relocation requirements, sequencing of works, alternative service arrangements, and measures to maintain essential healthcare services.
- Temporary functional arrangements will be established within available and suitable spaces to maintain uninterrupted delivery of critical healthcare services during rehabilitation works.
- Construction activities will be phased and scheduled to avoid peak operational hours and periods of high patient demand, where feasible.
- Any shifting or temporary relocation of hospital units will be undertaken in coordination with Hospital Administration, ensuring that essential equipment, utilities, infection prevention requirements, and patient access are maintained.
- Clear wayfinding signage and timely information dissemination will be implemented to ensure safe and efficient movement of patients, attendants, staff, and visitors during changes to unit locations or internal access routes.
- Emergency departments, critical care units, operating theatres, laboratories, and other essential hospital services will remain accessible and operational throughout the construction period.
- At DHQ Hospital, Parachinar and DHQ Hospital, Mishti Mela, relocation and construction sequencing will consider the remote setting, challenging terrain, material transport constraints, and potential weather-related access disruptions.
- At DHQ Hospital, Khar, DHQ Hospital, Landi Kotal, and DHQ Hospital, Ghallanai, temporary relocations and construction staging will be planned carefully to minimize impacts associated with constrained space and difficult internal circulation.
- At DHQ Hospital, Wana and DHQ Hospital, Miran Shah, service continuity arrangements will consider the remote location and the limited availability of alternative healthcare facilities or temporary service arrangements.
- Continuous coordination with Hospital Administration will be maintained to ensure uninterrupted operation of emergency and essential healthcare services at all locations.
- Patients, attendants, staff, and visitors will be informed in advance of any changes to service locations, access arrangements, or temporary disruptions.

371. The SCP is attached as **Annexure-XI.**

5.6.14 Disturbance to Utilities

Potential Impact

372. 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.

373. 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.

374. 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

375. 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.

376. 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

377. 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 levelling 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

378. 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.
- 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.

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

Mitigation Measures

A. Workplace and Fire Emergencies

- A site-specific HSE and 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 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.

380. 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 **Annexure-XII.**

5.6.17 Flora and Fauna

381. No significant impacts on flora or fauna are anticipated, as the project is confined to existing hospital premises within an already developed urban or semi-urban environment. Minor temporary impacts on planted vegetation and urban-adapted fauna may occur due to construction activities, dust, noise. Any unavoidable vegetation removal will be compensated through plantation and landscaping using native species to enhance green cover and the overall site environment.

382. Care will be taken to minimize disturbance to urban-adapted fauna, particularly birds and small animals, through controlled construction activities, proper waste management, and restriction of major construction works to daytime hours.

5.6.18 Discovery of Heritage Sites/ Structures during Excavation

Potential Impact

383. 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 (**Annexure-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.

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

5.6.19 Social/ Cultural Conflicts

Potential Impact

385. 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.

386. 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.

387. 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

388. 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.

389. 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

390. 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

391. 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

392. 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

393. 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

394. 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

395. 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

396. 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

397. 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 OHS, 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

398. 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. Impacts are expected to be high, site-specific, and long-term in nature.

Mitigation Measures:

- Comprehensive 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

399. 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.

400. 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

401. 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

402. 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

403. 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 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

404. 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

405. The hospitals are located in districts exposed to varying climate change and disaster-related hazards. Khar, Ghalanai, Miran Shah, Wana, and Landi Kotal are primarily vulnerable to extreme heat, water scarcity, dust storms, intense rainfall, and flash flooding, while Parachinar and Mishti Mela, are more susceptible to heavy rainfall, flash floods, landslides, snowfall, and extreme cold. These hazards may disrupt hospital access, damage buildings and critical infrastructure, interrupt electricity, water supply, sanitation, drainage, and communications, and affect the reliability of medical equipment. They may also restrict the movement of patients, staff, and essential medical supplies and compromise the continuity of healthcare services. Impacts are expected to be moderate to high, site-specific, and long-term in nature.

Mitigation Measures:

406. The proposed design incorporates climate-resilient and disaster risk reduction measures, including improved drainage and flood protection, energy-efficient HVAC and lighting, rooftop solar photovoltaic systems with backup power, adequate water storage and filtration facilities, and appropriate slope and erosion protection where required. Emergency preparedness and business continuity measures should also be incorporated to maintain hospital access and essential healthcare services during extreme weather events, thereby enhancing the resilience and operational continuity of the participating hospitals under changing climatic conditions.

6 ANALYSIS OF THE ALTERNATIVES

407. 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.

408. 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)

409. 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.

410. 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

411. 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.

412. 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)

413. 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.

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

6.2.2 Alternative II- Phased Implementation Option

415. 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.

416. 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

417. 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.

418. 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)

419. 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.

420. 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

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

422. 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.

423. 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

424. 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)

425. Consultations, participation, and information disclosure (CPID) are an integral part of project planning 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.

426. 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

427. 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 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

428. 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

429. 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

430. 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 Farooque	Chief Consevator Wildlife
			Nafeez Zafar	Assistant Technical
4.	16-02-26	Khyber Pakhtunkhwa Forest Department	Ahmad Jalil	Chief Conservator of Forest
			Fawad Khalil	Director Headquarter
			Zubair Ali	Senior Director
			Muhammad Ilias	Director
5.	17-02-26	Water and Sanitation Services Peshawar	Muhammad Ijaz	Manager Water Supply and Waste Water Management
			Zalmeer Ul Hussan	GM Planning
6.	18-02-26	Local Government, Elections and Rural Government Department	Siraj Muneer	Senior Chief Planning Officer
7.	18-02-26	Irrigation Department Khyber Pakhtunkhwa	Mustajab Khan	Subdivisional Officer of Peshawar
			Shireen Khan	Executive Engineer
8.	19-02-26	Khyber Pakhtunkhwa Health Care Commission	Dr. Shafaq Haider	Director Registration

7.4.1 Consultations with Departments

431. 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

432. 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

433. 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. • It was suggested to incorporate: ◦ Killer tanks for pathological waste and; ◦ OT Tanks-carsolex for chemical sterilization 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 expressed over hazardous solid and water waste being mixed in municipal waste without being segregated. • 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. • Incinerators are recommended to be installed on the hospital premises. • Liquid waste must be catered to with preliminary treatment on the hospital premises before being mixed with municipal liquid waste.

Sr. No.	Department/ Organization	Stakeholder Views/Concerns
		• The hospitals are required to sign MOU's with relevant private or government bodies to assist in segregation and hazardous waste disposal. • KPEPA and KPHCC 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.

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

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

7.5 PUBLIC CONSULTATION AND PARTICIPATION PROCESS

435. 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.

7.5.1 Methods of Public Consultation

436. 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

7.5.2 Consultations with Hospital Staff, Patients, Attendants and Nearby Community

437. Stakeholder consultations were conducted across the project area to understand the views, concerns, and expectations of the communities and hospital users, and to incorporate their feedback into the project planning process. A total of seven consultative meetings were held in the study area, with the participation of 55 respondents representing different groups. The consultations were conducted at the hospitals given in **Table 7.3**. The consultations included representatives from different stakeholder groups including patients, attendants, community members and Hospital staff to ensure that a broad range of perspectives was captured.

438. Lists of consultation participants are attached as **Annex-XIV**

Table 7.3: **Consultation Participants at each location**

Sr. No.	Hospital Name	Consultation Dates	Consultation Participants
1	DHQ, Khar	29-04-2026	8
2	DHQ, Landi Kotal,	17-04-2026	9
3	DHQ, Ghallanai	29-04-2026	9
4	DHQ, Wana	9-07-2026	10
5	DHQ, Parachinar	01-07-2026	3
6	DHQ, Miran Shah	05-07-2026	9
7	DHQ, Mishti Mela	28-04-2026	7
		Total	55

7.5.3 Stakeholders and their apprehensions

439. During the consultations, participants shared their concerns, expectations, and suggestions regarding the proposed project. These discussions provided valuable insights into the anticipated project impacts and informed the identification of appropriate mitigation and enhancement measures. **Plate 7-2** presents photographs of the consultation meetings conducted at the project hospitals, while **Table 7.4** summarizes the major concerns and apprehensions raised by the stakeholders.

440. Overall, the majority of respondents expressed a positive perception of the proposed project and considered it beneficial for the health sector. They anticipated that the project would enhance healthcare facilities, improve hygiene and sanitation conditions, and strengthen the overall quality of healthcare services. Respondents also expected the project to generate indirect socioeconomic benefits, including employment opportunities for local communities during construction and operation, leading to increased household incomes and contributing to poverty reduction.

Table 7.4: Major Concerns and suggestions of the respondents in the Project Area

Concerns	Response
• Hospital services and patient care will be disturbed to during construction. • Noise, dust, and vibration will adversely affect patients, attendants, and hospital staff and hospital machinery. • Health and safety risks to patients, visitors, and hospital staff. • Employment opportunity for local community shall be preference • Timely completion of construction works shall be carried out. • Disruption to hospital access, including delays in ambulance movement and emergency response due to construction activities may be observed. • Improper handling and disposal of construction and demolition waste may affect hospital hygiene, safety, and the surrounding environment. • Inadequate water supply, safe	• Appropriate measures will be taken in coordination with the hospital administration to ensure continuity of healthcare services to ensure continuity of hospital services. • Appropriate mitigation measures, including dust suppression, noise and vibration control, and scheduling of high-impact activities during off-peak hours, will be implemented. • Sensitive hospital areas and equipment will be protected throughout the construction period. • Construction areas will be barricaded, warning signage installed, and all activities carried out in accordance with good management practices. • The contractor will be encouraged to give preference to qualified local workers, where feasible, in accordance with project requirements and applicable labor laws. • A detailed construction schedule will be followed to ensure timely completion of works while minimizing disruption to hospital operations. • Uninterrupted access for patients, visitors, ambulances, and emergency vehicles will be

Concerns	Response
drinking water, sanitation, and hygiene (WASH) facilities within the hospital. • Inadequate safety, security, privacy, lighting, and wayfinding within the hospital, particularly for female staff, patients, attendants, and visitors • Inadequate gender-responsive facilities, including separate washrooms, rest areas, waiting spaces, and lactation rooms for female staff, patients, and attendants. Limited accessibility and convenience of hospital facilities for women and other vulnerable groups, including pregnant women, the elderly, and persons with disabilities.	maintained throughout the construction period. • Proper collection, storage, transportation, and disposal of waste at approved disposal sites will be ensured to ensure • Water supply and sanitation services will be maintained throughout the construction period. Any temporary disruption will be minimized, and damaged utilities will be restored promptly by the contractor. • The project will provide or upgrade gender-responsive facilities, including separate washrooms, waiting and rest areas, and lactation rooms, wherever included within the approved project scope and design. • The project will improve water supply and WASH infrastructure, including the provision of safe drinking water and adequate sanitation facilities, in accordance with the approved design and hospital requirements. The project will incorporate appropriate lighting, safety and security measures, privacy provisions, and clear signage to improve the safety and comfort of hospital users, particularly women and other vulnerable groups. • Universal accessibility principles will be incorporated into the hospital design, including barrier-free access and user-friendly facilities for women, older persons, pregnant women, and persons with disabilities, wherever feasible and within the project scope.

441. 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 particularly female staff, patients and attendants are adequately informed about project activities, implementation schedules, potential impacts, mitigation measures, and the grievance redress mechanism.

442. 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: Photo log for consultations and socioeconomic survey




DHQ Bajaur




DHQ Miran Shah




DHQ Landi Kotal

8 GRIEVANCE REDRESS MECHANISM

8.1 INTRODUCTION

443. The GRM [32] 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.

444. 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.

445. 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.

446. 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.

[32] 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.

447. 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.

448. 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.

8.1.1 Health Center Level GRC-I

449. 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.

450. 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.

451. 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

452. 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.

8.1.2 PMIU/C&W Level GRC-II

453. 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.

454. 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.

455. 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.

456. 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

457. 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.

8.1.3 Department of Health Level GRC-III

458. 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.

459. 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.

460. 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.

461. 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.

462. 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.

463. 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.

8.2 GBV COMMITTEE

464. The 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.

465. 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.

8.3 INFORMATION DISSEMINATION AND COMMUNITY OUTREACH

466. 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.

467. 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.

468. 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

9 ENVIRONMENTAL MANAGEMENT PLAN

469. The Environmental Management Plan (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.

470. 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

471. 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 EMP

472. 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). The implementation of the EMP will be carried out through coordinated efforts among these institutions.

473. The following staff will be involved in the implementation of EMP:
- PD, PMIU;
- Environmental and Social (E&S) Safeguard Specialist, PMIU;
- E&S Specialist, SC;

- Environmental & Social Health and Safety (ESHS) specialist, Construction Contractor(s); and
- ADB Safeguards Team.

474. 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.

475. No construction activities, including establishment of camps or mobilization of equipment, shall commence without prior approval of the SSEMP and necessary statutory clearances.

476. The organizational structure for EMP implementation for KPHSSP is given in **Figure 9.1.**

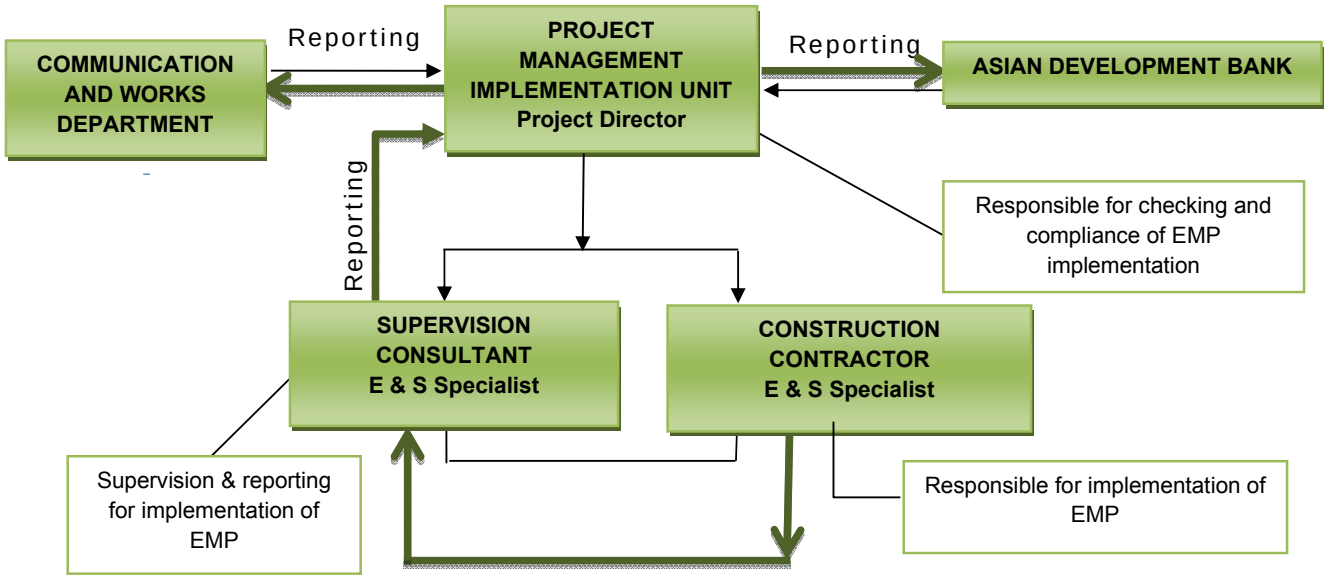


Figure 9.1: Organizational Setup for Implementation of EMP at Construction Phase

9.3 ROLES AND RESPONSIBILITIES

a) Asian Development Bank

477. The ADB serves as the financing institution and the oversight authority for environmental and social safeguards under its Safeguard Policy Statement. In accordance with ADB requirements, this Initial Environmental Examination (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

i. Project Director

478. 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.

479. 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)

480. 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.

481. 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. Gender & Social Safeguard Specialist (G&SSS)

482. The G&SSS 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 G&SSS will be responsible for the day-to-day oversight, coordination, and monitoring of gender and social safeguard compliance throughout the project lifecycle.

483. The primary responsibilities of the G&SSS 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 (SC)

484. 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.

485. 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 EHS 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.

486. The E&S team of SC shall comprise the following key personnel:

a) Environment Health and Safety Specialist

487. 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.

b) Social and Gender Specialist

488. 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

489. 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.

490. 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 (EHS) regulations;
- Assignment of appropriately qualified environmental and health and safety (EHS) 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 EHS 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.

491. The E&S team of contractor shall comprise the following key personnel:

a) Environment, Health and Safety Specialist

492. 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.

b) Social and Gender Specialist

493. 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

494. 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, 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 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 Corrective Action Plan (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

495. 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.

496. 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, considering site-specific conditions and construction methodologies.

497. 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.

498. 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.

499. 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

500. 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.

501. The project will ensure in-house training for PMIU staff, contractors, and SC through one-day basic training and one-day advanced training sessions. These sessions will cover environmental and social safeguards applicable to healthcare facility revamp works, with particular emphasis on the roles and responsibilities of PMIU, contractors, and consultants in implementing the EMP and environmental monitoring requirements during construction.

- Key environmental and social issues related to hospital revamp and healthcare facility operations

- Objectives and importance of E&S compliance under ADB safeguard requirements
- Applicable regulatory and institutional requirements and roles of implementing agencies
- Mitigation measures and responsibilities for effective EMP implementation
- Environmental and social monitoring parameters, data collection, documentation, and reporting procedures
- Occupational health and safety measures, including proper use of PPE and emergency preparedness
- Communication and coordination mechanisms among PMIU, contractors, consultants, and hospital management
- Grievance redress mechanisms and complaint handling procedures
- CoC, gender sensitivity, and labor rights awareness.

9.6 COMMUNICATION & DOCUMENTATION

9.6.1 Meetings and Reports

502. 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
Project Completion	Overall project implementation; safeguards compliance; lessons learned	SC E&S Experts	PMIU	ADB

9.6.2 Photographic Record and Data Base

503. 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

504. 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

505. 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.

506. **Table 9.2** provides information about all impacts to be raised due to project activities during different phases of the project i.e. pre-construction, construction and operation phases.

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. 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.	• 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 SCP continuity plan will be prepared to ensure uninterrupted hospital services, including electricity, water, medical gases, and emergency access, during renovation works.	Design Consultant	PMIU
2.	**Topography** The project mainly involves renovation of existing buildings and upgrading internal systems such as plumbing, fire-fighting, electrical, ICT, ELV, medical gas,	• 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	Design Consultant	PMIU

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	Monitoring
	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.	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.		
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, impacts are expected to be moderate to high, site-specific, and long-term.	• 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 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	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.	Design Consultant	PMIU

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	Monitoring
	negative but manageable due to the limited scope of hospital upgrades. 24. Impacts are expected to be moderate, site-specific, and short-term in nature	• Basic site layout planning and waste segregation will be implemented. Resources Conservation Plan is attached as **Annexure-VII.**		
5.	**Flora** The project involves rehabilitation and revamping works within existing hospital premises, and no major tree cutting or vegetation removal is anticipated. Minor impacts on planted vegetation and landscaped areas may occur due to temporary site mobilization, movement of machinery, dust deposition, and material storage if activities are not properly managed. However, impacts on flora are expected to be negligible to low, site-specific, short-term, and reversible in nature.	• Avoid unnecessary cutting or trimming of trees and vegetation within hospital premises; • Restrict material storage, temporary facilities, and construction activities to already paved or disturbed areas; • Implement dust suppression measures such as regular water sprinkling to minimize dust deposition on vegetation; • Compensate any unavoidable vegetation removal through plantation using native species; • Maintain and enhance landscaping and green areas within hospital premises.	Design Consultant	PMIU
6.	**Fauna** The project area comprises an already developed urban or semi-urban hospital environment with limited habitat value, mainly supporting urban-adapted fauna such as birds and small mammals. Construction activities, noise, machinery operation, and increased human presence may temporarily disturb local fauna within and around the hospital premises. However, as works are confined within existing developed areas, impacts on fauna are expected to be negligible to low, site-specific, short-term, and reversible in nature.	• Restrict construction activities to daytime hours to minimize disturbance to urban fauna; • Ensure that no natural habitats or existing green areas are unnecessarily disturbed; • Control noise, dust, and waste generation through appropriate site management practices; • Incorporate native vegetation and landscaping within hospital premises to support local urban biodiversity; • Ensure proper collection and disposal of construction and healthcare waste to avoid nuisance to birds and small animals.	Design Consultant	PMIU
7.	**Temporary Acquisition of Land** The hospital revamp works will be confined within the existing hospital premises. Limited temporary space	• 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.	Design Consultant	PMIU

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	Monitoring
	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.	• 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.		
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 Impacts are expected to be moderate, site-specific, and short-term in nature.	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.	Design Consultant	PMIU
9.	**Physical and Cultural Resources** 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. However, minor and temporary inconvenience may occur due to construction-related noise, dust, or traffic movement in surrounding areas, which could indirectly	• 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.	Design Consultant	PMIU

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	Monitoring
	affect access or comfort due to construction activities. Impacts are expected to be negligible to low, site-specific, and short-term in nature.			
Construction Phase				
10.	**Excavation** Small-scale excavation may be required for upgrading existing hospital utilities, including sewerage, drainage, water supply lines, and other minor external works. As the project focuses on rehabilitation rather than new construction, excavation activities will be localized, limited in extent, and short-term across all Phase IV project sites. Potential impacts include temporary soil disturbance, spoil generation, dust emissions, restricted internal access, interference with ambulance and emergency movement, utility disruption, and occupational health and safety risks. These impacts may be relatively more pronounced at DHQ Hospital, Khar (Bajaur), DHQ Hospital, Landi Kotal (Khyber), and DHQ Hospital, Ghallanai (Mohmand) due to the rugged terrain, constrained access, and logistical challenges associated with material movement and construction activities. Dust-related impacts may be more noticeable at DHQ Hospital, Wana, and DHQ Hospital, Miran Shah due to the relatively dry and semi-arid conditions and potential for wind-blown dust. Localized soil erosion, sediment runoff, and drainage-related impacts may occur at DHQ Hospital, Parachinar (Kurram), and DHQ Hospital, Mishti Mela (Orakzai) due to the mountainous	• Excavation will be carried out in small, phased sections, and works will be scheduled in coordination with hospital administration and, where feasible, during off-peak hours to maintain hospital operations and uninterrupted access to emergency services. • Dust will be controlled through regular water sprinkling and covering of spoil piles and transport vehicles, with enhanced attention at the relatively dry and semi-arid sites of DHQ Hospital, Wana and DHQ Hospital, Miran Shah • Excavated material will be properly managed, and trenches will be backfilled and compacted promptly to minimize soil erosion, sediment runoff, and drainage obstruction, particularly at the mountainous and high-elevation sites of DHQ Hospital, Parachinar (Kurram) and DHQ Hospital, Mishti Mela (Orakzai). • Excavated material will be reused where feasible, while surplus spoil will be transported and disposed of at approved disposal locations, with due consideration to the logistical and access constraints of remote sites such as Wana, Miran Shah, Parachinar, and Mishti Mela. • Temporary barriers, fencing, warning tape, and signage will be installed around excavation areas to protect patients, staff, attendants, visitors, and workers, particularly where hospital access is constrained by rugged or uneven terrain. • Proper trench support, shoring, and safe excavation practices will be implemented to	Contractor	SC and PMIU

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	Monitoring
	terrain, steep slopes, seasonal rainfall, and, in some areas, cold-weather conditions, particularly where minor utility excavations are undertaken in external areas. The high elevation and remote location of these sites may also increase the difficulty of transporting excavated material, construction supplies, and waste. Across all project sites, there is also a possibility of encountering undocumented underground utilities and, in rare cases, physical cultural resources during excavation activities. Impacts are expected to be moderate to high, site-specific, and temporary in nature.	prevent trench collapse and ensure worker safety, with particular attention to excavations on sloping or uneven ground. • Underground utilities and service lines will be identified and mapped prior to excavation to minimize accidental damage and disruption to essential hospital services, including water supply, sewerage, drainage, electricity, and communications. • Controlled excavation methods will be adopted near existing and older hospital structures, and the Chance-Find Procedure will be implemented in case archaeological or culturally significant materials are encountered. • Close coordination with hospital administration will be maintained to ensure continuous access to emergency units, ambulances, critical care areas, and essential hospital services. Particular attention will be given to access arrangements at remote and geographically constrained sites. • Excavation and spoil management will be planned with consideration of seasonal rainfall, runoff, and possible flash-flood conditions, particularly at the mountainous sites of Parachinar and Mishti Mela, to prevent obstruction of natural or existing drainage pathways. • Regular air quality, noise, and safety inspections will be conducted, particularly near sensitive hospital units such as ICUs, operation theatres, laboratories, isolation wards, and emergency departments. • Workers will receive training on occupational health and safety, hazard identification, infection prevention and control, emergency response, safe excavation, working on uneven terrain, and		

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	Monitoring
		safe waste and spoil handling procedures.		
11.	**Construction campsites and Contractor Facilities** The contractor's site office and temporary facilities will be established within the existing hospital premises at locations approved by the SC and PMIU, in coordination with the respective Hospital Administration, across all Phase IV project sites. Considering the limited scale of rehabilitation works, only small temporary areas will be utilized for site offices, material storage, equipment placement, and worker welfare facilities. However, if such temporary facilities are located within or close to functional hospital areas, localized and short-term impacts may occur. These impacts may be relatively more noticeable at DHQ Hospital, Khar (Bajaur), DHQ Hospital, Landi Kotal (Khyber), and DHQ Hospital, Ghallanai (Mohmand) due to constrained space, rugged terrain, limited internal access, and the need to maintain continuous emergency and hospital access. At DHQ Hospital, Wana and DHQ Hospital, Miran Shah, relatively dry and semi-arid conditions may increase dust-related nuisance around temporary storage and material movement areas. At DHQ Hospital, Parachinar (Kurram) and DHQ Hospital, Mishti Mela (Orakzai), mountainous and high-elevation terrain, seasonal rainfall, and potential runoff may increase the risk of localized erosion, drainage obstruction, and difficulties in establishing stable temporary facilities. The remoteness of several Phase IV sites may also create logistical challenges for material storage, waste removal, water supply, and worker welfare	• The contractor's site office and temporary facilities will be located only within designated areas approved by the SC and Hospital Administration, avoiding sensitive zones such as wards, emergency units, ICUs, laboratories, operation theatres, and ambulance routes. • The footprint of temporary facilities will be minimized, and unnecessary clearing of vegetation, paved areas, landscaped spaces, or natural ground surfaces will be avoided. • Adequate sanitation arrangements, including clean toilets, safe drinking water, handwashing facilities, and proper wastewater disposal systems, will be provided and maintained at all temporary facilities. Direct discharge into drains, soil, or open areas will be strictly prohibited. • Solid waste generated from contractor facilities will be properly segregated, collected, and disposed of through authorized municipal or other approved waste management systems. Fuel, lubricants, and maintenance activities will be managed in designated areas with appropriate spill prevention and response measures to avoid soil and water contamination. • Dust, noise, and visual disturbance will be minimized through regular housekeeping, controlled material storage, water sprinkling where appropriate, covered transport, and scheduling of noisy activities during less sensitive hours. Additional attention will be given to DHQ Hospital, Wana and DHQ Hospital, Miran Shah due to their relatively dry and semi-arid conditions. • At DHQ Hospital, Parachinar (Kurram) and DHQ Hospital, Mishti Mela (Orakzai), temporary	Contractor	SC and PMIU

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	Monitoring
	arrangements. Potential impacts include minor vegetation or surface disturbance, obstruction of internal movement, noise and visual intrusion, generation of solid waste and wastewater, sanitation issues, temporary water contamination risks, vector breeding, and disruption of hospital access routes, including ambulance and emergency pathways. Considering the operational sensitivity of healthcare facilities, the continuous presence of patients, attendants, and critical medical services, as well as the terrain, climatic, access, and logistical constraints at some Phase IV locations, these impacts are assessed as moderate to high, site-specific, and temporary in nature.	facilities and material stockpiles will, wherever practicable, be located on stable and level surfaces. Drainage pathways will be kept clear, and suitable measures will be implemented to minimize localized runoff, erosion, and sediment movement during rainfall. • At sites with rugged or uneven terrain, including Khar, Landi Kotal, Ghallanai, Parachinar, and Mishti Mela, temporary facilities, storage areas, and access routes will be arranged to maintain safe movement and minimize risks associated with slopes, unstable surfaces, and uneven ground. • All internal access routes, emergency pathways, and ambulance movement corridors will remain open and unobstructed throughout the construction period. Any temporary restriction or diversion will be planned in advance and coordinated with the Hospital Administration. • Vector control measures, including proper waste management, drainage of stagnant water, and routine site cleaning, will be implemented to prevent mosquito and pest breeding. • Adequate worker welfare facilities, including food, rest, hygiene, drinking water, and first aid arrangements, will be provided in accordance with applicable national labour requirements and occupational health and safety standards. Workers will be trained and bound by a Code of Conduct under an approved Construction Camp Management Plan and Labour Management Plan. • A Community Liaison Officer will be designated to coordinate with hospital administration and address complaints or grievances related to contractor activities.		

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	**Monitoring**
		• All temporary facilities, stockpiles, and storage areas will be dismantled immediately after completion of works, and disturbed areas will be restored to their original condition. • Regular environmental, health, and safety monitoring and supervision will be conducted to ensure compliance with the approved EMP.		
12.	**Air Quality** Air quality may be temporarily affected during rehabilitation works due to dust generation from demolition, excavation, material handling, transportation of construction materials, and movement of vehicles and machinery within hospital premises. Demolition and dismantling of existing structures and finishes may generate fine particulate matter, while diesel-powered generators, machinery, and transport vehicles may emit pollutants such as PM, NO_x, SO_2, CO, and VOCs. The magnitude of air quality impacts is expected to vary across project sites depending on climatic conditions, terrain, surrounding land use, traffic intensity, and the degree of exposure of work areas. Dust-related impacts may be relatively more pronounced at DHQ Hospital, Wana and DHQ Hospital, Miran Shah due to their relatively dry and semi-arid conditions, exposed surfaces, and potential for wind-blown dust. At DHQ Hospital, Khar (Bajaur), DHQ Hospital, Landi Kotal (Khyber), and DHQ Hospital, Ghallanai (Mohmand), rugged terrain, constrained access, and movement of construction materials and vehicles may result in localized dust emissions around active work areas.	• Dust emissions from demolition, excavation, transportation, and material handling will be controlled through regular water sprinkling on exposed areas, covering of stockpiles, and covering of transport vehicles carrying fine materials, with enhanced dust suppression measures implemented at the relatively dry and dust-prone sites of DHQ Hospital, Wana and DHQ Hospital, Miran Shah. • Only well-maintained and low-emission machinery and vehicles will be used. Open burning of waste will be strictly prohibited, and equipment engines will be turned off when not in use to minimize exhaust emissions. • Temporary dust screens, barricades, or enclosures will be installed around demolition and other high dust-generating activities to limit dust dispersion into sensitive hospital areas. • Dust-generating activities, including demolition, concrete cutting, and excavation, will be scheduled in coordination with hospital administration and, where practicable, during less sensitive or off-peak periods to minimize disturbance to patients, visitors, and medical staff. • Demolition debris and excavated materials will be promptly collected, covered, and transported to approved disposal sites to reduce airborne dust. • Construction materials prone to generating dust	Contractor	SC and PMIU

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	Monitoring
	DHQ Hospital, Parachinar (Kurram) and DHQ Hospital, Mishti Mela (Orakzai) may generally benefit from cooler and more elevated environments; however, localized dust emissions may still occur during demolition, excavation, and material handling, particularly during dry periods. Given the sensitivity of hospital environments, particularly around OPDs, ICUs, operation theatres, laboratories, emergency units, and isolation wards, even short-term exposure to dust and air emissions may adversely affect patients, healthcare workers, attendants, and sensitive medical equipment. The risk of exposure will depend on the location and duration of construction activities, prevailing wind conditions, proximity of work areas to sensitive hospital units, and the effectiveness of dust control measures. Particular attention will be required at Wana, Miran Shah, Khar, Landi Kotal, and Ghallanai, where dry conditions, exposed surfaces, constrained access, or material movement may increase localized dust exposure. Impacts are expected to be moderate to high, site-specific, temporary, and reversible in nature.	will be stored in covered areas or properly secured during transport and handling. • Workers will be provided with appropriate PPE, including dust masks and respirators where necessary, and trained in their proper use. • Regular air quality monitoring will be conducted near sensitive hospital units such as ICUs, operation theatres, laboratories, and isolation wards, where warranted, to ensure compliance with applicable NEQS and project requirements. • Warning signage will be installed around active work areas, and continuous coordination with hospital administration will be maintained regarding demolition schedules and high dust-generating activities. • Good housekeeping practices, including routine cleaning of access roads, pathways, and nearby hospital areas, will be implemented to minimize dust accumulation. • Particular care will be taken during material transportation and equipment movement at sites with rugged or constrained access, including Khar, Landi Kotal, Ghallanai, Parachinar, and Mishti Mela, to minimize dust generation and disturbance to hospital users.		
13.	**Noise** Activities including demolition, excavation, drilling, concrete cutting, material handling, and vehicle movement may generate temporary noise and minor vibration across all project sites. Noise generated during rehabilitation works may disturb	• Noisy activities, including demolition, drilling, concrete cutting, and operation of heavy machinery, will be scheduled in coordination with hospital administration and, where practicable, during less sensitive or off-peak periods. • Noisy equipment and machinery will be properly maintained and fitted with appropriate silencers, mufflers, or other noise-control devices. • Temporary acoustic barriers, screens, or	Contractor	SC and PMIU

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	**Monitoring**
	patients, healthcare staff, attendants, and visitors, particularly within sensitive hospital areas such as ICUs, operation theatres, emergency units, laboratories, and inpatient wards. Noise impacts may be relatively more pronounced at DHQ Hospital, Khar (Bajaur), DHQ Hospital, Landi Kotal (Khyber), and DHQ Hospital, Ghallanai (Mohmand) where constrained hospital premises, rugged terrain, and limited space may bring construction activities closer to operational hospital areas. At DHQ Hospital, Wana and DHQ Hospital, Miran Shah, vehicle and equipment movement may generate localized noise impacts despite the relatively less dense surrounding environment. At DHQ Hospital, Parachinar (Kurram) and DHQ Hospital, Mishti Mela (Orakzai), the surrounding mountainous terrain may influence the propagation of noise, while vibration from drilling, demolition, and heavy equipment may pose localized risks to older or structurally sensitive hospital buildings if activities are not properly controlled. Impacts are expected to be high, site-specific, and short-term in nature.	enclosures will be installed where necessary to reduce noise transmission to sensitive hospital areas. • Construction equipment and vehicles will not be allowed to idle unnecessarily, and unnecessary use of horns will be prohibited within and around hospital premises. • Construction activities will be phased and conducted in small sections to limit the duration and extent of noise exposure. • Particular care will be taken when undertaking drilling, demolition, or vibration-generating activities near older or structurally sensitive hospital buildings, particularly at mountainous and constrained sites such as Parachinar and Mishti Mela. • Where required, pre-construction condition surveys of nearby sensitive structures will be undertaken before major demolition or vibration-generating activities. • Noise levels will be monitored near sensitive receptors, including ICUs, operation theatres, emergency units, laboratories, and inpatient wards, where construction activities have the potential to generate significant noise. • Workers exposed to elevated noise levels will be provided with appropriate hearing protection and trained in its proper use. • Hospital administration will be informed in advance of particularly noisy activities, and complaints related to noise and vibration will be promptly recorded, investigated, and addressed. • All noise monitoring records, complaints, corrective actions, and inspection findings will be properly documented and maintained.		
14.	**Traffic Management**	• Construction activities will be carried out in	Contractor	SC and

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	Monitoring
	Rehabilitation works within operational hospital premises, including transportation of construction materials, movement of machinery and equipment, temporary closure or diversion of internal pathways, and partial occupation of parking or circulation areas, may temporarily disrupt internal traffic circulation at all Phase IV project sites. Such disruptions may result in localized congestion and restricted movement for patients, visitors, ambulances, hospital staff, and service vehicles. These impacts may be relatively more pronounced at DHQ Hospital, Khar (Bajaur), DHQ Hospital, Landi Kotal (Khyber), and DHQ Hospital, Ghallanai (Mohmand) due to constrained hospital premises, rugged terrain, limited internal circulation space, and access challenges. At DHQ Hospital, Parachinar (Kurram) and DHQ Hospital, Mishti Mela (Orakzai), mountainous terrain, steep or uneven access routes, and logistical challenges associated with the movement of construction materials and equipment may create additional traffic and safety constraints. At DHQ Hospital, Wana and DHQ Hospital, Miran Shah, the remoteness of the sites and potential limitations in road and supply access may create additional challenges for the movement of construction vehicles and materials. Across all sites, the continuous need to maintain access to emergency services and ambulance routes will be a key consideration. Given the operational sensitivity of healthcare facilities and the critical need for uninterrupted emergency access, any obstruction or delay in internal circulation	phased sections to ensure continuous access to emergency departments, critical care units, hospital entrances, and other essential services. • Coordination with hospital administration will be maintained to ensure uninterrupted ambulance and emergency access at all times, with particular attention to sites with constrained or uneven internal circulation. • Alternate entry and exit routes within the hospital premises will be clearly demarcated and communicated to staff, patients, attendants, and visitors before any temporary route diversion is implemented. • Advance notice 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, where practicable, to minimize congestion and avoid conflicts with peak patient and emergency movements. • Dedicated and clearly marked pathways will be provided for pedestrians, while separate routes will be maintained for construction vehicles wherever practicable to avoid conflicts. • Visible directional signage, safety barricades, lighting, and protective barriers will be installed along construction zones and temporary access routes. • Trained personnel or traffic marshals will be stationed at key locations during material deliveries and other high-traffic construction activities to guide vehicles and pedestrians safely and ensure unobstructed access for ambulances and hospital staff.		PMIU

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	Monitoring
	may result in moderate to high, site-specific, and short-term impacts.	• Construction materials, machinery, excavated material, and debris will not be stored in a manner that obstructs emergency routes, hospital entrances, ambulance access, fire access corridors, or pedestrian pathways. • At DHQ Hospital, Khar (Bajaur), DHQ Hospital, Landi Kotal (Khyber), DHQ Hospital, Ghallanai (Mohmand), DHQ Hospital, Parachinar (Kurram), and DHQ Hospital, Mishti Mela (Orakzai), special attention will be given to the safe movement of construction vehicles and materials along constrained, uneven, sloping, or mountainous access routes to minimize traffic conflicts and accident risks. • At DHQ Hospital, Wana and DHQ Hospital, Miran Shah, material deliveries and construction vehicle movements will be carefully planned in view of the remote location and potential logistical and road access constraints. • Vehicle speeds will be controlled within hospital premises, and all construction vehicles and drivers will comply with designated routes and hospital traffic safety requirements. • All temporary traffic arrangements will be reviewed regularly in coordination with hospital management to ensure effectiveness and minimize disruption. 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 **Annexure-VIII.**		
15.	**Impact on Soil**	• Excavations for utilities and minor external works will be kept as small and short-term as	Contractor	SC and PMIU

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	Monitoring
	Soil impacts from the proposed rehabilitation works are expected to be localized, minor to moderate, and short-term in nature, as project activities will be confined to upgrading and rehabilitation within the existing premises of DHQ Hospitals across all sites. Temporary soil disturbance may occur during minor excavation for drainage systems, sewerage lines, water supply pipelines, underground utilities, equipment foundations, and external works such as paving, landscaping, parking improvements, boundary works, and other minor site improvements. Potential impacts may include localized erosion of exposed soil, temporary disruption of surface drainage, dust generation, and minor soil contamination from accidental spills of fuel, lubricants, wastewater, or construction waste. These impacts may be relatively more noticeable at DHQ Hospital, Wana (North Waziristan) and DHQ Hospital, Miran Shah (North Waziristan) due to relatively dry and semi-arid conditions, exposed soil surfaces, and potential for wind-blown dust. At DHQ Hospital, Khar (Bajaur), DHQ Hospital, Landi Kotal (Khyber), and DHQ Hospital, Ghallanai (Mohmand), rugged terrain, uneven ground, and constrained access may increase the potential for localized soil disturbance and difficulties in managing excavated material. At DHQ Hospital, Parachinar (Kurram) and DHQ Hospital, Mishti Mela (Orakzai), mountainous terrain, sloping ground, seasonal rainfall, and runoff may result in localized soil erosion and sediment movement from exposed excavated areas if	practicable to minimize soil disturbance. • Excavated materials will be managed within designated work areas and will not be placed in a manner that blocks access routes, drains, emergency pathways, or patient movement areas. • Regular water sprinkling will be applied to exposed soil or loose material to control dust, with increased attention at the relatively dry sites of DHQ Hospital, Wana and DHQ Hospital, Miran Shah. • Refueling and maintenance of machinery will be carried out on impermeable surfaces or using suitable drip trays and spill prevention measures to prevent soil contamination. • Construction waste and debris will be collected promptly, segregated where practicable, and disposed of at approved locations to prevent soil contamination and obstruction of drainage or access routes. • At DHQ Hospital, Khar (Bajaur), DHQ Hospital, Landi Kotal (Khyber), and DHQ Hospital, Ghallanai (Mohmand), temporary stockpiles will be located on stable surfaces and managed to minimize disturbance to surrounding ground surfaces and internal access routes. • At DHQ Hospital, Parachinar (Kurram) and DHQ Hospital, Mishti Mela (Orakzai), excavated material will be properly stockpiled, exposed excavated areas will be stabilized where necessary, and trenches will be backfilled and compacted promptly after completion of utility works to minimize soil erosion and sediment runoff during rainfall. • Natural drainage pathways and existing drainage infrastructure will be kept clear of excavated		

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	Monitoring
	not properly managed. Across all sites, improper stockpiling of excavated material or construction waste may obstruct drainage pathways and hospital access routes. 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.	material, construction waste, and other obstructions. • Equipment movement will be restricted to designated routes and immediate work areas to avoid unnecessary damage to surrounding paved, landscaped, or undisturbed surfaces. • Disturbed areas, including small patches of soil along access routes and work areas, will be restored promptly through paving, landscaping, compaction, or other appropriate surface treatment. • Workers will be trained in dust control, spill prevention, safe handling of excavated material, and basic soil protection measures, and compliance will be monitored regularly.		
16.	**Community Health and Safety** During the hospital rehabilitation works at all Phase IV locations, minor excavation, demolition, material handling, and movement of equipment within operational hospital premises may pose risks to patients, visitors, hospital staff, attendants, nearby pedestrians, and other hospital users. Potential impacts include: • Accidents resulting from the movement of construction vehicles, machinery, and equipment within hospital premises. • Exposure to dust, noise, and minor vibrations, particularly affecting vulnerable patients, including children, elderly persons, and persons with pre-existing health conditions. • Localized contamination from accidental spills of fuel, lubricants, wastewater, or construction materials.	• Construction activities will be confined to clearly demarcated work areas, with restricted access maintained through appropriate barricades, fencing, warning tape, and signage. • Safe and uninterrupted access for patients, hospital staff, attendants, visitors, and emergency vehicles will be maintained at all times through phased works and clearly designated routes. • Construction vehicle and equipment movement within hospital premises will be strictly controlled, and low speed limits will be enforced to minimize accident risks. Particular attention will be given to sites with uneven, sloping, or constrained access, including Khar, Landi Kotal, Ghallanai, Parachinar, and Mishti Mela. • Dust, noise, and minor vibration will be minimized through water sprinkling, proper equipment maintenance, dust suppression measures, and scheduling of works during less sensitive hours. Enhanced dust control will be implemented at	Contractor	SC and PMIU

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	Monitoring
	• Increased risk of communicable disease transmission among hospital users, visitors, workers, and attendants if hygiene, sanitation, and infection prevention and control measures are not properly maintained. • Slips, trips, falls, or collisions due to temporary obstacles, uneven surfaces, open excavations, construction debris, or changes in internal access routes. • Additional movement and access constraints at DHQ Hospital, Khar (Bajaur), DHQ Hospital, Landi Kotal (Khyber), and DHQ Hospital, Ghallanai (Mohmand) due to rugged terrain, constrained hospital premises, uneven surfaces, and potentially limited internal circulation. • Increased risks associated with sloping, uneven, or mountainous access routes at DHQ Hospital, Parachinar (Kurram) and DHQ Hospital, Mishti Mela (Orakzai), particularly during material transportation and adverse weather conditions. • Enhanced dust exposure at relatively dry and semi-arid sites such as DHQ Hospital, Wana and DHQ Hospital, Miran Shah due to exposed surfaces and potential for wind-blown dust. • Increased potential for pedestrian–vehicle interaction and access conflicts at all hospitals due to the continued operation of hospital services during rehabilitation works, with particular attention required at sites where internal circulation is constrained. • Impacts are expected to be moderate, site-specific, and short-term in nature.	DHQ Hospital, Wana and DHQ Hospital, Miran Shah due to their relatively dry and semi-arid conditions. • Additional coordination with Hospital Administration will be maintained at all sites to safely manage pedestrian movement, emergency access, ambulance routes, and construction activities within operational hospital premises. • All work areas near sensitive hospital units, including emergency departments, ICUs, operation theatres, laboratories, isolation wards, and inpatient areas, will be secured with suitable barriers and warning signs to prevent accidental exposure. • Good housekeeping will be maintained, including timely removal of debris, proper waste management, safe management of excavated material, and prevention of stagnant water. • Refueling and storage of fuels, lubricants, and other potentially contaminating materials will be carried out only in designated and controlled areas with appropriate spill prevention and response measures. • At DHQ Hospital, Parachinar (Kurram) and DHQ Hospital, Mishti Mela (Orakzai), additional measures will be implemented to maintain safe movement along sloping or uneven terrain and to reduce risks associated with runoff, slippery surfaces, and adverse weather conditions. • Separate pedestrian pathways and construction access routes will be maintained wherever practicable to minimize interaction between hospital users and construction activities. • Traffic control personnel or trained flaggers will be deployed during major material deliveries, equipment movement, and other activities with a		

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	Monitoring
		potential to affect pedestrian or vehicle movement. • Workers will be trained on site safety, infection prevention and control, hygiene practices, emergency response, and appropriate conduct within hospital premises. • A site-specific HSE Plan, IPC protocol, and GRM will be implemented at each hospital site to address safety concerns, complaints, and emergency situations. • Prior information will be provided to hospital staff, patients, attendants, and visitors regarding construction activities that may affect access, movement, or the use of specific hospital areas. • Regular monitoring and supervision will be conducted to ensure compliance with environmental, health, safety, and infection prevention requirements throughout the rehabilitation period.		
17.	**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. 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	• 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 OHS Plan, IPC Plan, and 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.	Contractor	SC and PMIU

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	Monitoring
	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, 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. Impacts are expected to be moderate to high, site-specific, and short-term in nature.	• 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 **Annexure-IX.**		
18.	**Generation of Solid Waste** Rehabilitation works within hospital premises will generate solid waste, including construction and demolition debris, excavated material, packaging waste, and domestic waste from contractor staff across all sites. The estimated quantities are discussed in **section 3.18.** 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.	• 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	Contractor	SC and PMIU

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	Monitoring
	Impacts are expected to be moderate, site-specific, and short-term in nature.	disposed of through licensed contractors. • Healthcare waste generated by hospital operations will not be mixed with construction or domestic waste. Any healthcare waste encountered during rehabilitation activities will be managed in accordance with the hospital's approved healthcare waste management procedures and applicable requirements. • Good housekeeping practices will be maintained to prevent accumulation of waste and debris within hospital premises. • Loose waste, spoil, and demolition debris will be covered during transport and storage, with enhanced attention at the relatively dry and windy sites of DHQ Hospital, Wana and DHQ Hospital, Miran Shah. • At DHQ Hospital, Parachinar (Kurram) and DHQ Hospital, Mishti Mela (Orakzai), special care will be taken to prevent the disposal or stockpiling of debris near drainage pathways, slopes, or areas susceptible to runoff and erosion. • At remote locations, including Wana, Miran Shah, Parachinar, and Mishti Mela, waste collection and transportation arrangements will be planned in advance to avoid prolonged accumulation of waste within hospital premises. • Waste storage areas will be located away from patient areas, food preparation areas, water sources, drainage channels, and emergency access routes. • 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		

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	**Monitoring**
		Conduct and site procedures. A comprehensive plan for construction waste management shall be prepared for construction stage (framework plan attached as **Annexure-X**).		
19.	**Generation of Wastewater** 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.** If not properly managed, wastewater generated during rehabilitation activities may lead to localized contamination of hospital grounds, drains, and surrounding surfaces; blockage of drainage systems; formation of stagnant water; odor generation; and increased risk of vector breeding, thereby affecting hygiene and sanitation conditions within hospital premises across all Phase IV project sites. At DHQ Hospital, Parachinar (Kurram) and DHQ Hospital, Mishti Mela (Orakzai), mountainous terrain, sloping ground, and seasonal rainfall may increase the potential for localized runoff, erosion, and sediment transport from work areas if wastewater and drainage are not properly managed. At DHQ Hospital, Wana and DHQ Hospital, Miran Shah dry and semi-arid conditions may increase the risk of wastewater stagnation, localized soil contamination, and unsanitary conditions around work areas if wastewater is not promptly collected and managed. At DHQ Hospital, Khar (Bajaur), DHQ Hospital, Landi Kotal (Khyber), and DHQ Hospital,	• Existing hospital sanitation facilities will be utilized by workers where feasible and approved by Hospital Administration to avoid the need for unnecessary temporary sanitation arrangements. • Construction-related wastewater, including concrete wash water, equipment cleaning wastewater, and wastewater potentially contaminated with oils or lubricants, will be collected and managed in designated areas and will not be discharged into hospital drains, open ground, or surrounding areas without appropriate treatment or approval. • Designated equipment and vehicle cleaning areas will be established, where required, with appropriate containment measures, including sediment traps, collection systems, or oil-water separators as appropriate to the activity. • Fuels, oils, lubricants, and chemicals will be stored on impermeable surfaces with suitable secondary containment to prevent leakage and contamination of soil, surface water, or drainage systems. • Stormwater will be prevented from entering active work areas wherever practicable to avoid waterlogging, mixing with wastewater, and potential contamination. • Special drainage and runoff management measures will be implemented at DHQ Hospital, Parachinar (Kurram) and DHQ Hospital, Mishti Mela (Orakzai) to control wastewater movement on sloping terrain and minimize erosion and	Contractor	SC and PMIU

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	Monitoring
	Ghallanai (Mohmand), rugged terrain and constrained drainage conditions may create localized challenges for the safe management of wastewater and runoff. Impacts are expected to be moderate, site-specific, and short-term in nature.	sediment transport. • At DHQ Hospital, Khar (Bajaur), DHQ Hospital, Landi Kotal (Khyber), and DHQ Hospital, Ghallanai (Mohmand), existing drainage pathways will be kept clear, and wastewater will be managed to avoid localized ponding and obstruction of hospital access routes. • At DHQ Hospital, Wana and DHQ Hospital, Miran Shah, wastewater will not be allowed to accumulate in open areas or unlined depressions, and suitable measures will be implemented to prevent stagnant water, odor, and vector breeding. • Non-potable water will be reused where feasible for dust suppression and minor construction activities, subject to suitability and applicable health and safety requirements. • Good housekeeping practices will be maintained to prevent wastewater accumulation, drainage blockages, leakage, or stagnant water within hospital premises. • Workers will be trained on water conservation, hygiene, spill prevention, and proper wastewater handling practices. • Drainage systems and wastewater handling arrangements will be regularly inspected to identify and address leaks, blockages, overflows, or contamination risks. • A site-specific wastewater management approach will be implemented in coordination with Hospital Administration, and records of wastewater generation, treatment, reuse, and disposal will be maintained where applicable. • Any wastewater containing oils, chemicals, or other hazardous contaminants will be managed separately and will not be discharged into the		

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	Monitoring
		hospital drainage system or surrounding environment. • All wastewater management practices will comply with applicable environmental regulations, project requirements, and hospital sanitation standards.		
20.	**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 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. • At DHQ Hospital, Parachinar (Kurram) and DHQ Hospital, Mishti Mela (Orakzai), mountainous terrain, sloping ground, and seasonal rainfall may increase the risk of sediment transport, runoff, and localized drainage disturbance if exposed areas and excavated materials are not properly managed. • At DHQ Hospital, Khar (Bajaur), DHQ Hospital, Landi Kotal (Khyber), and DHQ Hospital, Ghallanai (Mohmand), rugged terrain and constrained	• Workers will utilize existing hospital sanitation facilities where feasible and approved by Hospital Administration, minimizing the need for temporary arrangements and preventing uncontrolled wastewater discharge. • Construction-related wastewater, including wastewater from concrete works, equipment cleaning, and other construction activities, will be collected and managed in designated areas and will not be allowed to mix with hospital sewage or enter stormwater drains without appropriate management. • Equipment and vehicles will be cleaned only in designated service areas, where required, with appropriate containment measures such as sediment traps and oil-water separators, as applicable. • Fuels, oils, lubricants, and chemicals will be stored on impermeable, bunded surfaces and kept away from drainage lines, water supply infrastructure, and natural water pathways. • Spill prevention and response procedures will be implemented, and workers will be trained in spill containment, cleanup, reporting, and safe handling of potentially contaminating substances. • Runoff from minor excavation and disturbed areas will be controlled through good housekeeping, prompt backfilling and compaction of excavations, and protection of nearby drainage inlets to prevent sediment or contaminants from entering drainage systems.	Contractor	SC and PMIU

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	Monitoring
	drainage conditions may increase the potential for localized runoff and drainage obstruction during external works. • At relatively dry sites such as DHQ Hospital, Wana and DHQ Hospital, Miran Shah, water demand for dust suppression and construction activities may be comparatively higher during active work periods, while limited water availability may create additional pressure on existing supplies. Impacts are expected to be low to moderate, site-specific, and short-term in nature.	• At DHQ Hospital, Parachinar (Kurram) and DHQ Hospital, Mishti Mela (Orakzai), excavated material will be properly stockpiled, exposed areas will be stabilized where necessary, and suitable runoff and erosion control measures will be implemented to minimize sediment movement during rainfall. • At DHQ Hospital, Khar (Bajaur), DHQ Hospital, Landi Kotal (Khyber), and DHQ Hospital, Ghallanai (Mohmand), drainage pathways will be kept clear, and excavated materials and construction debris will be managed to prevent localized blockage and runoff-related impacts. • Construction materials, debris, fuel, chemicals, and excavated spoil will not be stored near drainage channels, water supply facilities, natural water pathways, or other areas where they could cause blockage or contamination. • Water consumption for construction activities will be minimized, monitored, and managed efficiently. Water conservation practices will be promoted, particularly at DHQ Hospital, Wana and DHQ Hospital, Miran Shah, where relatively dry conditions and potential water supply constraints may occur. • Existing hospital water supply and sewerage connections will be maintained and protected from damage during excavation and utility works. • No direct discharge of wastewater, contaminated runoff, or construction-related pollutants into natural water bodies, open drains, or surrounding land will be permitted. • Regular inspections will be carried out to ensure proper functioning of drainage systems, prevent blockages, identify leaks or contamination risks, and ensure compliance with applicable		

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	**Monitoring**
		environmental requirements and hospital sanitation protocols.		
21.	**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. Presence of Asbestos Containing Materials (ACM) may also pose hazardous impacts if disturbed or removed during rehabilitation works. 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. • Asbestos exposure may release asbestos fibres, posing potential occupational and public health risks to workers, patients, hospital staff, and visitors. • Blockage or damage to drainage infrastructure if hazardous residues (e.g., cement slurry or chemicals) enter the drainage system. Impacts are expected to be moderate, site-specific, and	• 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. • Where ACMs are identified, an Asbestos Management Plan (AMP) will be implemented before commencement of work. • ACMs will be removed, handled, and disposed of by licensed/authorized contractors and trained personnel, with appropriate PPE, fiber-control measures, and access controls in place. • ACMs will not be broken, reused, or incorporated	Contractor	SC and PMIU

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	Monitoring
	short-term in nature	into the works. Asbestos waste will be securely packaged, transported, and disposed of at an authorized facility, with disposal records maintained.		
22.	**Disturbance to Hospital Services and Shifting of Units** The proposed rehabilitation and upgrading works within operational hospital settings may result in temporary disruption to routine healthcare services and may require the temporary relocation or phased shifting of certain functional units during construction activities. Such disruptions may affect patient flow, internal circulation, waiting areas, access to healthcare services, and operational efficiency within hospital premises. Disruptions may be relatively more pronounced at DHQ Hospital, Khar (Bajaur), DHQ Hospital, Landi Kotal (Khyber), and DHQ Hospital, Ghallanai (Mohmand) due to constrained hospital premises, rugged terrain, limited space for temporary relocation arrangements, and challenges in maintaining safe internal access during rehabilitation works. At DHQ Hospital, Parachinar (Kurram) and DHQ Hospital, Mishti Mela (Orakzai), the remote and mountainous setting may create additional logistical challenges for the temporary relocation of services, movement of equipment, and maintenance of uninterrupted access to healthcare facilities. At DHQ Hospital, Wana and DHQ Hospital, Miran Shah, remoteness and potential limitations in alternative service arrangements may further increase the importance of careful construction phasing and service continuity planning.	• A comprehensive Service Continuity Plan will be prepared in coordination with Hospital Administration, identifying affected units, relocation requirements, sequencing of works, alternative service arrangements, and measures to maintain essential healthcare services. • Temporary functional arrangements will be established within available and suitable spaces to maintain uninterrupted delivery of critical healthcare services during rehabilitation works. • Construction activities will be phased and scheduled to avoid peak operational hours and periods of high patient demand, where feasible. • Any shifting or temporary relocation of hospital units will be undertaken in coordination with Hospital Administration, ensuring that essential equipment, utilities, infection prevention requirements, and patient access are maintained. • Clear wayfinding signage and timely information dissemination will be implemented to ensure safe and efficient movement of patients, attendants, staff, and visitors during changes to unit locations or internal access routes. • Emergency departments, critical care units, operating theatres, laboratories, and other essential hospital services will remain accessible and operational throughout the construction period. • At DHQ Hospital, Parachinar (Kurram) and DHQ Hospital, Mishti Mela (Orakzai), relocation and construction sequencing will consider the remote setting, challenging terrain, material transport	Contractor	SC and PMIU

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	Monitoring
	Impacts are expected to be high, site-specific, and short-term in nature.	constraints, and potential weather-related access disruptions. • At DHQ Hospital, Khar (Bajaur), DHQ Hospital, Landi Kotal (Khyber), and DHQ Hospital, Ghallanai (Mohmand), temporary relocations and construction staging will be planned carefully to minimize impacts associated with constrained space and difficult internal circulation. • At DHQ Hospital, Wana and DHQ Hospital, Miran Shah, service continuity arrangements will consider the remote location and the limited availability of alternative healthcare facilities or temporary service arrangements. • Continuous coordination with Hospital Administration will be maintained to ensure uninterrupted operation of emergency and essential healthcare services at all locations. • Patients, attendants, staff, and visitors will be informed in advance of any changes to service locations, access arrangements, or temporary disruptions. The SCP is attached as **Annexure-XI**.		
23.	**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.	• 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.	Contractor	SC and PMIU

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	**Monitoring**
	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. Impacts are expected to be moderate to high, site-specific, and short-term in nature.	• 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.		
24.	**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. 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	• 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.	Contractor	SC and PMIU

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	Monitoring
	Impacts are expected to be low to moderate, site-specific, and short-term in nature.	• Construction personnel will be trained on safe handling of muck, debris, and minor hazardous materials to prevent contamination or accidents.		
25.	**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. • 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.	**A. Workplace and Fire Emergencies** • A site-specific HSE and 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.	Contractor	SC and PMIU

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	Monitoring
	Impacts are expected to be high, site-specific, and short-term in nature.	• All incidents, near-misses, and corrective actions will be documented and reported. **B. Natural and Man-Made Disasters** • The 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 **Annexure-XII.**		
26.	**Handling and Disposal of ACMs** Demolition, dismantling, cutting, drilling, or removal of identified ACMs during rehabilitation works may release	• No work involving suspected ACMs will commence until the asbestos survey is completed and the AMP is implemented.	Contractor	SC and PMIU

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	**Monitoring**
	asbestos fibers into the air, potentially exposing workers, patients, hospital staff, and visitors to health risks.	• ACMs will be removed, handled, transported, and disposed of by licensed/authorized contractors and trained personnel in accordance with applicable requirements and international good practice. • ACM work areas will be isolated and access controlled, with appropriate signage, PPE, and fibre-control measures. • ACMs will not be broken, reused, or incorporated into the works. • Asbestos waste will be securely packaged and disposed of at an authorized facility, with disposal records maintained.		
27.	**Flora and Fauna** No significant impacts on flora or fauna are anticipated, as the project is confined to existing hospital premises within an already developed urban or semi-urban environment. Minor temporary impacts on planted vegetation and urban-adapted fauna may occur due to construction activities, dust, noise. Any unavoidable vegetation removal will be compensated through plantation and landscaping using native species to enhance green cover and the overall site environment.	Care will be taken to minimize disturbance to urban-adapted fauna, particularly birds and small animals, through controlled construction activities, proper waste management, and restriction of major construction works to daytime hours.	Contractor in consultation with KP Forest Department	SC and PMIU
28.	**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	• The Chance-Find Procedure (**Annexure-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.	Contractor in consultation with Department of Archeology	SC and PMIU

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	Monitoring
	informed in accordance with applicable regulations.	• 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.		
29.	**Social/ Cultural Conflicts** 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. 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. Impacts are expected to be low to moderate, site-specific, and short-term in nature.	• 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.	Contractor	SC and PMIU
30.	**GBV, Child Labour and Forced Labour**	• Contractors will comply with national labor laws, including prohibition of child labor (<15 years)	Contractor	SC and PMIU

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	**Monitoring**
	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. Impacts are expected to be moderate to high, site-specific, and short-term in nature.	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 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.		
Operation Phase				
31.	**Water Supply & Usage** Hospital operations require substantial water for patient	• Water-efficient fixtures, taps, and appliances will be installed. • Regular maintenance of plumbing systems will be	Hospital Administration	Health Department

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	Monitoring
	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.	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.		
32.	**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. Impacts are expected to be high, site-specific, and long-term 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
33.	**Solid Waste Generation**	• Waste will be segregated at source into	Hospital	Health

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. Impacts are expected to be high, site-specific, and long-term in nature.	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)	Administration	Department
34.	**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. Impacts are expected to be moderate to high, site-specific, and long-term 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	Hospital Administration	Health Department

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	**Monitoring**
		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.		
35.	**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. Impacts are expected to be moderate, site-specific, and long-term 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
	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. Impacts are expected to be moderate to high, site-specific, and long-term 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	Hospital Administration	Health Department

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	**Monitoring**
		emergency vehicles will be maintained at all times.		
36.	**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 may be particularly susceptible to injury. Impacts are expected to be moderate to high, site-specific, and long-term in nature.	• 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 OHS, 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.	Hospital Administration	Health Department
37.	**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. Impacts are expected to be high, site-specific, and long-term in nature.	• Comprehensive 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.	Hospital Administration	Health Department

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	**Monitoring**
		• 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.		
38.	**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. 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.	• 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.	Hospital Administration	Health Department
39.	**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. Impacts are expected to be low to moderate, site-specific, and long-term 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	Hospital Administration	Health Department

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	Monitoring
		ensure compliance with applicable environmental standards and hospital waste management procedures.		
40.	**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. Impacts are expected to be moderate to high, site-specific, and long-term 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
41.	**Emergency Preparedness and Disaster Management** **A. Natural Disasters** 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. **B. Fire Safety** 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.	• Compliance with the Seismic Building Code of Pakistan (SBC-2021) will be ensured. • An 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. • 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
42.	**Climate Change Impacts** The hospitals are located in districts exposed to varying	The proposed design incorporates climate-resilient and disaster risk reduction measures, including improved drainage and flood protection, energy-	Hospital Administration	Health Department

Sr. No.	Impacts	Mitigation Measure	Responsibility	
			Implementation	Monitoring
	climate change and disaster-related hazards. Khar Bajaur, Ghalanai Mohmand, Miran Shah, Wana, and Landi Kotal are primarily vulnerable to extreme heat, water scarcity, dust storms, intense rainfall, and flash flooding, while Parachinar and Mishti Mela, Orakzai are more susceptible to heavy rainfall, flash floods, landslides, snowfall, and extreme cold. These hazards may disrupt hospital access, damage buildings and critical infrastructure, interrupt electricity, water supply, sanitation, drainage, and communications, and affect the reliability of medical equipment. They may also restrict the movement of patients, staff, and essential medical supplies and compromise the continuity of healthcare services. Impacts are expected to be moderate to high, site-specific, and long-term in nature.	efficient HVAC and lighting, rooftop solar photovoltaic systems with backup power, adequate water storage and filtration facilities, and appropriate slope and erosion protection where required. Emergency preparedness and business continuity measures should also be incorporated to maintain hospital access and essential healthcare services during extreme weather events, thereby enhancing the resilience and operational continuity of the participating hospitals under changing climatic conditions.		

9.8 MONITORING PLAN

507. 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

508. 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.

509. 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

510. 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.**

511. 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)	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	SC; PMIU
3.	Dust Emissions	Compliance with PM_{10} $PM_{2.5}$ 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)	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,	Visual checks of laboratory activities	Once before the start of construction activity On quarterly basis during	Contractor (through KP-EPA-approved	SC; PMIU

Sr. No.	Receptor	Monitoring Parameters / Performance Indicator	Locations	Monitoring Mechanism	Monitoring and Reporting Frequency	Responsibility	
						Implementation	Supervision
			subject to approval by the SC.	Monitoring of noise level at site.	the construction	laboratory)	
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	Contractor (through KP-EPA-approved laboratory)	SC; PMIU
6.	Ecological Resources	Disturbance to natural habitat, uncontrolled floral cutting which can be avoidable. Implementation of Plantation Plan Fauna and avifauna rehabilitation program	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	SC; PMIU

Table 9.4: Instrumental Monitoring and Lab Testing

Item No.	Components	Parameters	No. of Samples	Frequency	Duration	Amount (Rs.)
A	**Construction Phase (24 Months)**					
1	**Air Quality**	CO, NO_2, SO_2, Lead, Ozone, SPM. $PM_{2.5}PM_{10}$	1	Quarterly	24 hours	520,000/-@ Rs. 65,000/ sample
2	**Drinking Water Quality**	Total Coliforms, Fecal E. Coli, TotalColiform Bacteria, pH, TDS, Total Hardness, Taste, Turbidity, $CaCO_3$, Aluminium, Arsenic, Barium, Cadmium, Chloride, Chromium, Copper, Cyanide, Fluoride, Lead, Manganese, Mercury, Nickel, Nitrate, Nitrite, Selenium, Residual Chlorine, Zinc, Phenolic Compound as Phenols	1	Quarterly	-	256,000/- @ Rs. 32,000/sample
3	**Waste Water Quality**	Temprature, pH, Colour, TSS, TDS, Alkalinity, BOD_5, COD, Grease and Oil, Phenolic Compounds, Chlorides, Fluorides, Cyanide, An-ionic detergents, Sulphate, Sulphides, Ammonia, Calcium, Cadmium, Chromium, Lead, Mercury, Selenium, Nickel, Silver, Zinc, Arsenic, Barium, Iron, Manganese, Boron, Chlorine Total	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**	CO, NO2, SO2, Lead, Ozone, SPM. PM2.5PM10	1	Once	24 hours	65,000/-@ Rs. 65,000/ sample
2	**Drinking Water Quality**	Total Coliforms, Fecal E. Coli, Total Coliform Bacteria, pH, TDS, Total Hardness, Taste, Turbidity, $CaCO_3$, Aluminium, Arsenic, Barium, Cadmium, Chloride, Chromium, Copper, Cyanide, Fluoride, Lead, Manganese, Mercury, Nickel, Nitrate, Nitrite, Selenium, Residual Chlorine, Zinc, Phenolic Compound as Phenols	1	Once	-	32,000/- @ Rs. 32,000/sample

Item No.	Components	Parameters	No. of Samples	Frequency	Duration	Amount (Rs.)
3	**Waste Water Quality**	Temprature, pH, Colour, TSS, TDS, Alkalinity, BOD_5, COD, Grease and Oil, Phenolic Compounds, Chlorides, Fluorides, Cyanide, An-ionic detergents, Sulphate, Sulphides, Ammonia, Calcium, Cadmium, Chromium, Lead, Mercury, Selenium, Nickel, Silver, Zinc, Arsenic, Barium, Iron, Manganese, Boron, Chlorine Total	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

512. 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.

513. 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

514. 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 **Annexure-XV.**

9.9.2 HSE Management Plan

515. 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 **Annexure-XVI** in IEE**.**

516. 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

517. 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 **Annexure-X** 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.

518. 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.

519. 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

520. 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.

521. 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

522. 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

523. 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

524. 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

525. 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

526. The 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

527. 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

528. 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.

529. 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

530. 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 IV is **Rs. 64,857,800/-**.

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 EHS and social specialist for EMP implementation	One EHS Specialist and one Social and gender Specialist for 24 months	4,800,000
4	Cost of Health & Safety and other miscellaneous items	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. No.	Items	Description	Cost (Rs.)
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

Sr. No.	Items	Description	Cost (Rs.)
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/-	
		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 (Rs.)
	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 CORRECTIVE ACTION PLAN

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-IV.

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	**DHQ Hospital Khar**	• No healthcare waste segregation or colour-coded bins; open dumping; no on-site treatment; incinerator available but non-functional; poor waste records. • No on-site wastewater treatment; direct discharge to municipal sewer. • Gaps in PPE, electrical safety, housekeeping, hazardous-material handling, safety signage, sharps handling and biological exposure controls. • Inadequate fire extinguishers and fire alarm coverage; routine inspection and maintenance not evidenced; inadequate emergency escape routes and assembly points; no documented emergency response procedures, staff training or mock drills. • No structured environmental monitoring program 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. • Construct septic tanks, with appropriate structural design watertight construction, properly designed inlet/outlet arrangements, access covers, and provisions for scheduled desludging. • 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.	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 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. 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**
2	**DHQ Hospital Parachinar**	• No healthcare waste segregation; inadequate colour-coded bins; open dumping; no on-site treatment; incinerator available but non-functional; poor waste	**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.	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.	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			
		records. • No on-site wastewater treatment; direct discharge to municipal sewer. • Gaps in PPE, electrical safety, housekeeping, hazardous-material handling, safety signage, sharps handling and biological exposure controls. • Inadequate fire extinguishers and fire alarm coverage; routine inspection and maintenance not evidenced; inadequate emergency escape routes and assembly points; no documented emergency response procedures, staff training or mock drills. • No structured environmental monitoring program and limited institutional capacity.	• Establish daily healthcare-waste generation, collection 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. • 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.				• Daily waste records • Approved waste treatment/disposal arrangement documented and disposal records maintained.		
			Waste water: • Rehabilitate/upgrade the internal sewerage network and discharge connection to eliminate leakage, blockage and uncontrolled discharge. • Construct 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	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			
			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 **3 months**	Included in the approved scope of work for the current project. **10,000,000**
			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	12,500,000
3	**DHQ Hospital Landi Kotal**	• No healthcare waste segregation or colour-coded bins; open dumping; no on-site treatment; poor waste records.	**Medical Waste:** • Provide colour-coded bins and sharps containers; • Provide waste-segregation signage at waste-generation and temporary	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.	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			
		• No on-site wastewater treatment; direct discharge to municipal sewer. Gaps in PPE, electrical safety, housekeeping, hazardous-material handling, safety signage, sharps handling and biological exposure controls. • Fire extinguishers are inadequate and inconsistently calibrated; inadequate fire alarm coverage; routine inspection and maintenance not evidenced; inadequate emergency escape routes and assembly points; no documented emergency response procedures, staff training or mock drills. • No structured environmental monitoring program and limited institutional capacity.	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.				• Waste-segregation signage installed at relevant locations. • Daily waste records • Approved waste treatment/disposal arrangement documented and disposal records maintained.		
			Wastewater: • Rehabilitate/upgrade the internal sewerage network and discharge connection to eliminate leakage, blockage and uncontrolled discharge. • Construct septic tanks, with appropriate structural design watertight construction, properly designed inlet/outlet arrangements, access covers, and provisions for scheduled desludging. • 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
			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. 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 Hospital Ghallanai**	• No healthcare waste segregation or colour-coded bins; open dumping; incinerator available but non-functional; no waste records. • No on-site wastewater treatment; direct discharge to municipal sewer. Gaps in PPE, electrical safety, housekeeping, hazardous-material handling, safety signage, sharps handling and biological exposure	**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	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			
		controls. • No fire extinguishers, fire detection/alarm system or fixed firefighting system; no designated emergency escape routes, assembly points or fire-safety signage; no documented emergency response procedures, staff training or mock drills. • No structured environmental monitoring program and limited institutional capacity.	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. • Construct septic tanks, with appropriate structural design watertight construction, properly designed inlet/outlet arrangements, access covers, and provisions for scheduled desludging. • 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

Sr. No.	Hospital	Existing Environmental Liability	Corrective Action	Responsibility			Indicator	Timeline	Indicative Cost (PKR) Annual Basis
				Implementation	Monitoring	Funding Source			
			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	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
								Total	**7,500,000**
5	**DHQ Hospital Miran Shah**	• No healthcare waste segregation or colour-coded bins; open dumping; incinerator available but non-functional; no waste records. • No on-site wastewater treatment; direct discharge to municipal sewer. Gaps in PPE, electrical safety, housekeeping, hazardous-material handling, safety signage, sharps handling and biological exposure controls. • No fire extinguishers, fire detection/alarm system or fixed firefighting system; no	**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-	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			
		designated emergency escape routes, assembly points or fire-safety signage; no documented emergency response procedures, staff training or mock drills. • No structured environmental monitoring program and limited institutional capacity.	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. • Construct/upgrade septic tanks, with appropriate structural design watertight construction, properly designed inlet/outlet arrangements, access covers, and provisions for scheduled desludging. • 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. • 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	**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. 10,000,000

Sr. No.	Hospital	Existing Environmental Liability	Corrective Action	Responsibility			Indicator	Timeline	Indicative Cost (PKR) Annual Basis
				Implementation	Monitoring	Funding Source			
						housekeeping and operational OHS measures in Health Department Budget.			
			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	**12,500,000**
6	**DHQ Hospital Wana**	• No healthcare waste segregation; inadequate colour-coded bins; open dumping; no on-site treatment; incomplete waste records. • No on-site wastewater treatment; direct discharge to municipal sewer. • Gaps in PPE, electrical safety, housekeeping, hazardous-material handling, safety signage, sharps handling and biological exposure controls. • Fire extinguishers are inadequate and inconsistently calibrated; inadequate fire alarm coverage; routine inspection and maintenance not evidenced; inadequate emergency escape routes and assembly points; no documented emergency response procedures, staff training or mock drills.	**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	Hospital Administration	HSE Focal Person/ PMIU	Included in the approved scope of	**Wastewater**: • Rehabilitated sewerage network	After completion of rehabilitation	Included in the

Sr. No.	Hospital	Existing Environmental Liability	Corrective Action	Responsibility			Indicator	Timeline	Indicative Cost (PKR) Annual Basis
				Implementation	Monitoring	Funding Source			
		• No structured environmental monitoring program and limited institutional capacity.	sewerage network and discharge connection to eliminate leakage, blockage and uncontrolled discharge. • Construct septic tanks, with appropriate structural design watertight construction, properly designed inlet/outlet arrangements, access covers, and provisions for scheduled desludging. • 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.		Safeguards Unit	work for the current project.	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.	works	approved scope of work for the current project.
			• 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	Hospital Administration	HSE Focal Person/PMIU Safeguards Unit	• Electrical distribution, internal wiring and power-supply	**OHS:** • Monthly OHS inspections conducted and documented; PPE	After completion of rehabilitation works	Included in the approved scope of work for the current

Sr. No.	Hospital	Existing Environmental Liability	Corrective Action	Responsibility			Indicator	Timeline	Indicative Cost (PKR) Annual Basis
				Implementation	Monitoring	Funding Source			
			biological-exposure gaps. • Improve designated storage areas and general Housekeeping.			improvements are Included in the approved scope of work for the current project. • PPE, routine housekeeping and operational OHS measures in Health Department Budget.	availability records maintained; incidents, near misses, first-aid cases, and corrective actions recorded and report.	Within 3 months from commencement of the project.	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	**12,500,000**
7.	**DHQ Mishti Mela**	• No healthcare waste segregation; inadequate colour-coded bins; open dumping; no on-site treatment; incinerator available but non-functional; incomplete waste records. • No on-site wastewater treatment; direct discharge to municipal sewer. • Gaps in PPE, electrical safety, housekeeping, hazardous-material handling, safety signage, sharps handling and biological exposure controls. • Fire extinguishers are inadequate and inconsistently calibrated; inadequate fire alarm	**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			
		coverage; routine inspection and maintenance not evidenced; inadequate emergency escape routes and assembly points; no documented emergency response procedures, staff training or mock drills. • No structured environmental monitoring program and limited institutional capacity.	• 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. • Construct septic tanks, with appropriate structural design watertight construction, properly designed inlet/outlet arrangements, access covers, and provisions for scheduled desludging. • 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.
			• 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.	**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	Included in the approved scope of work for the current project.
						PPE, routine housekeeping and operational OHS measures in Health Department Budget.		Within 3 months from commencement of the project.	5,000,000
			Fire/Life Safety:	Hospital	HSE Focal	Included in the	**Fire/Life Safety:**	After completion	Included in

Sr. No.	Hospital	Existing Environmental Liability	Corrective Action	Responsibility			Indicator	Timeline	Indicative Cost (PKR) Annual Basis
				Implementation	Monitoring	Funding Source			
			• 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.	Administration	Person/PMIU Safeguards Unit	approved scope of work for the current project.	• 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.	of rehabilitation works	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	7,500,000

10 CONCLUSION AND RECOMMENDATIONS

10.1 CONCLUSION

531. This report presents IEE of the project entitled as; KPHSSP, Revamping of Non-Teaching (DHQs) Hospitals across KP, Phase-IV. The report has been prepared in accordance with the requirements of the KP Environmental Protection Act, 2014, KP Environmental Assessment Rules, 2021 and the ADB SPS, 2009.

532. The project encompasses comprehensive upgrades and service improvements across secondary healthcare hospitals in Khyber Pakhtunkhwa 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.

533. The project with an estimated cost of Rs. 4886.703 million, will be implemented over a period of twenty-four (24) months and focuses on the rehabilitation and upgrading of existing hospital facilities in KP.

534. 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.

535. 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.

536. However, following negative impacts are also anticipated during implementation of the project:

537. 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.

538. 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.

539. 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

540. 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.

541. 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.

542. 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.

543. 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.

Initial Environmental Examination

Date: July 2026

Pakistan: Khyber Pakhtunkhwa Health Systems Strengthening Program (KPHSSP)

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

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
Annexure-II	AOI Maps
Annexure-III	Environmental Monitoring Report
Annexure-IV	Land use and Sensitive receptors
Annexure-V	Social Survey Tools
Annexure-VI	Impact Evaluation Matrix
Annexure-VII	Resource Conservation Plan
Annexure-VIII	Traffic Management Plan
Annexure-IX	Sanitation Plan
Annexure-X	Waste Management Plan
Annexure-XI	Service Continuity Plan
Annexure-XII	Emergency Response Plan
Annexure-XIII	Chance-Find Procedure
Annexure-XIV	List of Consultation Participants
Annexure-XV	Tree Plantation Plan
Annexure-XVI	Guideline HSE Plan

ANNEXURE-I: SCOPE OF WORK



LEGEND

BUILDINGS IN SCOPE	
NOT IN SCOPE	
CONCRETE PAVERS	CP
CHEQUERED TILES	CC
ASPHALT ROAD	AR
GREEN AREA	GREEN

- PLINTH PROTECTION IN CONCRETE CHEQUERED TILES 3'-0" WIDE ALL AROUND THE BUILDINGS
- ALL PAVEMENTS AND PARKING LOTS TO BE FINISHED IN CONCRETE PAVERS
- ALL GREEN AREAS TO BE FINISHED 0'-6" BELOW THE ROAD LEVEL
- ALL COVERED CORRIDORS TO BE FINISHED IN TERRAZO TILE

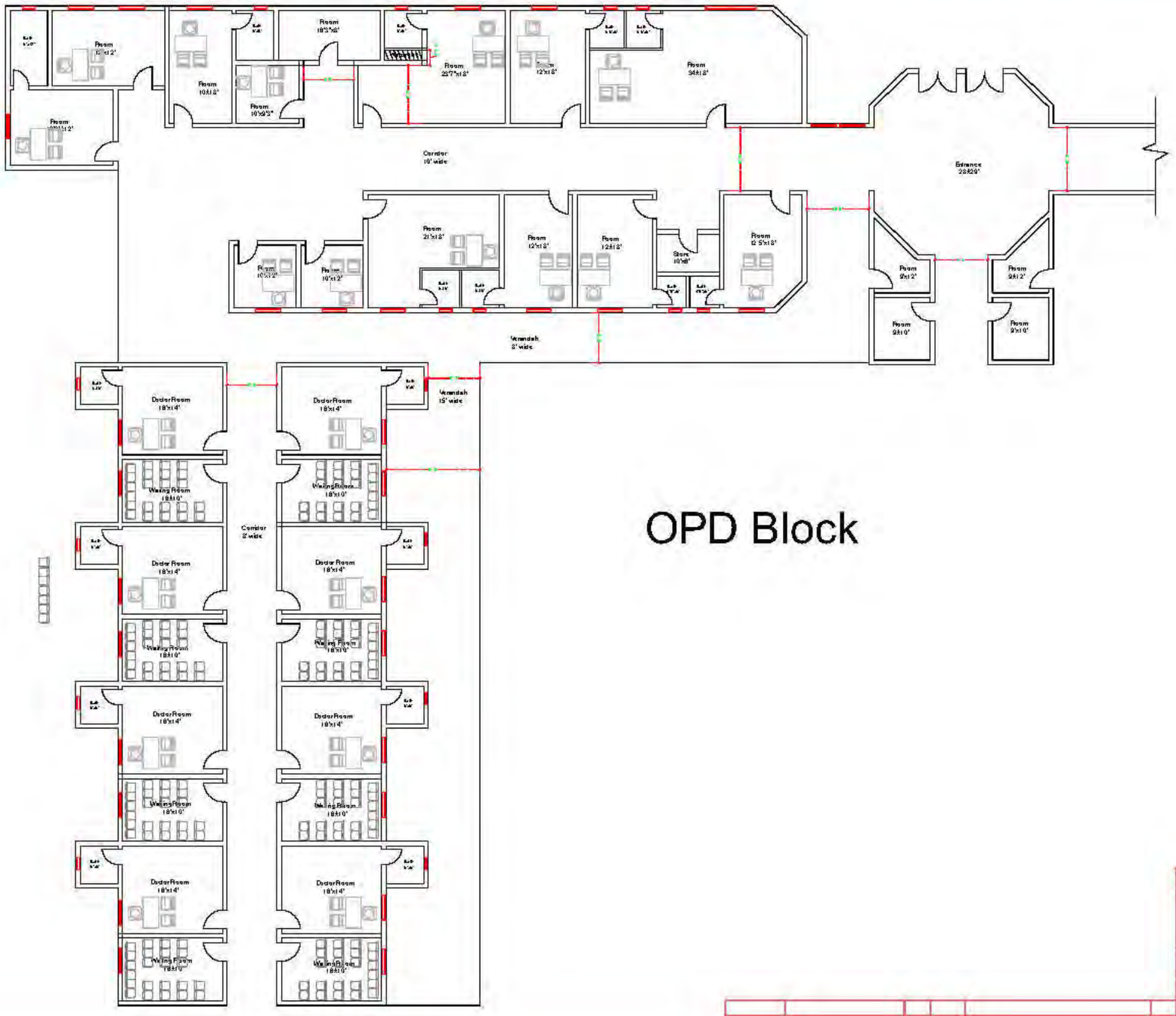
PROJECT MANAGEMENT & IMPLEMENTATION UNIT
COMMUNICATION & WORKS DEPARTMENT MEGA PROJECT-1 PESHAWAR

DHQ BAJAUR PLANS

SCOPE OF WORK

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. PESHAWAR

DESIGN	RECOMMENDED	VERIFIED	APPROVED
DWN			
M.E			
CKD	DATE	DRAWING NO	REV
SUBM		43161/021/TD/ASH/00801	0



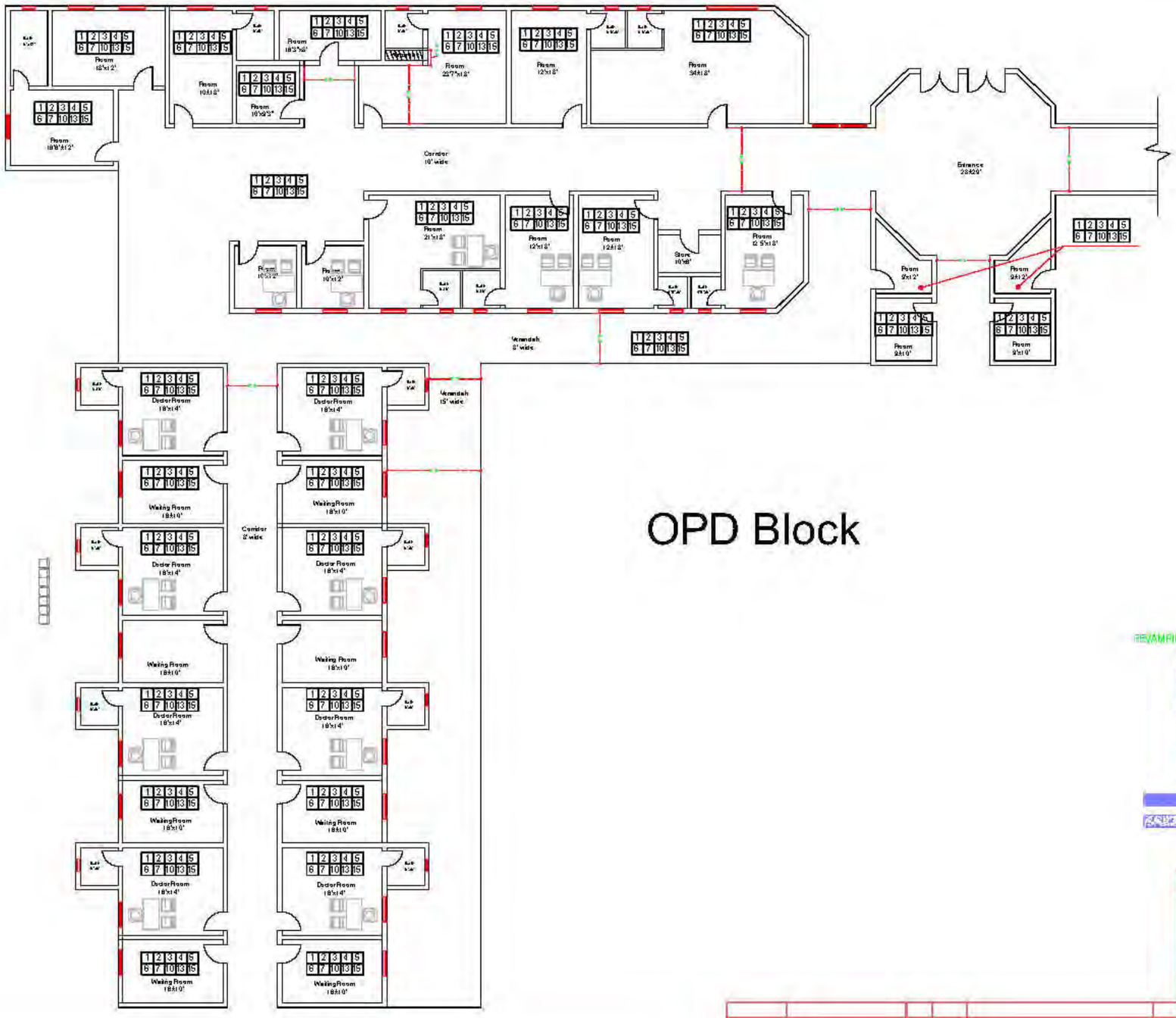
OPD Block

PROJECT MANAGEMENT & IMPLEMENTATION UNIT
COMMUNICATION & WORKS DEPARTMENT MEGA PROJECT 1 PESHAWAR

DHQ BAJAUR PLANS
OPD Block
GROUND FLOOR PLAN

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. PESHAWAR

DESIGN	RECOMMENDED	VERIFIED	APPROVED
DRAWN			
FILE			
CHD	DATE	DRAWING NO	REV.
SUBMT	[illegible] 2021	43.161/021/ABASH/01608	0



OPD Block

REVAMPING SCOPE OF WORK

PROJECT MANAGEMENT & IMPLEMENTATION UNIT
COMMUNICATION & WORKS DEPARTMENT MEGA PROJECT 1 PESHAWAR

DHQ BAJAUR PLANS
OPD Block
GROUND FLOOR PLAN

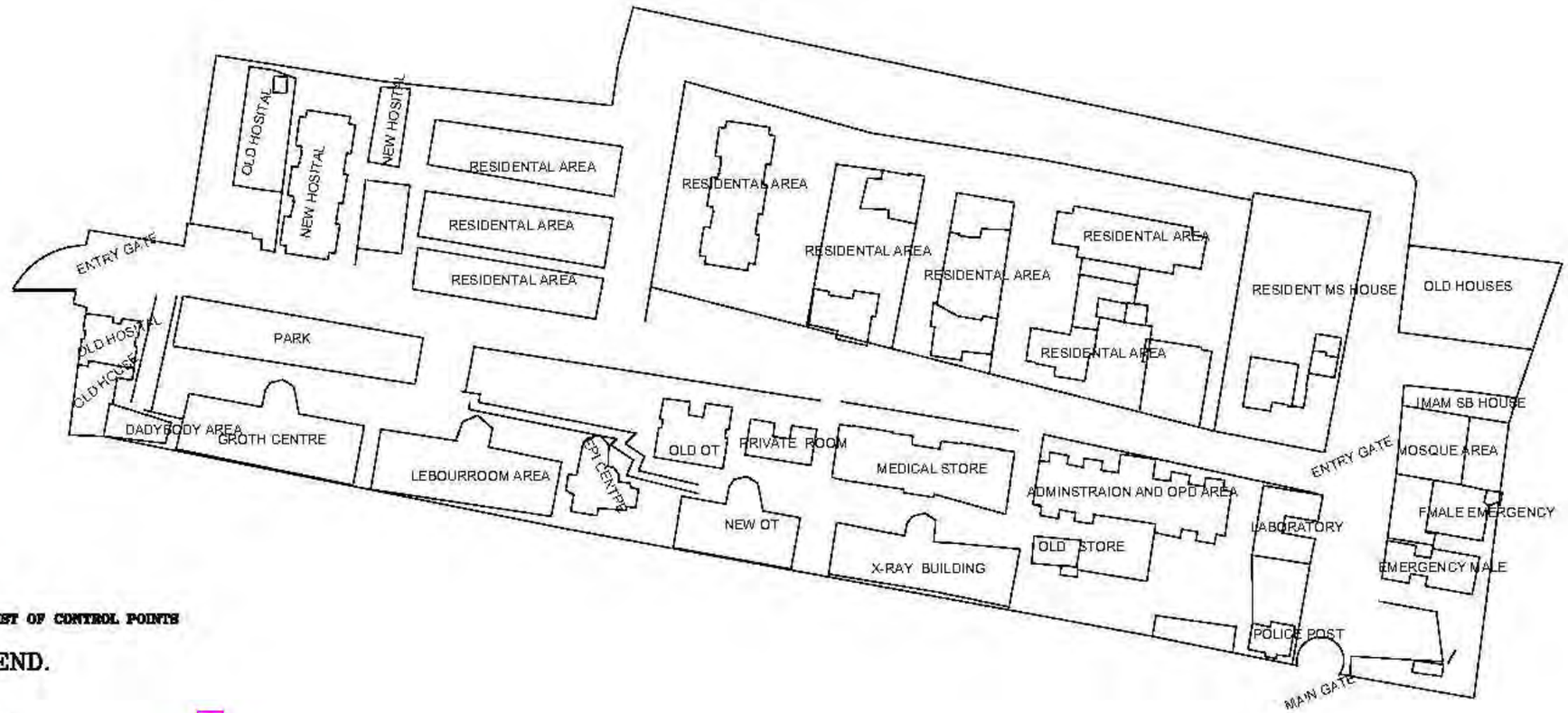
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. PESHAWAR

DESIGN
DRAWN
FILE
CHKD
SUBMT

RECOMMENDED | VERIFIED | APPROVED

DATE: [illegible] 2021

DRAWING NO: 43.161/021/ABA/ASH/01608



LIST OF CONTROL POINTS

LEGEND.

BUILDING

ELECTRIC POLE

GRID

LIGHT POLE

MANHOLE

TREE

PAVED ROAD

SPOT LEVEL (TYP) 451

TELEPHONE POLE

TRAVERSE/BM STATION

PROJECT MANAGEMENT & IMPLEMENTATION UNIT
COMMUNICATION & WORKS DEPARTMENT MEGA PROJECT-1 PESHAWAR

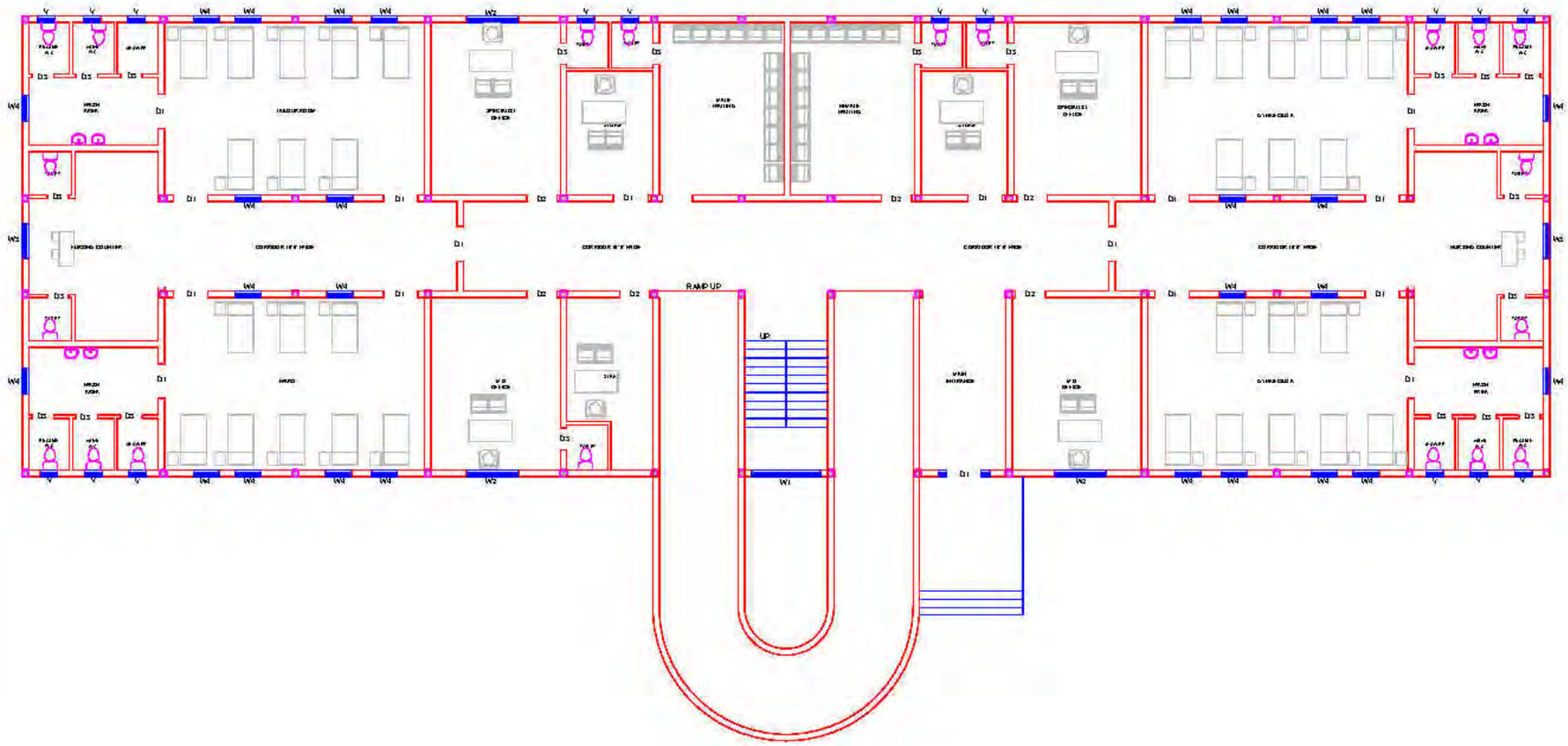
DHQ HOSPITAL LANDI KOTAL

EXISTING MASTER PLAN

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. PESHAWAR

RECOMMENDED | VERIFIED | APPROVED

DATE | DRAWING NO. | REV.



GROUND FLOOR
BLOCK A

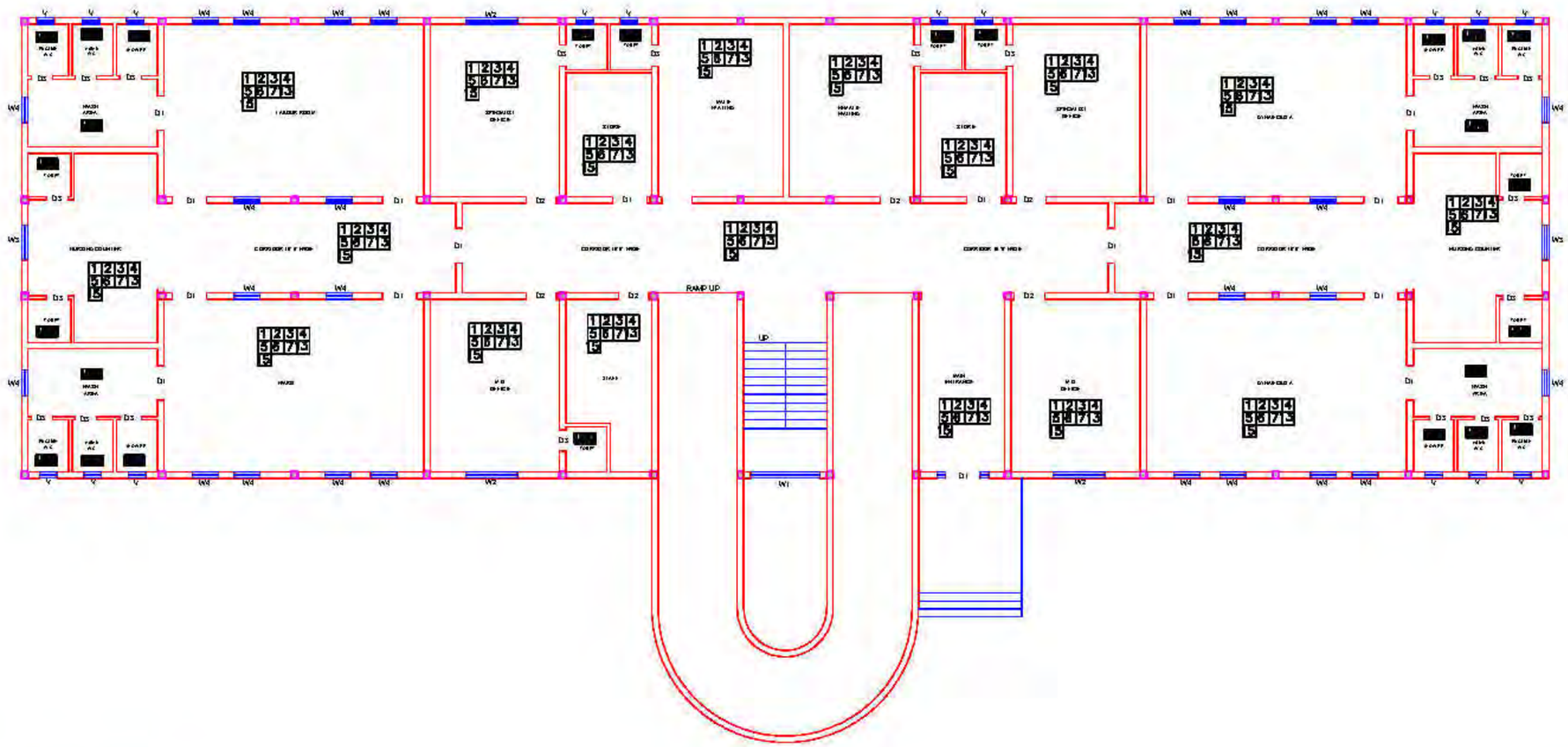
NOTE:
1) ALL DOORS & WINDOWS ARE TO BE REPLACED AS APPROVED BY THE ENGINEER/ARCHITECT.
2) ALL TOILET FIXTURES ARE SHOWN SYMBOLICALLY. FOR ACCURATE PLACEMENT OF FIXTURES, REFER PLUMBING DRAWINGS.
3) ALL TOILET DOORS WILL BE OPEN TOWARDS OUTSIDE
4) FURNITURE ITEMS ARE SHOWN ONLY TO FACILITATE OTHER DISCIPLINES FOR PROVIDING SERVICES. NO FURNITURE ITEM IS PART OF BOQ EXCEPT RECEPTION DESKS.

PROJECT MANAGEMENT & IMPLEMENTATION UNIT
COMMUNICATION & WORKS DEPARTMENT MEGA PROJECT 1 PESHAWAR

DHQ HOSPITAL LANDI KOTAL
BLOCK A
GROUND FLOOR PLAN (FURNITURE LAYOUT)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

DESN	RECOMMENDED	VERIFIED	APPROVED
DRWN			
CHD	DATE	DRAWING NO.	REV.
TUEN		43161/021/TD/ASH/01601	0



REVAMPING SCOPE OF WORK

GROUND FLOOR
BLOCK A

PROJECT MANAGEMENT & IMPLEMENTATION UNIT
COMMUNICATION & WORKS DEPARTMENT MEGA PROJECT 1 PESHAWAR
DHQ HOSPITAL LANDI KOTAL
BLOCK A
GROUND FLOOR PLAN (FINISHES PLAN)
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD
DRAWING NO.
43161(023)TD/ASH/01B09



N

POPULATION WARD

LEGEND

BUILDINGS IN SCOPE	
NOT IN SCOPE	
CONCRETE PAVERS	CP
CHEQUERED TILES	CT
ASPHALT ROAD	AR
GREEN AREA	GREEN
DAMAGE BUILDING	

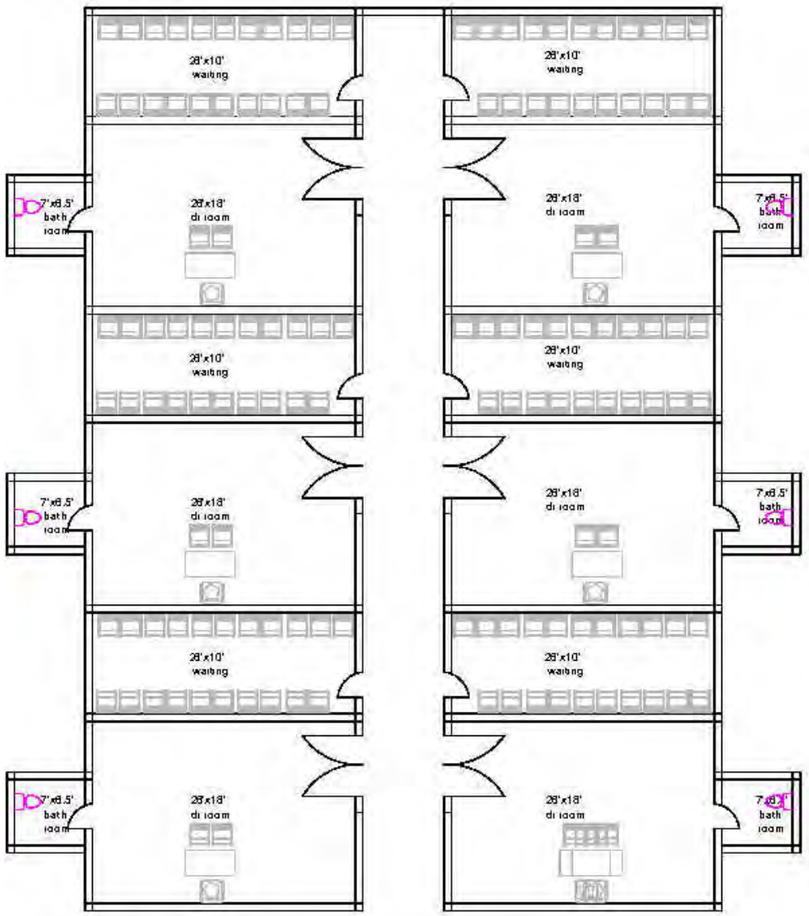
- PLINTH RPOTECTION IN CONCRETE CHEQUERED TILES 3'-0" WIDE ALL AROUND THE BUILDINGS
- ALL PAVEMENTS AND PARKING LOTS TO BE FINISHED IN CONCRETE PAVERS
- ALL GREEN AREAS TO BE FINISHED 0'-6" BELOW THE ROAD LEVEL
- ALL COVERED CORRIDORS TO BE FINISHED IN TERRAZO TILE

PROJECT MANAGEMENT & IMPLEMENTATION UNIT

DHQ HOSPITAL
GHALANAI MOHMAND
SCOPE OF WORK

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. PESHAWAR

DESIGN	RECOMMENDED	VERIFIED	APPROVED
DRAWN			
FILE			
CHKD	DATE	DRAWING NO.	REV.
SUBM		43181(02)/TD/ASH/00801	0



GROUND FLOOR OPD GALLERY

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.
4) FURNITURE ITEMS ARE SHOWN ONLY TO FACILITATE OTHER DISCIPLINES FOR PROVIDING SERVICES. NO FURNITURE ITEM IS PART OF BOQ EXCEPT RECEPTION DESKS.

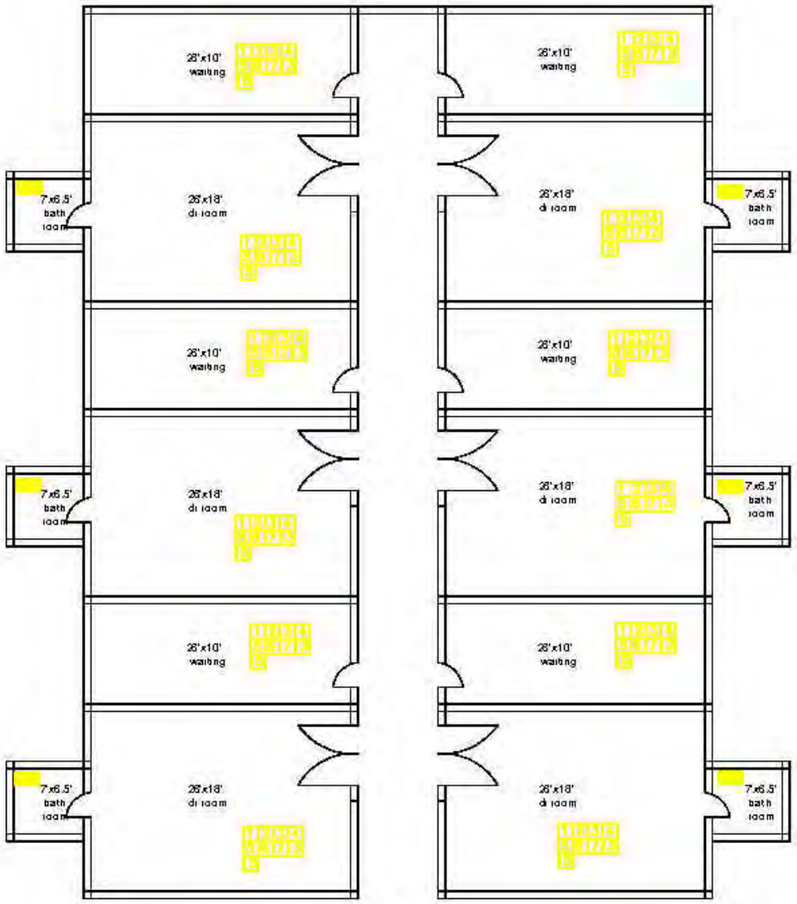
PROPOSED INTERVENTIONS
DEMOLISHED WALL
PROPOSED WALL

PROJECT MANAGEMENT & IMPLEMENTATION UNIT
IRRIGATION & WORKS DEPARTMENT MEGA PROJECT-I PESHAWAR

DHQ HOSPITAL GHALANAI MOHMAND
OPD GALLERY
GROUND FLOOR PLAN (FURNITURE LAYOUT)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. PESHAWAR

DESN	RECOMMENDED	VERIFIED	APPROVED
DWN			
PHZ			
CHD			
SUBM			
	DATE	DRAWING NO	SH
	NOV 2025	4316/024/TD/ASH/01B01	0



GROUND FLOOR OPD GALLERY

REVAMPING SCOPE OF WORK

PROJECT MANAGEMENT & IMPLEMENTATION UNIT
COMMUNICATION & WORKS DEPARTMENT MEGA PROJECT-1 PESHAWAR

DHQ HOSPITAL GHALANAI MOHMAND
OPD GALLERY
GROUND FLOOR PLAN (FINISHES PLAN)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. PESHAWAR

DESIGN | RECOMMENDED | VERIFIED | APPROVED
DRAWN
CHECKED
TRACED
DATE | DRAWING NO. | REV.
43161/021/TD/ASH/01605 | 0



MASTER PLAN
(78077.85 SQUARE FT.)

LEGEND

BUILDINGS IN SCOPE	
NOT IN SCOPE	
CONCRETE PAVERS	CP
CHEQUERED TILES	CC
ASPHALT ROAD	AP
GREEN AREA	GREEN

N

PROJECT MANAGEMENT & IMPLEMENTATION UNIT
COMMUNICATION & WORKS DEPARTMENT MEGA PROJECT-I PESHAWAR

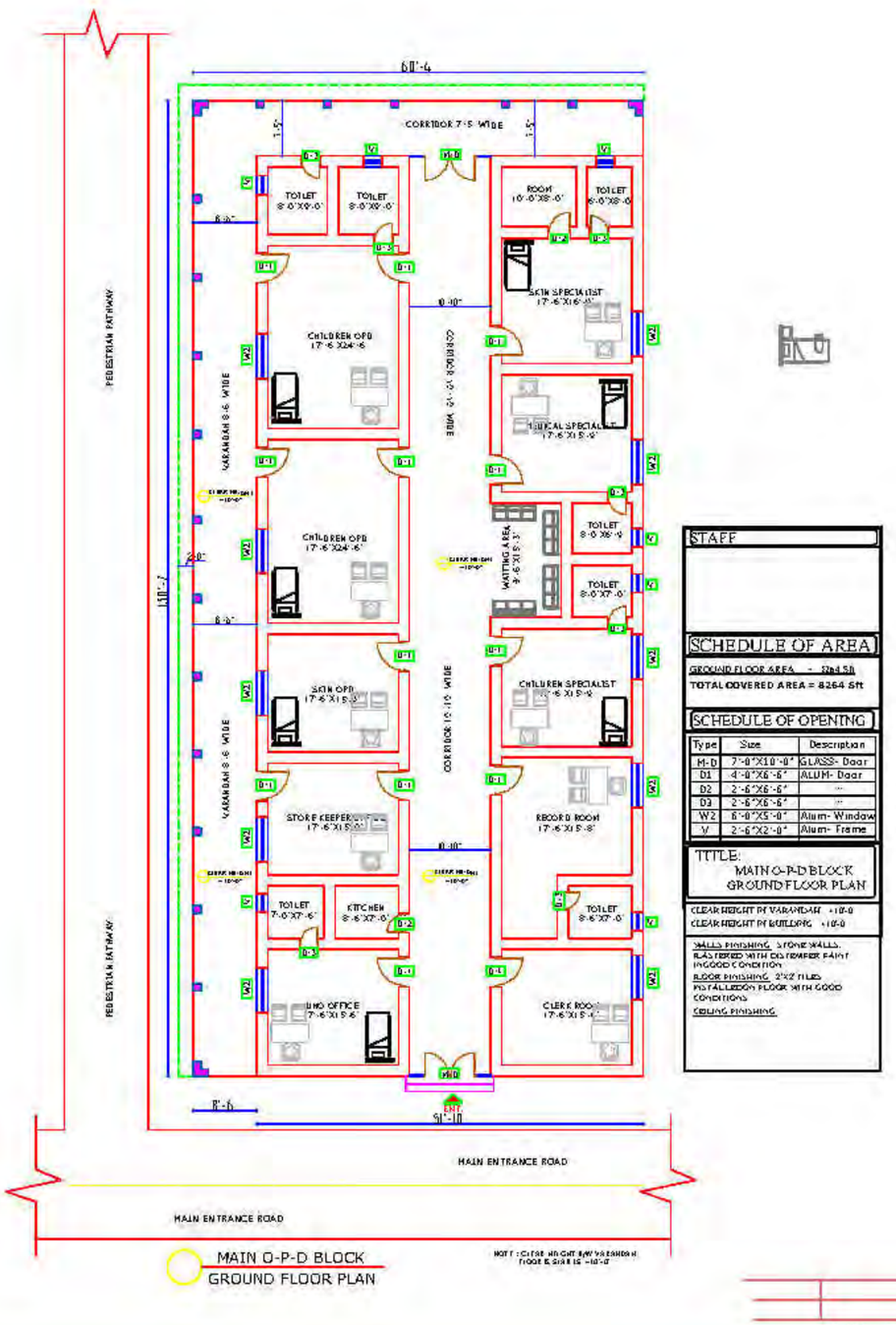
DHQ MIRANSHAH

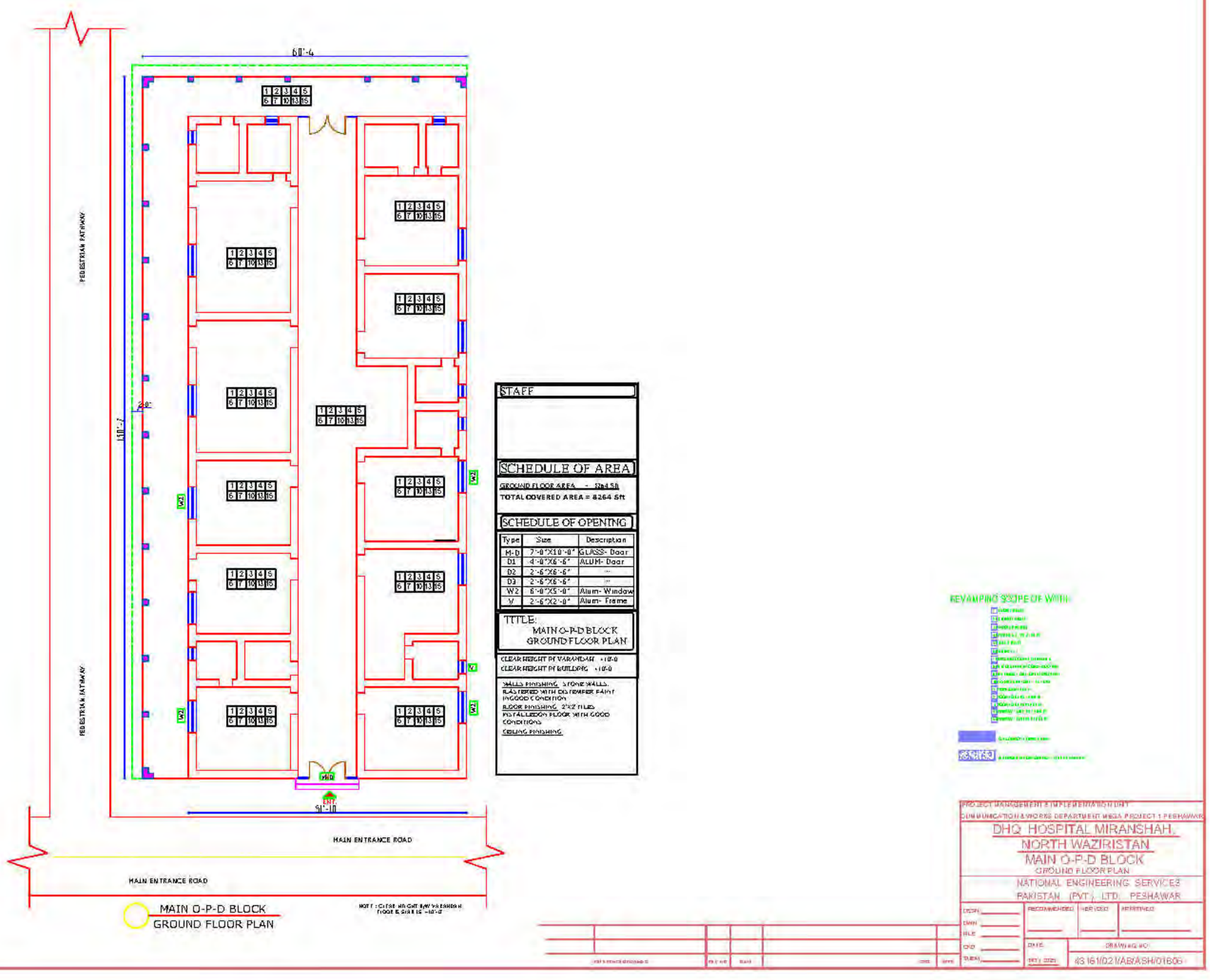
EXTERNAL SIGNAGE PLAN

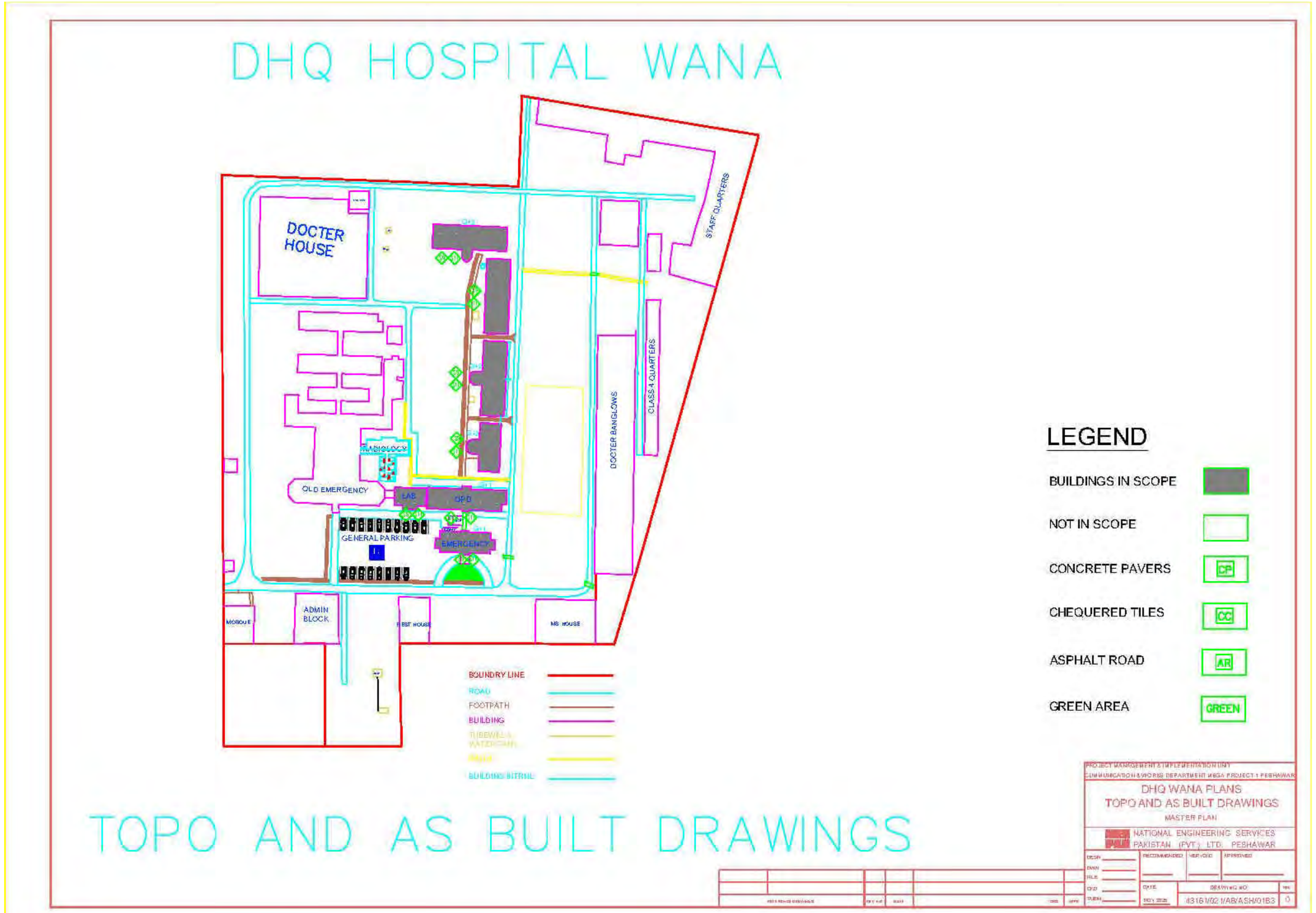
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. PESHAWAR

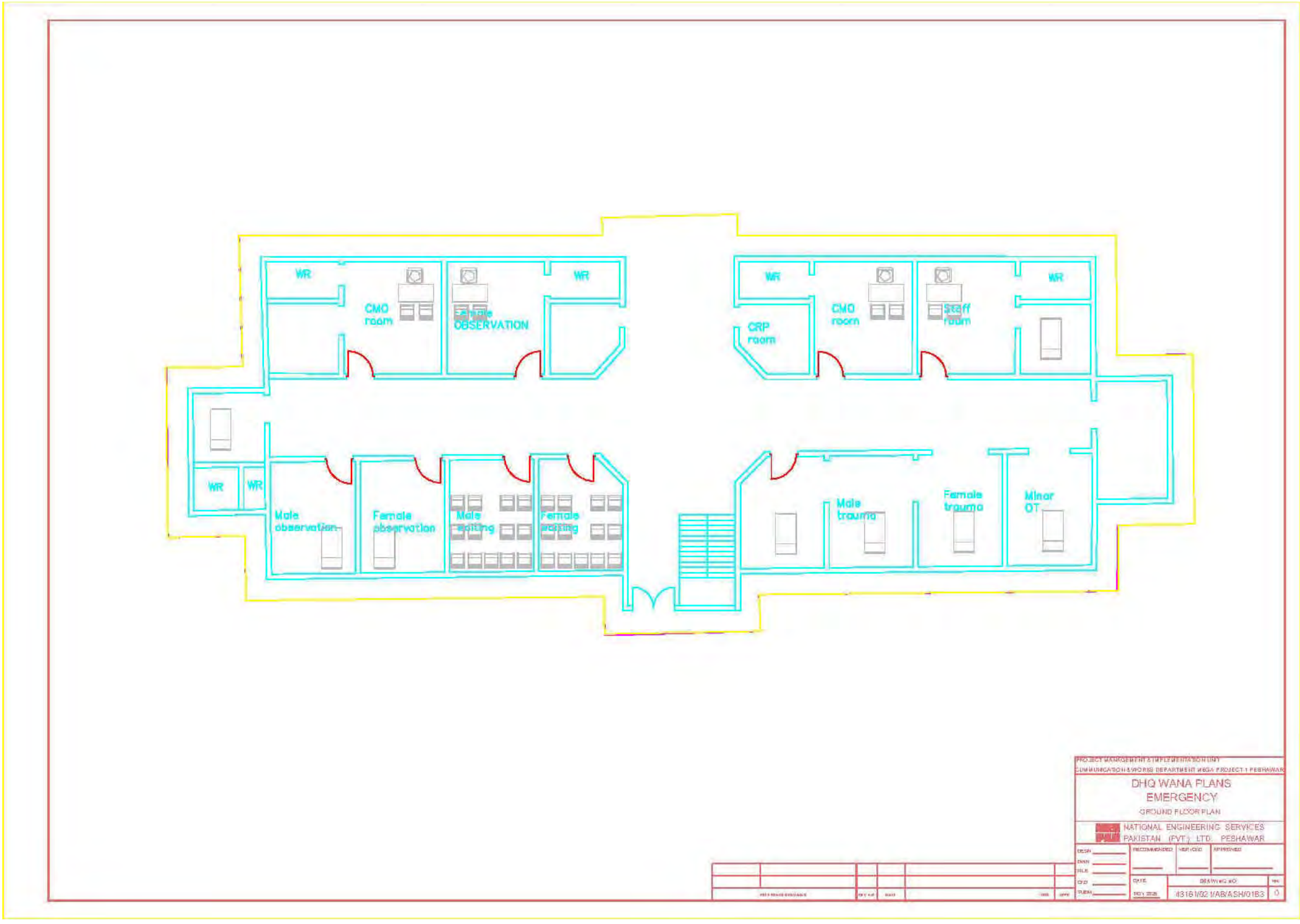
REFERENCE DRAWINGS	REV NO	DATE	BY	CKD	APPR

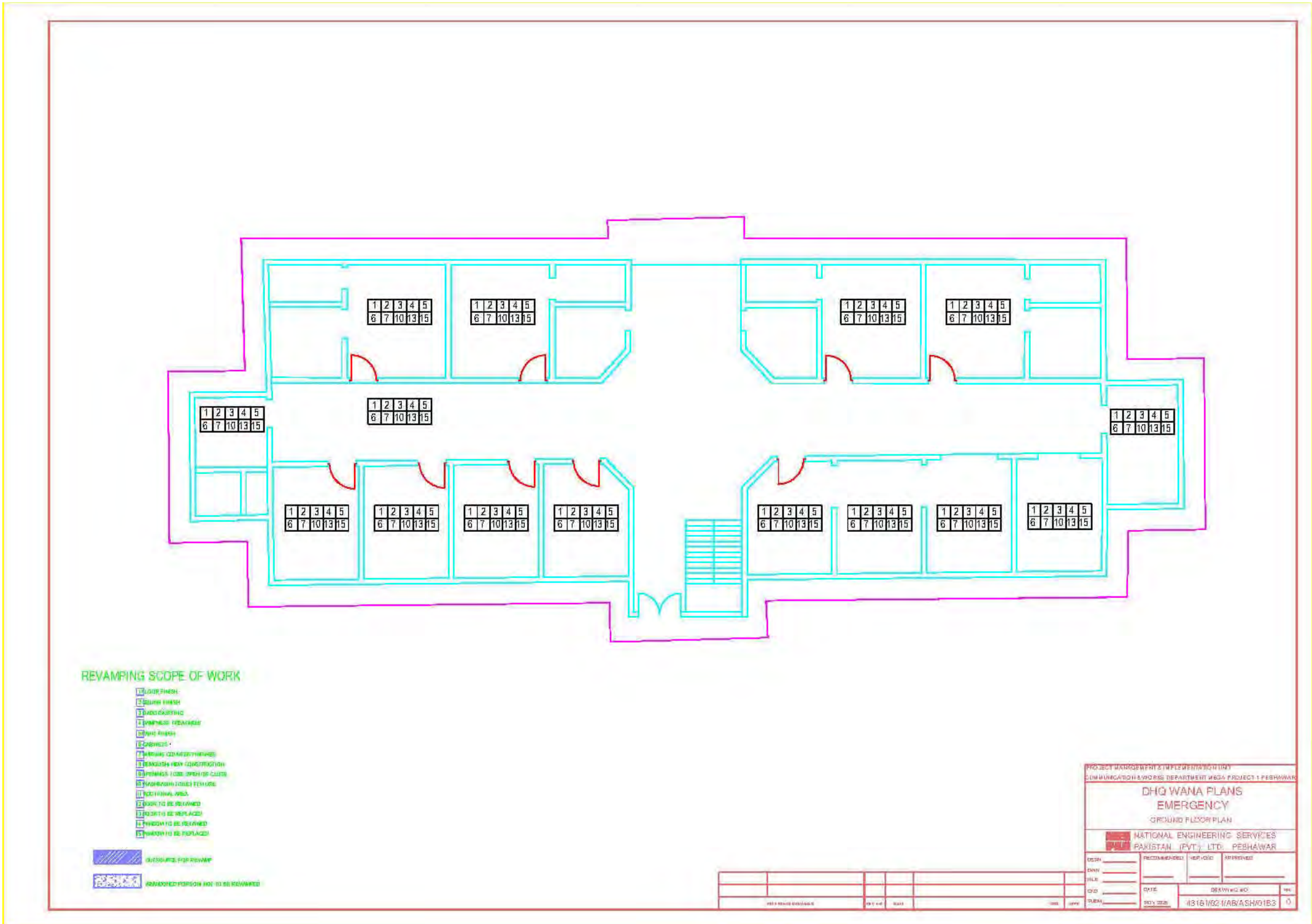
DESN	RECOMMENDED	VER/CKD	APPROVED
DWN			
FILE			
CKD			
SUBM	DATE	DRAWING NO.	REV
		43161/021/TD/ASH/00B01	0

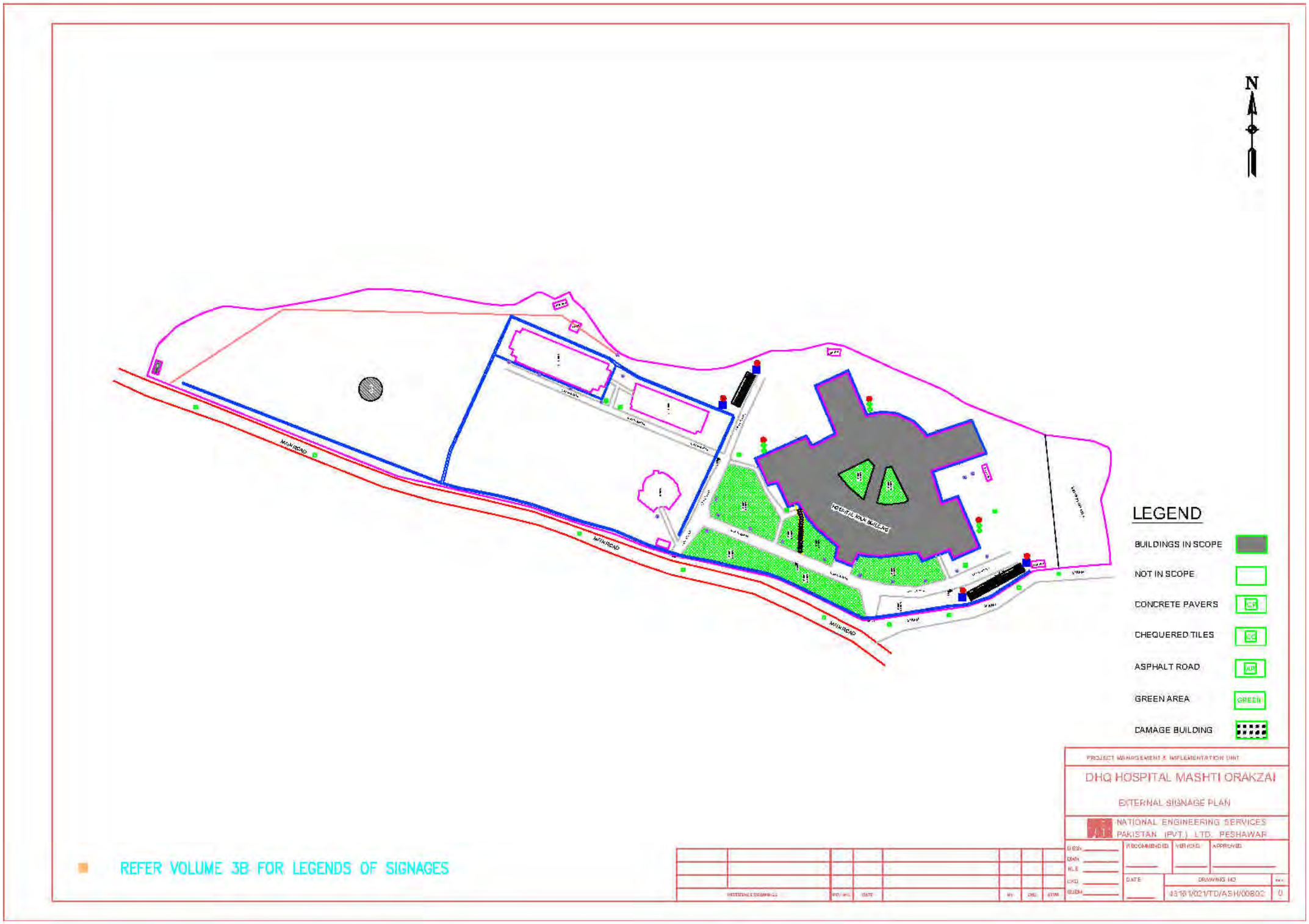

60'-6
CORRIDOR 7'-5" WIDE
TOILET
TOILET
ROOM
TOILET
SKIN SPECIALIST
CHILDREN OPD
CHILDREN OPD
SKIN OPD
CHILDREN SPECIALIST
STORE KEEPER
RECORD ROOM
TOILET
KITCHEN
TOILET
DMO OFFICE
CLERK ROOM
WAITING AREA
VARANDAH 8'-6" WIDE
CORRIDOR 10'-11" WIDE
PEDESTRIAN PATHWAY
150'-7"
8'-0"
9'-10"
9'-6"
ENT.
MAIN ENTRANCE ROAD
MAIN ENTRANCE ROAD
MAIN O-P-D BLOCK
GROUND FLOOR PLAN
STAFF
SCHEDULE OF AREA
GROUND FLOOR AREA = 8264 Sft
TOTAL COVERED AREA = 8264 Sft
SCHEDULE OF OPENING
Type | Size | Description
M-D | 7'-0"X10'-0" | GLASS- Door
D1 | 4'-0"X6'-6" | ALUM- Door
D2 | 2'-6"X6'-6" | ...
D3 | 2'-6"X6'-6" | ...
W2 | 6'-0"X5'-0" | Alum- Window
V | 2'-6"X2'-0" | Alum- Frame
TITLE:
MAIN O-P-D BLOCK
GROUND FLOOR PLAN
CLEAR HEIGHT IN VARANDAH =10'-0
CLEAR HEIGHT IN BUILDING =10'-0
WALLS FINISHING: STONE WALLS, PLASTERED WITH DISTEMPER PAINT IN GOOD CONDITION
FLOOR FINISHING: 2'X2' TILES INSTALLED ON FLOOR WITH GOOD CONDITIONS
CEILING FINISHING
PROJECT MANAGEMENT & IMPLEMENTATION UNIT
COMMUNICATION & WORKS DEPARTMENT MEGA PROJECT 1 PESHAWAR
DHQ HOSPITAL MIRANSHAH,
NORTH WAZIRISTAN
MAIN O-P-D BLOCK
GROUND FLOOR PLAN
NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LTD. PESHAWAR
DRAWING NO:
43.161/D2.1/ABIASH/01B06

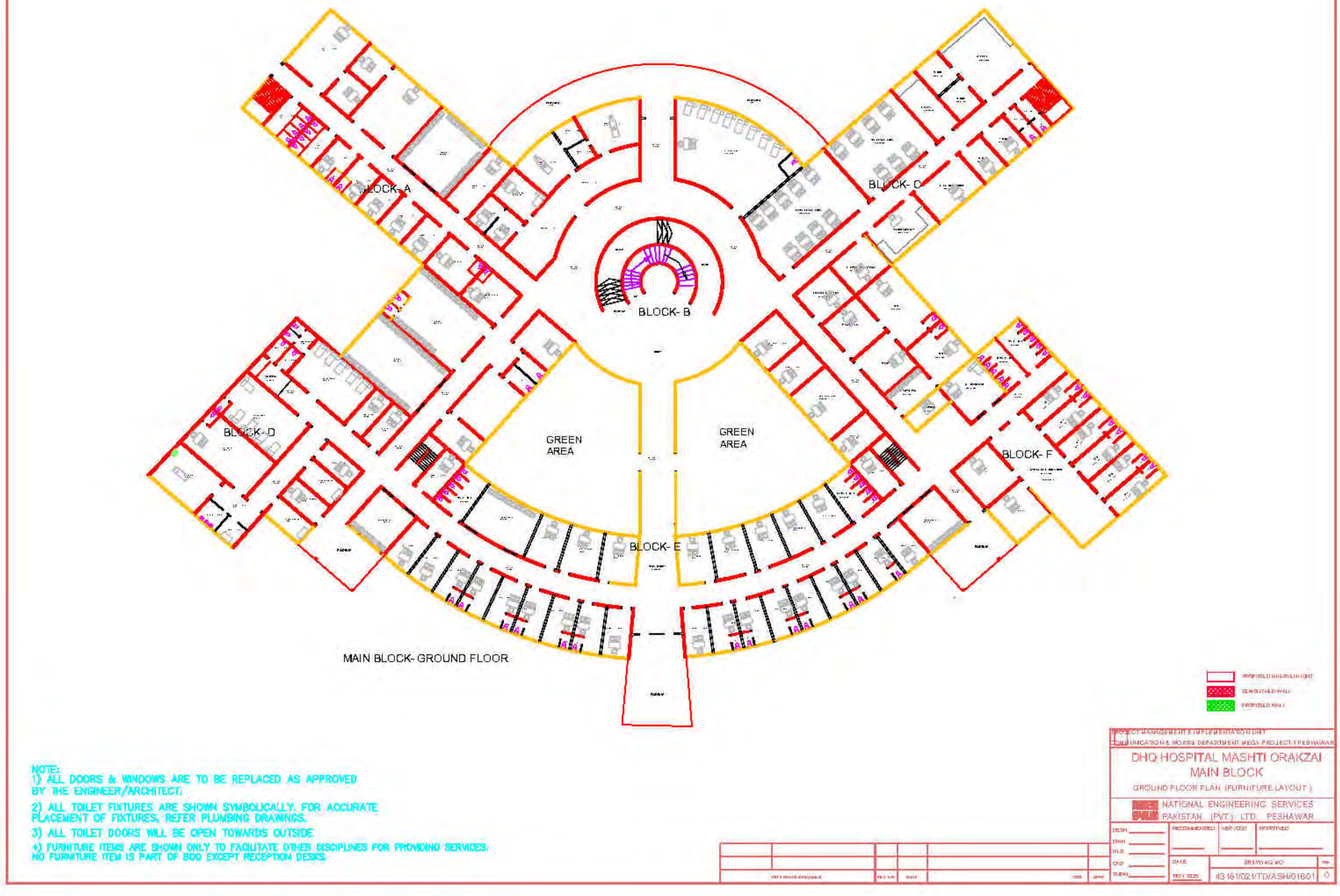

PEDESTRIAN PATHWAY
60'-6
150'-7
2'-0"
W2
W1
MAIN
ENT.
SC-10
MAIN ENTRANCE ROAD
MAIN ENTRANCE ROAD
MAIN O-P-D BLOCK
GROUND FLOOR PLAN
STAFF
SCHEDULE OF AREA
GROUND FLOOR AREA = 8264 Sft
TOTAL COVERED AREA = 8264 Sft
SCHEDULE OF OPENING
Type | Size | Description
M-D | 7'-0"X10'-0" | GLASS- Door
D1 | 4'-0"X6'-6" | ALUM- Door
D2 | 2'-6"X6'-6" | ...
D3 | 2'-6"X6'-6" | ...
W2 | 6'-0"X5'-0" | Alum- Window
V | 2'-6"X2'-0" | Alum- Frame
TITLE:
MAIN O-P-D BLOCK
GROUND FLOOR PLAN
CLEAR HEIGHT OF VARANDAH =10'-0
CLEAR HEIGHT OF BUILDING =10'-0
WALLS FINISHING: STONE WALLS, PLASTERED WITH EXTERMER PAINT IN GOOD CONDITION
FLOOR FINISHING: 2'X2' TILES INSTALLED ON FLOOR WITH GOOD CONDITIONS
CEILING FINISHING
REVAMPING SCOPE OF WORK
PROJECT MANAGEMENT & IMPLEMENTATION UNIT
COMMUNICATION & WORKS DEPARTMENT MEGA PROJECT 1 PESHAWAR
DHQ HOSPITAL MIRANSHAH,
NORTH WAZIRISTAN
MAIN O-P-D BLOCK
GROUND FLOOR PLAN
NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LTD. PESHAWAR
DESIGN
DRAWN
FILE
CHD
QUEN
RECOMMENDED
VERIFIED
APPROVED
DATE
DRAWING NO.
43.161/0.21/ABIASH/01B06

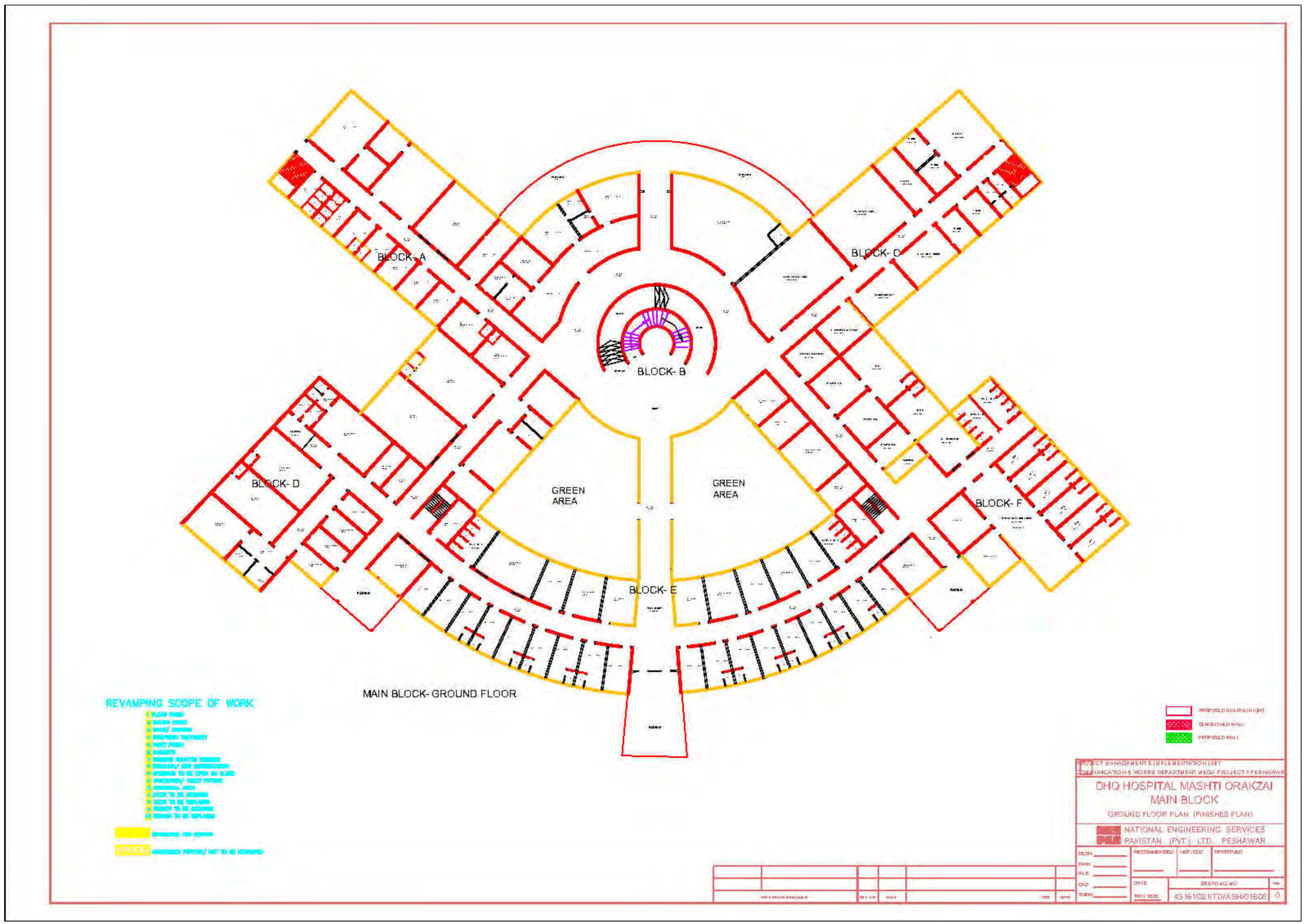

DHQ HOSPITAL WANA
DOCTER HOUSE
STAFF QUARTERS
CLASS-4 QUARTERS
DOCTER BANGLOWS
OLD EMERGENCY
LAB
OPD
GENERAL PARKING
EMERGENCY
ADMIN BLOCK
MOSQUE
REST HOUSE
MS HOUSE
BOUNDRY LINE
ROAD
FOOTPATH
BUILDING
BUILDING WITHIN
LEGEND
BUILDINGS IN SCOPE
NOT IN SCOPE
CONCRETE PAVERS
CP
CHEQUERED TILES
CC
ASPHALT ROAD
AR
GREEN AREA
GREEN
PROJECT MANAGEMENT & IMPLEMENTATION UNIT
COMMUNICATION & WORKS DEPARTMENT MEGA PROJECT-1 PESHAWAR
DHQ WANA PLANS
TOPO AND AS BUILT DRAWINGS
MASTER PLAN
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. PESHAWAR
DESIGN
DRAWN
TRACE
CHKD
CHECKED
RECOMMENDED
VERIFIED
APPROVED
DATE
DRAWING NO
d3161/92 I/AB/ASH/01B3
TOPO AND AS BUILT DRAWINGS

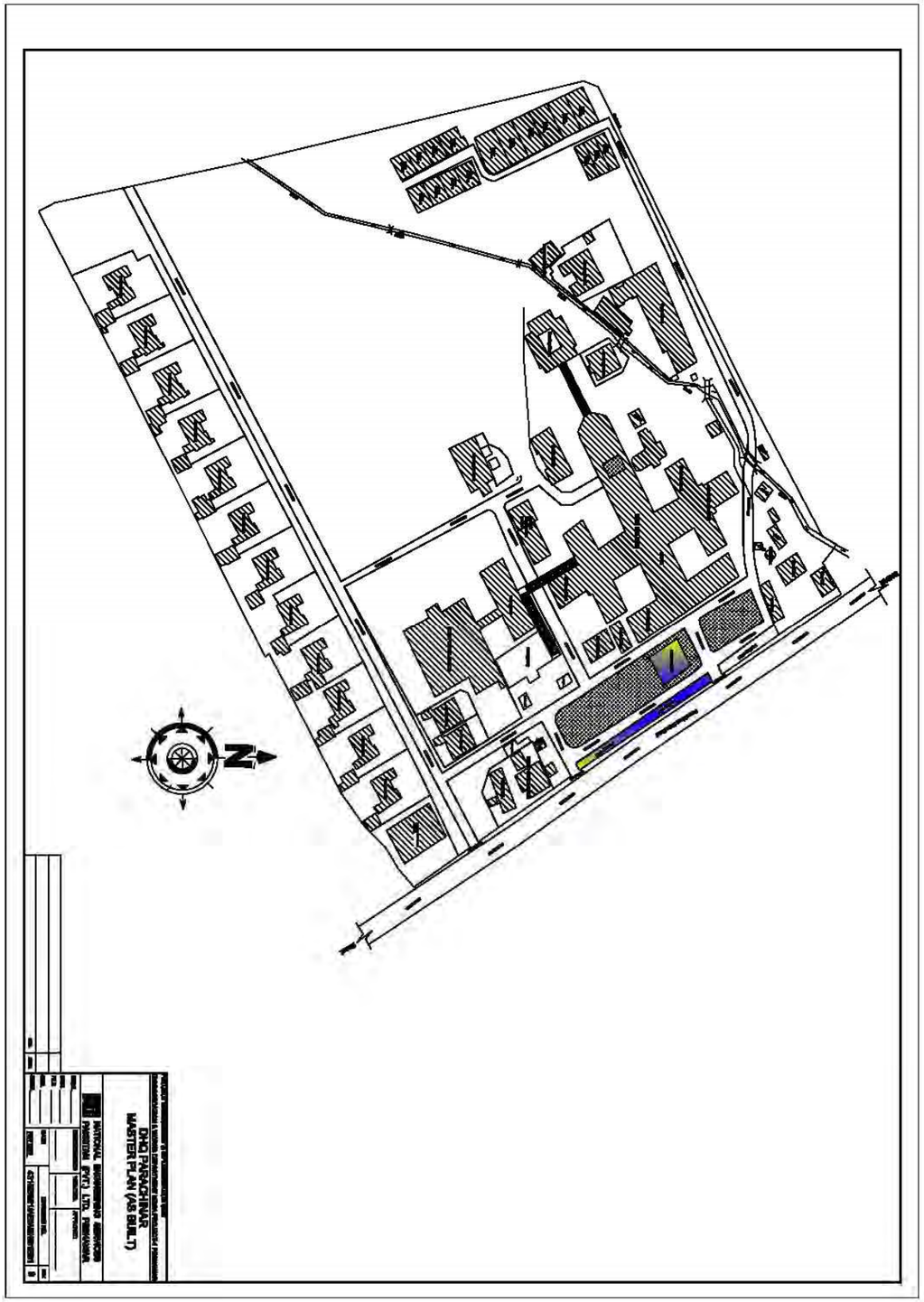

WR
CMO room
Female OBSERVATION
WR
WR
CRP room
CMO room
Staff room
WR
WR
WR
Male observation
Female observation
Male waiting
Female waiting
Male trauma
Female trauma
Minor OT
PROJECT MANAGEMENT & IMPLEMENTATION UNIT
COMMUNICATION & WORKS DEPARTMENT MEGA PROJECT-1 PESHAWAR
DHQ WANA PLANS
EMERGENCY
GROUND FLOOR PLAN
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. PESHAWAR
DESIGN
DRAWN
CHECK
TRACED
RECOMMENDED
VERIFIED
APPROVED
DATE
DRAWING NO.
4316/902-1/AB/ASH/01B3
0


REVAMPING SCOPE OF WORK
OUTSOURCE FOR REWMP
REMARKED PORTION NOT TO BE REWARKED
PROJECT MANAGEMENT & IMPLEMENTATION UNIT
COMMUNICATION & WORKS DEPARTMENT MEGA PROJECT-1 PESHAWAR
DHQ WANA PLANS
EMERGENCY
GROUND FLOOR PLAN
NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LTD. PESHAWAR

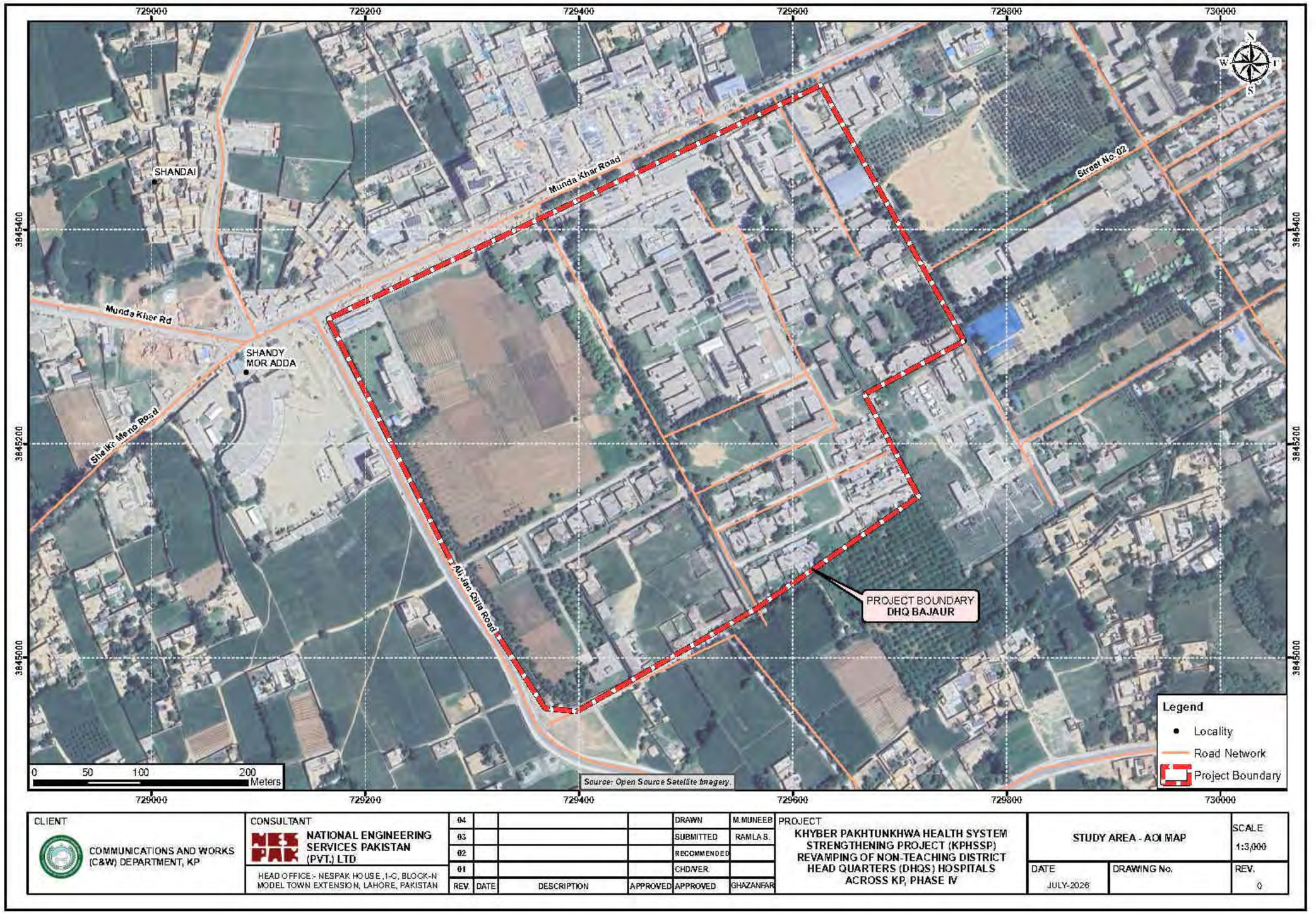

N
MAIN ROAD
MAIN ROAD
MAIN ROAD
HOSPITAL MAIN BUILDING
LEGEND
BUILDINGS IN SCOPE
NOT IN SCOPE
CONCRETE PAVERS
CHEQUERED TILES
ASPHALT ROAD
GREEN AREA
DAMAGE BUILDING
REFER VOLUME 3B FOR LEGENDS OF SIGNAGES
PROJECT MANAGEMENT & IMPLEMENTATION UNIT
DHQ HOSPITAL MASHTI ORAKZAI
EXTERNAL SIGNAGE PLAN
NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LTD. PESHAWAR
RECOMMENDED
VERIFIED
APPROVED
DATE
DRAWING NO.
43181/021/TD/ASH/00802
0


BLOCK- A
BLOCK- B
BLOCK- C
BLOCK- D
GREEN AREA
GREEN AREA
BLOCK- E
BLOCK- F
MAIN BLOCK- GROUND FLOOR
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
4) FURNITURE ITEMS ARE SHOWN ONLY TO FACILITATE OTHER DISCIPLINES FOR PROVIDING SERVICES. NO FURNITURE ITEM IS PART OF BOQ EXCEPT RECEPTION DESKS.
DHQ HOSPITAL MASHTI ORAKZAI
MAIN BLOCK
GROUND FLOOR PLAN (FURNITURE LAYOUT)
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. PESHAWAR
43161/021/TD/ASH/01601


BLOCK- A
BLOCK- C
BLOCK- B
BLOCK- D
GREEN AREA
GREEN AREA
BLOCK- F
BLOCK- E
MAIN BLOCK- GROUND FLOOR
REVAMPING SCOPE OF WORK
DHQ HOSPITAL MASHTI ORAKZAI
MAIN BLOCK
GROUND FLOOR PLAN (FINISHES PLAN)
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. PESHAWAR


N
DHQ PARACHINAR
MASTER PLAN (AS BUILT)

ANNEXURE-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	PROJECT: KHYBER PAKHTUNKHWA HEALTH SYSTEM STRENGTHENING PROJECT (KPHSSP) REVAMPING OF NON-TEACHING DISTRICT HEAD QUARTERS (DHQS) HOSPITALS ACROSS KP, PHASE IV
		03			SUBMITTED	RAMLA S.	
		02			RECOMMENDED		
		01			CHD/VER.		
		REV.	DATE	DESCRIPTION	APPROVED	APPROVED GHAZANFAR	

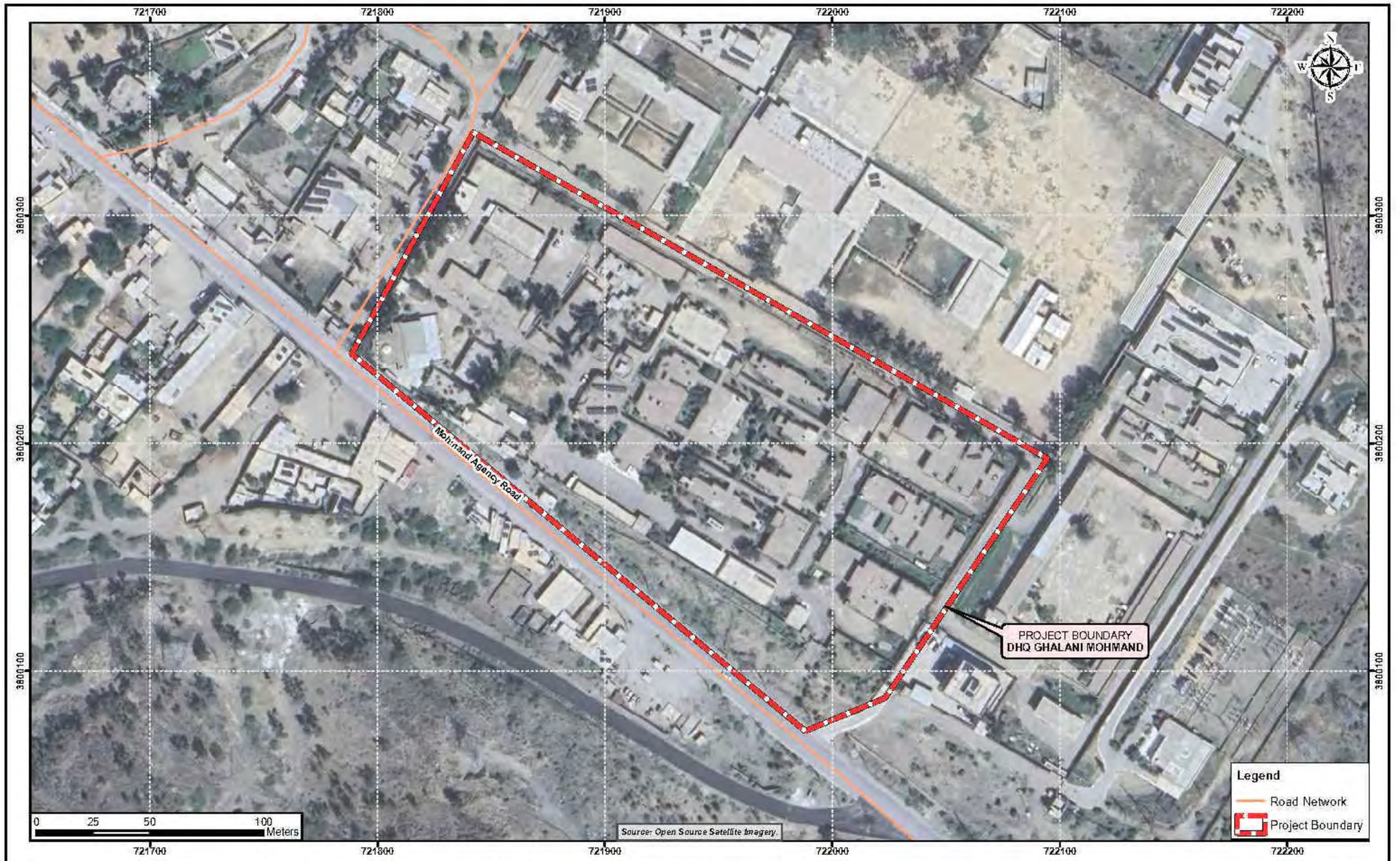
STUDY AREA - AOI MAP		SCALE: 1:3,000
DATE: JULY-2026	DRAWING No.	REV.: 0



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 IV	STUDY AREA - AOI MAP	SCALE 1:2,500
		03				SUBMITTED	RAMLA S.			
		02				RECOMMENDED				
		01				CHD/VER.			DATE JULY-2026 / DRAWING No.	REV. 0
		REV.	DATE	DESCRIPTION	APPROVED	APPROVED	GHAZANFAR			



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 IV	STUDY AREA - AOI MAP	SCALE 1:2,000
		03			SUBMITTED	RAMLA S.				
		02			RECOMMENDED					
		01			CHD/VER.			DATE JULY-2026	DRAWING No.	REV. 0
		REV.	DATE	DESCRIPTION	APPROVED	APPROVED	GHAZANFAR			



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 IV	STUDY AREA - AOI MAP	SCALE 1:1,500
		03				SUBMITTED	RAMLA S.			
		02				RECOMMENDED				
		01				CHD/VER.			DATE: JULY-2026	DRAWING No.
		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 IV
		03			SUBMITTED	RAMLA S.	
		02			RECOMMENDED		
		01			CHD/VER.		
		REV.	DATE	DESCRIPTION	APPROVED	APPROVED	GHAZANFAR

STUDY AREA - AOI MAP		SCALE: 1:2,000
DATE: JULY-2026	DRAWING No.	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 IV	STUDY AREA - AOI MAP	SCALE 1:5,000
		03				SUBMITTED	RAMLA S.			
		02				RECOMMENDED				
		01				CHD/VER.			DATE: JULY-2026	DRAWING No.
		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 IV
		03			SUBMITTED	RAMLA S.	
		02			RECOMMENDED		
		01			CHD/VER.		
		REV.	DATE	DESCRIPTION	APPROVED	APPROVED	GHAZANFAR

STUDY AREA - AOI MAP		SCALE: 1:2,500
DATE: JULY-2026	DRAWING No.	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/2026-664/AA

Issue date: 08-Jun-26

Name of Client:	NESPAK JV TES
Project Name:	Phase-IV: 210287-Revamping of Secondary Health Facilities Including Improvement of Accident And Emergency Units In Newly Merged Districts (AIP)
Sampling Location:	DHQ Hospital Khar, Bajour
Coordinates:	34.725063°N 71.50653°E
Name of Sampling Person:	Hameed Ullah
Nature of Monitoring:	Ambient Air
Monitoring By:	Pak Green Laboratories
Monitoring Instrument:	AQMS
Monitoring Duration:	24 hours
Monitoring Date:	19-Apr-26 to 20-Apr-26

Results:

Sr. No.	Time	CO	NO	NO_2	SO_2	O_3	PM_{10}	$PM_{2.5}$	SPM	Lead (Pb)
		mg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m3
1.	9:00 AM	1.45	9.80	27.50	39.04					
2.	10:00 AM	1.47	11.96	31.72	38.33					
3.	11:00 AM	1.50	12.86	32.52	39.32					
4.	12:00 PM	1.52	9.03	25.51	42.28					
5.	1:00 PM	1.55	10.94	27.62	33.34					
6.	2:00 PM	1.65	15.10	32.49	36.56					
7.	3:00 PM	1.67	20.26	30.69	37.12					
8.	4:00 PM	1.61	14.14	23.28	35.96					
9.	5:00 PM	2.50	11.42	27.97	46.82					
10.	6:00 PM	1.25	9.18	29.68	39.90					
11.	7:00 PM	1.18	7.17	33.74	42.46					
12.	8:00 PM	1.16	11.20	34.15	37.70					
13.	9:00 PM	1.13	10.62	36.21	35.55	65.7	148.2	46.9*	451.3	0.01
14.	10:00 PM	1.29	10.02	34.78	41.09					
15.	11:00 PM	2.19	9.31	26.77	36.45					
16.	12:00 AM	2.43	8.47	28.64	43.62					
17.	1:00 AM	1.27	13.49	32.42	34.02					
18.	2:00 AM	1.40	11.26	31.71	34.19					
19.	3:00 AM	1.85	14.41	31.24	32.67					
20.	4:00 AM	1.58	14.60	30.74	33.71					
21.	5:00 AM	2.53	14.04	34.82	36.64					
22.	6:00 AM	2.04	14.99	28.28	35.31					
23.	7:00 AM	1.15	12.51	22.17	40.38					
24.	8:00 AM	1.14	12.22	24.26	44.28					
Average (24 Hours)		1.60	12.04	29.95	38.20					
NEQS		5 8hours	40 24hours	80 24hours	120 24hours	130 1 hour	150 24hours	35 24hours	500 24hours	1.5 24 hours

End of Report

Ref. #: KPGL/LAB/2026-664/AA

Issue date: 08-Jun-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

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/2026-665/NL
Issue date: 08-Jun-26

Name of Client:	NESPAK JV TES
Project Name:	Phase-IV: 210287-Revamping of Secondary Health Facilities Including Improvement of Accident And Emergency Units In Newly Merged Districts (AIP)
Nature of Monitoring:	Noise Level (24 Hours)
Sampling Location:	DHQ Hospital Khar, Bajour
Monitoring By:	Pak Green Laboratories
Coordinates:	34.725063°N 71.50653°E
Name of Sampling Person:	Hameed Ullah
Monitoring Time:	Real Time
Monitoring Instrument:	Smart Sensor
Monitoring Date:	19-Apr-26 to 20-Apr-26

Results:

Sr. No.	Day Time	Equivalent Noise dB (A)
1.	6:00 – 7:00 AM	48.9
2.	7:00 -8:00 AM	49.7
3.	8:00- 9:00 AM	50.0
4.	9:00- 10:00 AM	51.2
5.	10:00 -11:00 AM	51.7
6.	11:00- 12:00 AM	57.3
7.	12:00 -1:00 PM	56.4
8.	1:00- 2:00 PM	57.9
9.	2:00- 3:00 PM	54.8
10.	3:00 4:00 PM	57.4
11.	4:00 5:00 PM	53.6
12.	5:00 6:00 PM	50.9
13.	6:00 7:00 PM	48.6
14.	7:00 8:00 PM	53.3
15.	8:00 9:00 PM	50.0
16.	9:00 10:00 PM	46.7
	Average	52.5

Sr. No.	Night Time	Equivalent Noise dB (A)
17.	10:00 PM - 11:00 PM	48.7
18.	11:00 -12:00 AM	53.4
19.	12:00 -1:00 AM	54.9
20.	1:00 -2:00 AM	47.0
21.	2:00 -3:00 AM	46.2
22.	3:00 -4:00 AM	42.1
23.	4:00- 5:00 AM	44.5
24.	5:00-6:00 AM	48.7
	Average	48.1

End of Report

Pak Green Enviro-Engineering (Pvt) Ltd. Peshawar Pakistan

Ref. #: KPGL/LAB/2026-665/NL

Issue date: 08-Jun-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

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

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/2026-666/DW

Issue date: 08-Jun-26

Name of Client:	NESPAK JV TES
Executing Agency:	C&W Department, Govt. of Khyber Pakhtunkhwa
Project Name:	Phase-IV: 210287-Revamping Of Secondary Health Facilities Including Improvement Of Accident And Emergency Units In Newly Merged Districts (AIP)

Sample Description:

Nature of sample:	Drinking water	
Sampling By:	Pak Green Laboratories	
Sampling Location:	DHQ Hospital Khar, Bajaur	
Coordinates:	34.723637°N 71.50759°E	
Sample Source:	Turbine	
Sample Code:	K-DW-195	
Date of sampling:	19-Apr-26	
Sample Receiving Date:	19-Apr-26	
Testing Facility:	Pak Green Laboratories	
Date of Completion of Analysis:	19-Apr-26 to 19-May-26	
Env. Conditions during Analysis:	Temp=22.0-24.6°C	RH=53.4-59.4%

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 In-charge
	Muhammad Raza Ullah	Mian [illegible]

Pak Green Enviro-Engineering (Pvt.) Ltd. Peshawar Pakistan

Ref #: KPGL/LAB/2026-666/DW

Issue date: 08-Jun-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	8.215 at 23.4°C	APHA-4500-H^+ B
5.	Taste	-	Non-Objectionable	-	Non-Objectionable	APHA-2160 C
6.	Color	TCU	≤ 15	0.0001	0.000	APHA-2120 C
7.	Odor	-	Non-Objectionable	-	Non-Objectionable	APHA-2150 B
8.	Turbidity	NTU	<5	0.01	0.30	APHA-2130 B
9.	Total dissolved Solids (TDS) ^	mg/L	< 1000	10	270	APHA-2540 C

Chemical Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
10.	Total Hardness ^	mg/L	<500	0.1	180	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	10	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	0.2	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	0.0200	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

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/2026-666/DW **Issue date:** 08-Jun-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 **With ^PNAC Accredited**
BDL: Below Detection Limits **LDL: Lowest Detection limit**

Green Enviro-Engineering (Pvt) Ltd. Peshawar Pakistan

info@pakgreen.pk www.pakgreen.pk

TEST REPORT

Ref #: KPGL/LAB/2026-667/WW

Issue date: 08-Jun-26

Name of Client:	NESPAK JV TES
Executing Agency:	C&W Department, Govt. of Khyber Pakhtunkhwa
Project Name:	Phase-IV: 210287-Revamping of Secondary Health Facilities Including Improvement of Accident and Emergency Units in Newly Merged Districts (AIP)

Sample Description:

Nature of sample:	Waste water	
Sampling By:	Pak Green Laboratories	
Sampling Location:	DHQ Hospital Khar, Bajaur	
Coordinates:	34.72648° N 71.50878° E	
Sample source:	Final Drain	
Sample Code:	K-WW-196	
Date of sampling:	19-Apr-26	
Sample Receiving Date:	19-Apr-26	
Testing Facility:	Pak Green Laboratories	
Date of Completion of Analysis:	19-Apr-26 to 19-May-26	
Env. Conditions during Analysis:	Temp=22.0-24.6°C	RH=53.4-59.4%

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 In-Charge
	Muhammad Raza Ullah	Mian Mukhtar Ahmad

Ref #: KPGL/LAB/2026-667/WW

Issue date: 08-Jan-26

Physical Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
1.	Temperature	°C	-	0.1	22.9	APHA-2550 B
2.	pH^	-	6-9	0.001	6.969 at 23.9°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	20	APHA-5210 D
4.	Chemical Oxygen Demand (COD) ^	mg/L	150	0.4	32	APHA-5220 B
5.	Total Suspended Solids (TSS) ^	mg/L	200	1	12	APHA-2540 D
6.	Total Dissolved Solids (TDS) ^	mg/L	3500	10	350	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	20	APHA-4500-Cl^- B
10.	Fluoride (F^-)	mg/L	10	0.1	0.6	APHA-4500-F-D
11.	An Ionic detergent as MBAs	mg/L	20	0.001	0.025	APHA 5540 C
12.	Sulphate (SO_4^{2-}) ^	mg/L	600	1	20	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	2.5	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	0.1376	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	0.0105	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	0.1806	APHA-3111 B
27.	Manganese (Mn)^	mg/L	1.5	0.0010	0.0618	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	0.1376	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/2026-667/WW

Issue date: 08-Jun-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	35.1	APHA-9221 D
35.	*Fecal Coliform*	-	-	Nil	Nil	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. Page 3

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/2026-660/AA

Issue date: 03-Apr-26

Name of Client:	NESPAK JV TES
Project Name:	Phase-IV: 210287-Revamping Of Secondary Health Facilities Including Improvement Of Accident And Emergency Units In Newly Merged Districts (AIP)
Sampling Location:	DHQ Hospital Ghallanai, Mohmand
Coordinates:	34.318905°N 71.412315°E
Name of Sampling Person:	Farman Ullah
Nature of Monitoring:	Ambient Air
Monitoring By:	Pak Green Laboratories
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}	$PM_{2.5}$	SPM	Lead (Pb)
		mg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m3
1.	9:00 AM	1.33	9.50	30.10	41.04					
2.	10:00 AM	1.35	11.66	34.32	40.33					
3.	11:00 AM	1.38	12.56	35.12	41.32					
4.	12:00 PM	1.40	8.73	28.11	44.28					
5.	1:00 PM	1.43	10.64	30.22	35.34					
6.	2:00 PM	1.53	14.80	35.09	38.56					
7.	3:00 PM	1.55	19.96	33.29	39.12					
8.	4:00 PM	1.49	13.84	25.88	37.96					
9.	5:00 PM	2.38	11.12	30.57	48.82					
10.	6:00 PM	1.13	8.88	32.28	41.90					
11.	7:00 PM	1.06	6.87	36.34	44.46					
12.	8:00 PM	1.04	10.90	36.75	39.70					
13.	9:00 PM	1.01	10.32	38.81	37.35	62.5	146.3	29.8	435.4	0.01
14.	10:00 PM	1.17	9.72	37.38	43.09					
15.	11:00 PM	2.07	9.01	29.37	38.45					
16.	12:00 AM	2.31	8.17	31.24	45.62					
17.	1:00 AM	1.15	13.19	35.02	36.02					
18.	2:00 AM	1.28	10.96	34.31	36.19					
19.	3:00 AM	1.73	14.11	33.84	34.67					
20.	4:00 AM	1.46	14.30	33.34	35.71					
21.	5:00 AM	2.41	13.74	37.42	38.64					
22.	6:00 AM	1.92	14.69	30.88	32.71					
23.	7:00 AM	1.03	12.21	24.77	42.38					
24.	8:00 AM	1.02	11.92	26.86	46.28					
Average (24 Hours)		1.48	11.74	32.55	40.20					
NEQS		5 8hours	40 24hours	80 24hours	120 24hours	130 1 hour	150 24hours	35 24hours	500 24hours	1.5 24 hours

End of Report

info@pakgreen.pk www.pakgreen.pk

Ref. #: KPGL/LAB/2026-660/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.
(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/2026-661/NL

Issue date: 03-Apr-26

Name of Client:	NESPAK JV TES
Project Name:	Phase-IV: 210287-Revamping of Secondary Health Facilities Including Improvement of Accident And Emergency Units In Newly Merged Districts (AIP)
Nature of Monitoring:	Noise Level (24 Hours)
Sampling Location:	DHQ Hospital Ghallanai, Mohmand
Monitoring By:	Pak Green Laboratories
Coordinates:	34.318905°N 71.412315°E
Name of Sampling Person:	Farman Ullah
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	55.8
2.	7:00 -8:00 AM	56.6
3.	8:00- 9:00 AM	56.9
4.	9:00- 10:00 AM	58.1
5.	10:00 -11:00 AM	58.6
6.	11:00- 12:00 AM	64.2
7.	12:00 -1:00 PM	63.3
8.	1:00- 2:00 PM	64.8
9.	2:00- 3:00 PM	61.7
10.	3:00 4:00 PM	64.3
11.	4:00 5:00 PM	60.5
12.	5:00 6:00 PM	57.8
13.	6:00 7:00 PM	55.5
14.	7:00 8:00 PM	60.2
15.	8:00 9:00 PM	56.9
16.	9:00 10:00 PM	53.6
	Average	59.4

Sr. No.	Night Time	Equivalent Noise dB (A)
17.	10:00 PM - 11:00 PM	50.8
18.	11:00 -12:00 AM	55.5
19.	12:00 -1:00 AM	57.0
20.	1:00 -2:00 AM	49.1
21.	2:00 -3:00 AM	48.3
22.	3:00 -4:00 AM	44.2
23.	4:00- 5:00 AM	46.6
24.	5:00-6:00 AM	50.8
	Average	50.2

End of Report

Ref. #: KPGL/LAB/2026-661/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

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

Peshawar Pakistan

	Rev. #01	Rev date: 16-06-25

TEST REPORT

Ref #: KPGL/LAB/2026-662/DW

Issue date: 03-Apr-26

Name of Client:	NESPAK JV TES
Executing Agency:	C&W Department, Govt. of Khyber Pakhtunkhwa
Project Name:	Phase-IV: 210287-Revamping Of Secondary Health Facilities Including Improvement Of Accident And Emergency Units In Newly Merged Districts (AIP)

Sample Description:

Nature of sample:	Drinking water	
Sampling By:	Pak Green Laboratories	
Sampling Location:	DHQ Hospital Ghillanai, Mohammad	
Coordinates:	34.319534°N 71.41167°E	
Sample Source:	Tap Water	
Sample Code:	K-DW-082	
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.

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 Dilawar Ahmed

Pak Green Enviro-Engineering (Pvt.) Ltd. Peshawar Pakistan

Rev. 803 | Rev. Date: 16-Dec-25

Ref #: KPGL/LAB/2026-662/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	7.081 at 23.4°C	APHA-4500-H^+ B
5.	Taste	-	Non-Objectionable	-	Non-Objectionable	APHA-2160 C
6.	Color	TCU	≤ 15	0.0001	0.000	APHA-2120 C
7.	Odor	-	Non-Objectionable	-	Non-Objectionable	APHA-2150 B
8.	Turbidity	NTU	≤5	0.01	0.34	APHA-2130 B
9.	Total dissolved Solids (TDS) ^	mg/L	< 1000	10	390	APHA-2540 C

Chemical Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
10.	Total Hardness ^	mg/L	<500	0.1	265	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	15	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	0.0289	APHA-3111 B
20.	Fluoride (F)	mg/L	≤ 1.5	0.1	0.4	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

Rev.#01 | Rev. date: 16-06-25

Ref #: KPGL/LAB/2026-662/DW

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	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	0.0067	APHA-3111 B
30.	Phenolic Compound (As Phenol)	mg/L	-	0.0005	BDL	APHA-5530 D
31.	Iron (Fe)^	mg/L	-	0.0010	0.2856	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/2026-663/WW

Issue date: 03-Apr-26

Name of Client:	NESPAK JV TES
Executing Agency:	C&W Department, Govt. of Khyber Pakhtunkhwa
Project Name:	Phase-IV: 210287-Revamping of Secondary Health Facilities Including Improvement of Accident and Emergency Units in Newly Merged Districts (AIP)

Sample Description:

Nature of sample:	Waste water	
Sampling By:	Pak Green Laboratories	
Sampling Location:	DHQ Hospital Ghallanai, Mohammad	
Coordinates:	34.319687° N 71.4113° E	
Sample source:	Final Drain	
Sample Code:	K-WW-081	
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

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 Zulfiqar Ahmed

Pak Enviro-Engineering (Pvt) Ltd. Peshawar Pakistan

Ref #: KPGL/LAB/2026-663/WW

Issue date: 03-Apr-26

Physical Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
1.	Temperature	°C	-	0.1	22.6	APHA-2550 B
2.	pH^	-	6-9	0.001	7.420 at 23.6°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	1724*	APHA-5210 D
4.	Chemical Oxygen Demand (COD) ^	mg/L	150	0.4	2785*	APHA-5220 B
5.	Total Suspended Solids (TSS) ^	mg/L	200	1	1550*	APHA-2540 D
6.	Total Dissolved Solids (TDS) ^	mg/L	3500	10	740	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	50	APHA-4500-Cl^- B
10.	Fluoride (F^-)	mg/L	10	0.1	0.6	APHA-4500-F-D
11.	An Ionic detergent as MBAs	mg/L	20	0.001	0.488	APHA 5540 C
12.	Sulphate (SO_4^{2-}) ^	mg/L	600	1	BDL	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	78.8*	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	0.2170	APHA-3111 B
17.	Copper (Cu)^	mg/L	1.0	0.0001	0.3442	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	0.0333	APHA-3111 B
23.	Zinc (Zn)^	mg/L	5.0	0.0001	0.5949	APHA-3111 B
24.	Arsenic (As)	mg/L	1.0	0.0001	1.8544	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	BDL	APHA-3111 B
27.	Manganese (Mn)^	mg/L	1.5	0.0010	115.8740*	APHA-3111 B
28.	Boron (B)	mg/L	6.0	0.0001	1.7822*	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	0.5849	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

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

Rev.#01 | Rev date: 16-06-25

Ref #: KPGL/LAB/2026-663/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	121.2	APHA-9221 D
35.	*Fecal Coliform*	-	-	Nil	39.8	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
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/2026-668/AA

Issue date: 08-Jun-26

Name of Client: NESPAK JV TES
Project Name: Phase-IV: 210287-Revamping of Secondary Health Facilities Including Improvement of Accident And Emergency Units In Newly Merged Districts (AIP)
Sampling Location: DHQ Hospital Landi Kotal
Coordinates: 34.092469°N 71.145211°E
Name of Sampling Person: Hameed Ullah
Nature of Monitoring: Ambient Air
Monitoring By: Pak Green Laboratories
Monitoring Instrument: AQMS
Monitoring Duration: 24 hours
Monitoring Date: 21-Apr-26 to 22-Apr-26

Results:

Sr. No.	Time	CO	NO	NO_2	SO_2	O_3	PM_{10}	$PM_{2.5}$	SPM	Lead (Pb)
		mg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m3
1.	9:00 AM	1.10	11.94	28.80	41.87					
2.	10:00 AM	1.12	14.10	33.02	41.16					
3.	11:00 AM	1.15	15.00	33.82	42.15					
4.	12:00 PM	1.17	11.17	26.81	45.11					
5.	1:00 PM	1.20	13.08	28.92	36.17					
6.	2:00 PM	1.30	17.24	33.79	39.39					
7.	3:00 PM	1.32	22.40	31.99	39.95					
8.	4:00 PM	1.26	16.28	24.58	38.79					
9.	5:00 PM	2.15	13.56	29.27	49.65					
10.	6:00 PM	0.90	11.32	30.98	42.73					
11.	7:00 PM	0.83	9.31	35.04	43.29					
12.	8:00 PM	0.81	13.34	35.45	40.53					
13.	9:00 PM	0.78	12.76	37.51	38.38	63.8	125.1	28.7	413.6	0.01
14.	10:00 PM	0.94	12.16	36.08	43.92					
15.	11:00 PM	1.84	11.45	28.07	39.28					
16.	12:00 AM	2.08	10.61	29.94	46.45					
17.	1:00 AM	0.92	15.63	33.72	36.85					
18.	2:00 AM	1.05	13.40	33.01	37.02					
19.	3:00 AM	1.50	16.55	32.54	35.50					
20.	4:00 AM	1.23	16.74	32.04	36.54					
21.	5:00 AM	2.18	16.18	36.12	39.47					
22.	6:00 AM	1.69	17.13	29.58	38.14					
23.	7:00 AM	0.80	14.65	23.47	43.21					
24.	8:00 AM	0.79	14.36	25.56	47.11					
Average (24 Hours)		1.25	14.18	31.25	41.03					
NEQS		5 8hours	40 24hours	80 24hours	120 24hours	130 1 hour	150 24hours	35 24hours	500 24hours	1.5 24 hours

End of Report

Ref. #: KPGL/LAB/2026-668/AA

Issue date: 08-Jun-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.
(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/2026-669/NL
Issue date: 08-Jun-26

Name of Client:	NESPAK JV TES
Project Name:	Phase-IV: 210287-Revamping of Secondary Health Facilities Including Improvement of Accident And Emergency Units In Newly Merged Districts (AIP)
Nature of Monitoring:	Noise Level (24 Hours)
Sampling Location:	DHQ Hospital Landi Kotal
Monitoring By:	Pak Green Laboratories
Coordinates:	34.092475°N 71.145088°E
Name of Sampling Person:	Hameed Ullah
Monitoring Time:	Real Time
Monitoring Instrument:	Smart Sensor
Monitoring Date:	21-Apr-26 to 22-Apr-26

Results:

Sr. No.	Day Time	Equivalent Noise dB (A)
1.	6:00 – 7:00 AM	45.1
2.	7:00 -8:00 AM	45.9
3.	8:00- 9:00 AM	46.2
4.	9:00- 10:00 AM	47.4
5.	10:00 -11:00 AM	47.9
6.	11:00- 12:00 AM	53.5
7.	12:00 -1:00 PM	52.6
8.	1:00- 2:00 PM	54.1
9.	2:00- 3:00 PM	51.0
10.	3:00 4:00 PM	53.6
11.	4:00 5:00 PM	49.8
12.	5:00 6:00 PM	47.1
13.	6:00 7:00 PM	44.8
14.	7:00 8:00 PM	49.5
15.	8:00 9:00 PM	46.2
16.	9:00 10:00 PM	42.9
	Average	48.7

Sr. No.	Night Time	Equivalent Noise dB (A)
17.	10:00 PM - 11:00 PM	45.1
18.	11:00 -12:00 AM	49.8
19.	12:00 -1:00 AM	51.3
20.	1:00 -2:00 AM	43.4
21.	2:00 -3:00 AM	42.6
22.	3:00 -4:00 AM	38.5
23.	4:00- 5:00 AM	40.9
24.	5:00-6:00 AM	45.1
	Average	44.5

End of Report

Ref. #: KPGL/LAB/2026-669/NL

Issue date: 08-Jun-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

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/2026-670/DW

Issue date: 08-Jun-26

Name of Client:	NESPAK JV TES
Executing Agency:	C&W Department, Govt. of Khyber Pakhtunkhwa
Project Name:	Phase-IV: 210287-Revamping Of Secondary Health Facilities Including Improvement Of Accident And Emergency Units In Newly Merged Districts (All")

Sample Description:

Nature of sample:	Drinking water	
Sampling By:	Pak Green Laboratories	
Sampling Location:	DHQ Hospital Landi Kotal	
Coordinates:	34.092661°N 71.145381°E	
Sample Source:	Turbine	
Sample Code:	K-DW-197	
Date of sampling:	21-Apr-26	
Sample Receiving Date:	21-Apr-26	
Testing Facility:	Pak Green Laboratories	
Date of Completion of Analysis:	21-Apr-26 to 19-May-26	
Env. Conditions during Analysis:	Temp=22.0-24.6°C	RH=53.4-59.4%

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 [illegible] Ahmad

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/2026-670/DW

Issue date: 08-Jun-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	7.890 at 23.9°C	APHA-4500-H^+ B
5.	Taste	-	Non-Objectionable	-	Non-Objectionable	APHA-2160 C
6.	Color	TCU	≤ 15	0.0001	0.000	APHA-2120 C
7.	Odor	-	Non-Objectionable	-	Non-Objectionable	APHA-2150 B
8.	Turbidity	NTU	<5	0.01	0.42	APHA-2130 B
9.	Total dissolved Solids (TDS) ^	mg/L	< 1000	10	505	APHA-2540 C

Chemical Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
10.	Total Hardness ^	mg/L	<500	0.1	300	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	45	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	0.5	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	0.0087	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

info@pakgreen.pk www.pakgreen.pk

Ref #: KPGL/LAB/2026-670/DW **Issue date:** 08-Jun-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	0.0456	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
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/2026-671/WW

Issue date: 08-Jun-26

Name of Client:	NESPAK JV TES
Executing Agency:	C&W Department, Govt. of Khyber Pakhtunkhwa
Project Name:	Phase-IV: 210287-Revamping of Secondary Health Facilities Including Improvement of Accident and Emergency Units in Newly Merged Districts (AIP)

Sample Description:

Nature of sample:	Waste water	
Sampling By:	Pak Green Laboratories	
Sampling Location:	DHQ Hospital Landi Kotal	
Coordinates:	34.092034° N 71.146579° E	
Sample source:	Final Drain	
Sample Code:	K-WW-198	
Date of sampling:	21-Apr-26	
Sample Receiving Date:	21-Apr-26	
Testing Facility:	Pak Green Laboratories	
Date of Completion of Analysis:	21-Apr-26 to 19-May-26	
Env. Conditions during Analysis:	Temp=22.0-24.6°C	RH=53.4-59.4%

Summary of Test Result:

Remarks:
Parameters with * are not 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

info@pakgreen.pk www.pakgreen.pk

Ref #: KPGL/LAB/2026-671/WW

Issue date: 08-Jun-26

Physical Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
1.	Temperature	°C	-	0.1	23.2	APHA-2550 B
2.	pH^	-	6-9	0.001	6.913 at 23.9°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	378*	APHA-5210 D
4.	Chemical Oxygen Demand (COD) ^	mg/L	150	0.4	608*	APHA-5220 B
5.	Total Suspended Solids (TSS) ^	mg/L	200	1	300*	APHA-2540 D
6.	Total Dissolved Solids (TDS) ^	mg/L	3500	10	780	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	105	APHA-4500-Cl^- B
10.	Fluoride (F^-)	mg/L	10	0.1	1.0	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	85	APHA-4500-SO_4 C
13.	Sulphide (S^{2-})	mg/L	1.0	0.1	1.8*	APHA-4500-S^{2-} F
14.	Ammonia (NH_3) ^	mg/L	40	0.1	68.9*	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	0.1949	APHA-3111 B
17.	Copper (Cu)^	mg/L	1.0	0.0001	0.0708	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	0.4971	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	6.8709	APHA-3111 B
27.	Manganese (Mn)^	mg/L	1.5	0.0010	0.3804	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	0.2657	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/2026-671/WW

Issue date: 08-Jun-26

Biological Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
33.	*E. coli*	-	-	Nil	532.0	APHA-9221 F
34.	*Total Coli-form*	-	-	Nil	1819.3	APHA-9221 D
35.	*Fecal Coliform*	-	-	Nil	1282.6	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.
(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/2026-678/AA

Issue date: 08-Jun-26

Name of Client: NESPAK JV TES
Project Name: Phase-IV: 210287-Revamping of Secondary Health Facilities Including Improvement of Accident And Emergency Units in Newly Merged Districts (AIP)
Sampling Location: DHQ Hospital Mishti Mela, Orakzai
Nature of Monitoring: Ambient Air
Monitoring By: Pak Green Laboratories
Monitoring Instrument: AQMS
Monitoring Duration: 24 hours
Monitoring Date: 23-Apr-26 to 24-Apr-26

Results:

Sr. No.	Time	CO	NO	NO_2	SO_2	O_3	PM_{10}	$PM_{2.5}$	SPM	Lead (Pb)
		mg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m3
1.	9:00 AM	0.86	5.98	21.75	38.17					
2.	10:00 AM	0.88	5.19	21.35	44.35					
3.	11:00 AM	0.85	4.92	20.53	35.89					
4.	12:00 PM	0.82	10.73	21.95	31.38					
5.	1:00 PM	0.96	8.62	25.61	30.82					
6.	2:00 PM	0.99	7.83	23.38	29.69					
7.	3:00 PM	0.91	9.41	22.16	31.10					
8.	4:00 PM	0.93	11.00	21.14	30.25					
9.	5:00 PM	0.98	12.58	27.16	31.66					
10.	6:00 PM	0.90	10.07	21.95	29.41					
11.	7:00 PM	0.97	10.73	24.19	32.51					
12.	8:00 PM	1.02	13.90	26.62	30.53					
13.	9:00 PM	0.88	10.47	25.81	29.69	63.7	148.6	42.7*	436.5	0.01
14.	10:00 PM	0.81	11.52	24.19	32.23					
15.	11:00 PM	0.86	12.05	30.68	31.10					
16.	12:00 AM	0.93	14.69	28.25	31.94					
17.	1:00 AM	0.99	12.71	25.00	31.38					
18.	2:00 AM	0.94	14.43	26.62	29.12					
19.	3:00 AM	0.91	13.37	25.81	32.51					
20.	4:00 AM	1.01	13.11	24.39	30.25					
21.	5:00 AM	0.90	15.48	28.25	35.61					
22.	6:00 AM	0.87	14.43	26.62	34.20					
23.	7:00 AM	0.91	16.01	31.90	33.35					
24.	8:00 AM	0.96	15.35	26.22	32.23					
Average (24 Hours)		0.92	11.44	25.06	32.47					
NEQS		5 8hours	40 24hours	80 24hours	120 24hours	130 1 hour	150 24hours	35 24hours	500 24hours	1.5 24 hours

End of Report

Ref. #: KPGL/LAB/2026-678/AA

Issue date: 08-Jun-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

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/2026-679/NL
Issue date: 08-Jun-26

Name of Client: NESPAK JV TES
Project Name: Phase-IV: 210287-Revamping of Secondary Health Facilities Including Improvement of Accident And Emergency Units in Newly Merged Districts (AIP)

Nature of Monitoring: Noise Level (24 Hours)
Sampling Location: DHQ Hospital Mishti Mela, Orakzai
Monitoring By: Pak Green Laboratories
Monitoring Time: Real Time
Monitoring Instrument: Smart Sensor
Monitoring Date: 23-Apr-26 to 24-Apr-26

Results:

Sr. No.	Day Time	Equivalent Noise
		dB (A)
1.	6:00 – 7:00 AM	55.3
2.	7:00 -8:00 AM	58.5
3.	8:00- 9:00 AM	63.4
4.	9:00- 10:00 AM	66.1
5.	10:00 -11:00 AM	64.0
6.	11:00- 12:00 AM	63.8
7.	12:00 -1:00 PM	64.5
8.	1:00- 2:00 PM	67.4
9.	2:00- 3:00 PM	65.3
10.	3:00 4:00 PM	65.9
11.	4:00 5:00 PM	64.8
12.	5:00 6:00 PM	63.6
13.	6:00 7:00 PM	55.1
14.	7:00 8:00 PM	59.5
15.	8:00 9:00 PM	60.4
16.	9:00 10:00 PM	61.7
	Average	62.3

Sr. No.	Night Time	Equivalent Noise
		dB (A)
17.	10:00 PM - 11:00 PM	40.1
18.	11:00 -12:00 AM	54.8
19.	12:00 -1:00 AM	49.2
20.	1:00 -2:00 AM	46.5
21.	2:00 -3:00 AM	55.3
22.	3:00 -4:00 AM	56.1
23.	4:00- 5:00 AM	50.6
24.	5:00-6:00 AM	40.1
	Average	50.4

End of Report

info@pakgreen.pk www.pakgreen.pk

Ref. #: KPGL/LAB/2026-679/NL

Issue date: 08-Jun-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

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 In-charge

Pak Green Enviro-Engineering (Pvt.) Ltd. Peshawar Pakistan

Rev #01 | Rev. date: [illegible]

TEST REPORT

Ref #: KPGL/LAB/2026-680/DW

Issue date: 08-Jun-26

Name of Client:	NESPAK JV TES
Executing Agency:	C&W Department, Govt. of Khyber Pakhtunkhwa
Project Name:	Phase-IV: 210287-Revamping Of Secondary Health Facilities Including Improvement Of Accident And Emergency Units In Newly Merged Districts (AIP)

Sample Description:

Nature of sample:	Drinking water	
Sampling By:	Pak Green Laboratories	
Sampling Location:	DHQ Mishti Mela, Orakzai	
Coordinates:	33.738327°N 70.87104°E	
Sample Source:	Turbine	
Sample Code:	K-DW-201	
Date of sampling:	23-Apr-26	
Sample Receiving Date:	23-Apr-26	
Testing Facility:	Pak Green Laboratories	
Date of Completion of Analysis:	23-Apr-26 to 19-May-26	
Env. Conditions during Analysis:	Temp=22.0-24.6°C	RH=53.4-59.4%

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 In[illegible]
	Muhammad Raza Ullah	Mian Iftikhar Ahmed

Pak Green Enviro-Engineering (Pvt) Ltd. Peshawar Pakistan

EPA PNAC LAB 180 17025

Ref #: KPGL/LAB/2026-680/DW

Issue date: 08-Jun-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	7.496 at 23.9°C	APHA-4500-H^+ B
5.	Taste	-	Non-Objectionable	-	Non-Objectionable	APHA-2160 C
6.	Color	TCU	≤ 15	0.0001	0.000	APHA-2120 C
7.	Odor	-	Non-Objectionable	-	Non-Objectionable	APHA-2150 B
8.	Turbidity	NTU	<5	0.01	0.32	APHA-2130 B
9.	Total dissolved Solids (TDS) ^	mg/L	< 1000	10	332	APHA-2540 C

Chemical Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
10.	Total Hardness ^	mg/L	<500	0.1	250	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	05	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	0.3	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	0.0132	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

	Rev #01	Rev date: 16-06-25

Ref #: KPGL/LAB/2026-680/DW
Issue date: 08-Jun-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

Pak Green Enviro-Engineering (Pvt) Ltd. Peshawar Pakistan

Rev-001 | Rev-date: 16-08-25

TEST REPORT

Ref #: KPGL/LAB/2026-681/WW

Issue date: 08-Jun-26

Name of Client:	NESPAK JV TES
Executing Agency:	C&W Department, Govt. of Khyber Pakhtunkhwa
Project Name:	Phase-IV: 210287-Revamping of Secondary Health Facilities Including Improvement of Accident and Emergency Units in Newly Merged Districts (AIP)

Sample Description:

Nature of sample:	Waste water	
Sampling By:	Pak Green Laboratories	
Sampling Location:	DHQ Mishti Mela, Orakzai	
Coordinates:	33.738663° N 70.87185° E	
Sample source:	Final Drain	
Sample Code:	K-WW-202	
Date of sampling:	23-Apr-26	
Sample Receiving Date:	23-Apr-26	
Testing Facility:	Pak Green Laboratories	
Date of Completion of Analysis:	23-Apr-26 to 19-May-26	
Env. Conditions during Analysis:	Temp=22.0-24.6°C	RH=53.4-59.4%

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 In-Charge
	Muhammad Raza Ullah	Mian Dilawar Ahmed

Pak Green Enviro-Engineering (Pvt) Ltd. Peshawar, Pakistan

Ref #: KPGL/LAB/2026-681/WW

Issue date: 08-Jun-26

Physical Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
1.	Temperature	°C	-	0.1	23.0	APHA-2550 B
2.	pH^	-	6-9	0.001	7.476 at 23.0°C	APHA-4500-H+ B

Chemical Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
3.	Biological Oxygen Demand (BOD_3 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	15	APHA-2540 D
6.	Total Dissolved Solids (TDS) ^	mg/L	3500	10	320	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	05	APHA-4500-Cl^- B
10.	Fluoride (F^-)	mg/L	10	0.1	0.4	APHA-4500-F-D
11.	An Ionic detergent as MBAs	mg/L	20	0.001	0.042	APHA 5540 C
12.	Sulphate (SO_4^{2-}) ^	mg/L	600	1	30	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	2.9	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	0.1249	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	BDL	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	0.1312	APHA-3111 B
27.	Manganese (Mn)^	mg/L	1.5	0.0010	0.0462	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	0.1249	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

Rev #01 | Rev date: 16-06-25

Ref #: KPGL/LAB/2026-681/WW

Issue date: 08-Jun-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	95.0	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

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

TEST REPORT

Ref. #: KPGL/LAB/2026-686/AA

Issue date: 08-Jun-26

Name of Client: NESPAK JV TES
Project Name: Phase-IV: 210287-Revamping of Secondary Health Facilities Including Improvement of Accident And Emergency Units In Newly Merged Districts (AIP)
Sampling Location: DHQ Hospital Parachinar, Kurram
Nature of Monitoring: Ambient Air
Monitoring By: Pak Green Laboratories
Monitoring Instrument: AQMS
Monitoring Duration: 24 hours
Monitoring Date: 26-Apr-26 to 27-Apr-26

Results:

Sr. No.	Time	CO	NO	NO_2	SO_2	O_3	PM_{10}	$PM_{2.5}$	SPM	Lead (Pb)
		mg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m3
1.	9:00 AM	1.78	10.56	30.61	49.37					
2.	10:00 AM	1.67	13.07	34.46	35.01					
3.	11:00 AM	1.63	11.86	32.64	35.41					
4.	12:00 PM	1.68	13.71	25.33	36.31					
5.	1:00 PM	1.70	14.67	19.24	30.84					
6.	2:00 PM	1.88	12.30	41.18	26.92					
7.	3:00 PM	1.78	15.52	44.52	20.57					
8.	4:00 PM	1.63	17.56	55.97	35.41					
9.	5:00 PM	1.61	17.03	25.74	46.94					
10.	6:00 PM	1.66	17.26	32.84	42.94					
11.	7:00 PM	1.59	16.13	66.48	40.93					
12.	8:00 PM	1.64	18.51	52.70	59.40					
13.	9:00 PM	1.67	17.53	36.46	57.28	69.1	147.4	49.3*	448.6	0.02
14.	10:00 PM	1.62	16.31	30.57	55.45					
15.	11:00 PM	1.66	15.78	26.51	55.14					
16.	12:00 AM	1.56	15.84	22.45	53.70					
17.	1:00 AM	1.71	14.98	41.37	53.00					
18.	2:00 AM	1.70	14.09	40.35	32.47					
19.	3:00 AM	1.64	11.78	38.32	31.91					
20.	4:00 AM	1.67	13.72	35.68	31.69					
21.	5:00 AM	1.65	11.22	35.48	30.56					
22.	6:00 AM	1.88	13.06	35.28	30.81					
23.	7:00 AM	1.78	10.57	33.04	34.34					
24.	8:00 AM	1.61	11.78	28.78	41.61					
Average (24 Hours)		1.68	14.37	36.08	40.33					
NEQS		5 8hours	40 24hours	80 24hours	120 24hours	130 1 hour	150 24hours	35 24hours	500 24hours	1.5 24 hours

End of Report

Ref. #: KPGL/LAB/2026-686/AA

Issue date: 08-Jun-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

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/2026-687/NL

Issue date: 08-Jun-26

Name of Client: NESPAK JV TES
Project Name: Phase-IV: 210287-Revamping of Secondary Health Facilities Including Improvement of Accident And Emergency Units in Newly Merged Districts (AIP)

Nature of Monitoring: Noise Level (24 Hours)
Sampling Location: DHQ Hospital Parachinar, Kurram
Monitoring By: Pak Green Laboratories
Monitoring Time: Real Time
Monitoring Instrument: Smart Sensor
Monitoring Date: 26-Apr-26 to 27-Apr-26

Results:

Sr. No.	Day Time	Equivalent Noise
		dB (A)
1.	6:00 - 7:00 AM	54.8
2.	7:00 -8:00 AM	58.0
3.	8:00- 9:00 AM	62.9
4.	9:00- 10:00 AM	65.6
5.	10:00 -11:00 AM	63.5
6.	11:00- 12:00 AM	63.3
7.	12:00 -1:00 PM	64.0
8.	1:00- 2:00 PM	66.9
9.	2:00- 3:00 PM	64.8
10.	3:00 4:00 PM	65.4
11.	4:00 5:00 PM	64.3
12.	5:00 6:00 PM	63.1
13.	6:00 7:00 PM	54.6
14.	7:00 8:00 PM	59.0
15.	8:00 9:00 PM	59.9
16.	9:00 10:00 PM	61.2
	Average	61.8

Sr. No.	Night Time	Equivalent Noise
		dB (A)
17.	10:00 PM - 11:00 PM	42.1
18.	11:00 -12:00 AM	56.8
19.	12:00 -1:00 AM	51.2
20.	1:00 -2:00 AM	48.5
21.	2:00 -3:00 AM	57.3
22.	3:00 -4:00 AM	58.1
23.	4:00- 5:00 AM	52.6
24.	5:00-6:00 AM	42.1
	Average	52.4

End of Report

info@pakgreen.pk www.pakgreen.pk

Ref. #: KPGL/LAB/2026-687/NL

Issue date: 08-Jun-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

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

Rev. #01 | Rev. date: 28-05-25

TEST REPORT

Ref #: KPGL/LAB/2026-688/DW

Issue date: 08-Jun-26

Name of Client:	NESPAK JV TES
Executing Agency:	C&W Department, Govt. of Khyber Pakhtunkhwa
Project Name:	Phase-IV: 210287-Revamping Of Secondary Health Facilities Including Improvement Of Accident And Emergency Units In Newly Merged Districts (AIP)

Sample Description:

Nature of sample:	Drinking water	
Sampling By:	Pak Green Laboratories	
Sampling Location:	DHQ Hospital Parachinar, Kurram	
Sample Source:	Tap Water	
Date of sampling:	26-Apr-26	
Sample Receiving Date:	26-Apr-26	
Testing Facility:	Pak Green Laboratories	
Date of Completion of Analysis:	26-Apr-26 to 01-May-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:

- 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

Rev #01 | Rev date: 10-06-25

Ref #: KPGL/LAB/2026-688/DW

Issue date: 08-Jun-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	8.086 at 23.4°C	APHA-4500-H+ B
5.	Taste	-	Non-Objectionable	-	Non-Objectionable	APHA-2160 C
6.	Color	TCU	≤ 15	0.0001	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	350	APHA-2540 C

Chemical Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
10.	Total Hardness ^	mg/L	<300	0.1	260	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	25	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	0.0286	APHA-3111 B
20.	Fluoride (F)	mg/L	≤ 1.5	0.1	0.7	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

Green Enviro-Engineering (Pvt) Ltd. Peshawar Pakistan

Rev. #01 | Rev. date: 16-05-25

Ref #: KPGL/LAB/2026-688/DW

Issue date: 08-Jun-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	0.0069	APHA-3111 B
30.	Phenolic Compound (As Phenol)	mg/L	-	0.0005	BDL	APHA-5530 D
31.	Iron (Fe)^	mg/L	-	0.0010	0.2757	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

Rev #01 | Rev date: 16-06-25

TEST REPORT

Ref #: KPGL/LAB/2026-689/WW

Issue date: 08-Jun-26

Name of Client:	NESPAK JV TES
Executing Agency:	C&W Department, Govt. of Khyber Pakhtunkhwa
Project Name:	Phase-IV: 210287-Revamping of Secondary Health Facilities Including Improvement of Accident and Emergency Units in Newly Merged Districts (AIP)

Sample Description:

Nature of sample:	Waste water	
Sampling By:	Pak Green Laboratories	
Sampling Location:	DHQ Hospital Parachinar, Kurram	
Sample source:	Final Drain	
Date of sampling:	26-Apr-26	
Sample Receiving Date:	26-Apr-26	
Testing Facility:	Pak Green Laboratories	
Date of Completion of Analysis:	26-Apr-26 to 01-May-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

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	Miah Iftikhar Ahmed

Pak Green Enviro-Engineering (Pvt.) Ltd. Peshawar Pakistan

EPA | PNAC LAB 190 17025

Ref #: KPGL/LAB/2026-689/WW

Issue date: 08-Jun-26

Physical Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
1.	Temperature	°C	-	0.1	22.5	APHA-2550 B
2.	pH^	-	6-9	0.001	7.420 at 23.6°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	1725*	APHA-5210 D
4.	Chemical Oxygen Demand (COD) ^	mg/L	150	0.4	2816*	APHA-5220 B
5.	Total Suspended Solids (TSS) ^	mg/L	200	1	1535*	APHA-2540 D
6.	Total Dissolved Solids (TDS) ^	mg/L	3500	10	770	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	45	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	0.488	APHA 5540 C
12.	Sulphate (SO_4^{2-}) ^	mg/L	600	1	BDL	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	89.3*	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	0.2177	APHA-3111 B
17.	Copper (Cu)^	mg/L	1.0	0.0001	0.3439	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	0.0333	APHA-3111 B
23.	Zinc (Zn)^	mg/L	5.0	0.0001	0.5949	APHA-3111 B
24.	Arsenic (As)	mg/L	1.0	0.0001	1.8518	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	BDL	APHA-3111 B
27.	Manganese (Mn)^	mg/L	1.5	0.0010	115.8854*	APHA-3111 B
28.	Boron (B)	mg/L	6.0	0.0001	1.7820*	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	0.5940	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.
(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/2026-689/WW

Issue date: 08-Jun-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	124.0	APHA-9221 D
35.	*Fecal Coliform*	-	-	Nil	35.6	APHA-9221 E

End of Report

NEQS: National Environmental Quality Standard
BDL: Below Detection Limits

With ^PNAC Accredited
LDL: Lowest Detection limit

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

TEST REPORT

Ref. #: KPGL/LAB/2026-678/AA

Issue date: 08-Jun-26

Name of Client: NESPAK JV TES
Project Name: Phase-IV: 210287-Revamping of Secondary Health Facilities Including Improvement of Accident And Emergency Units in Newly Merged Districts (AIP)
Sampling Location: DHQ Hospital Miran Shah, North Waziristan
Nature of Monitoring: Ambient Air
Monitoring By: Pak Green Laboratories
Monitoring Instrument: AQMS
Monitoring Duration: 24 hours
Monitoring Date: 24-Apr-26 to 25-Apr-26

Results:

Sr. No.	Time	CO	NO	NO_2	SO_2	O_3	PM_{10}	$PM_{2.5}$	SPM	Lead (Pb)
		mg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m3
1.	9:00 AM	0.99	11.53	21.28	25.36					
2.	10:00 AM	0.92	10.74	20.68	35.90					
3.	11:00 AM	0.89	9.94	25.95	32.80					
4.	12:00 PM	1.00	13.11	23.52	30.24					
5.	1:00 PM	0.95	12.06	21.49	32.77					
6.	2:00 PM	1.04	14.43	25.55	37.57					
7.	3:00 PM	1.09	11.53	23.11	29.67					
8.	4:00 PM	0.94	11.79	21.08	30.24					
9.	5:00 PM	1.05	13.51	25.34	31.65					
10.	6:00 PM	0.97	12.58	27.17	29.39					
11.	7:00 PM	0.92	11.40	27.98	29.11					
12.	8:00 PM	1.02	10.21	25.55	28.26					
13.	9:00 PM	0.88	15.36	25.14	30.24	57.6	90.6	26.4	413.9	0.01
14.	10:00 PM	0.82	16.81	26.75	31.93					
15.	11:00 PM	0.99	17.47	21.08	32.49					
16.	12:00 AM	0.95	15.75	25.55	39.08					
17.	1:00 AM	1.03	14.17	20.88	38.24					
18.	2:00 AM	0.94	17.73	20.27	41.90					
19.	3:00 AM	1.10	11.26	23.11	38.80					
20.	4:00 AM	1.02	12.58	20.27	43.31					
21.	5:00 AM	1.16	10.08	24.74	42.75					
22.	6:00 AM	1.11	11.26	27.58	41.90					
23.	7:00 AM	1.07	10.87	28.59	37.67					
24.	8:00 AM	0.95	10.60	25.55	39.93					
Average (24 Hours)		0.99	12.78	24.05	34.63					
NEQS		5 8hours	40 24hours	80 24hours	120 24hours	130 1 hour	150 24hours	35 24hours	500 24hours	1.5 24 hours

End of Report

info@pakgreen.pk www.pakgreen.pk

Ref. #: KPGL/LAB/2026-678/AA

Issue date: 08-Jun-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.
(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/2026-679/NL
Issue date: 08-Jun-26

Name of Client: NESPAK JV TES
Project Name: Phase-IV: 210287-Revamping of Secondary Health Facilities Including Improvement of Accident And Emergency Units in Newly Merged Districts (AIP)
Nature of Monitoring: Noise Level (24 Hours)
Sampling Location: DHQ Hospital Miran Shah, North Waziristan
Monitoring By: Pak Green Laboratories
Monitoring Time: Real Time
Monitoring Instrument: Smart Sensor
Monitoring Date: 24-Apr-26 to 25-Apr-26

Results:

Sr. No.	Day Time	Equivalent Noise
		dB (A)
1.	6:00 – 7:00 AM	49.4
2.	7:00 -8:00 AM	50.2
3.	8:00- 9:00 AM	50.5
4.	9:00- 10:00 AM	51.7
5.	10:00 -11:00 AM	52.2
6.	11:00- 12:00 AM	57.8
7.	12:00 -1:00 PM	56.9
8.	1:00- 2:00 PM	58.4
9.	2:00- 3:00 PM	55.3
10.	3:00 4:00 PM	57.9
11.	4:00 5:00 PM	54.1
12.	5:00 6:00 PM	51.4
13.	6:00 7:00 PM	49.1
14.	7:00 8:00 PM	53.8
15.	8:00 9:00 PM	50.5
16.	9:00 10:00 PM	47.2
	Average	52.9

Sr. No.	Night Time	Equivalent Noise
		dB (A)
17.	10:00 PM - 11:00 PM	45.1
18.	11:00 -12:00 AM	49.8
19.	12:00 -1:00 AM	51.3
20.	1:00 -2:00 AM	43.4
21.	2:00 -3:00 AM	42.6
22.	3:00 -4:00 AM	38.5
23.	4:00- 5:00 AM	40.9
24.	5:00-6:00 AM	45.1
	Average	44.6

End of Report

info@pakgreen.pk www.pakgreen.pk

Ref. #: KPGL/LAB/2026-679/NL

Issue date: 08-Jun-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

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/2026-679/GW

Issue date: 08-Jun-26

Name of Client:	NESPAK JV TES
Executing Agency:	C&W Department, Govt. of Khyber Pakhtunkhwa
Project Name:	Phase-IV: 210287-Revamping Of Secondary Health Facilities Including Improvement Of Accident And Emergency Units In Newly Merged Districts (All[5])

Sample Description:

Nature of sample:	Ground water	
Sampling By:	Pak Green Laboratories	
Sampling Location:	DHQ Hospital Miran Shah, North Waziristan	
Sample Source:	Pressure Pump	
Date of sampling:	24-Apr-26	
Sample Receiving Date:	24-Apr-26	
Testing Facility:	Pak Green Laboratories	
Date of Completion of Analysis:	24-Apr-26 to 01-May-26	
Env. Conditions during Analysis:	Temp=23.0-24.2°C	RH=53.4-59.4%

Summary of Test Result:

Remarks:
Parameters with * are not in compliance with the NEQS Limit.
Discussion: 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 Irfikhar 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/2026-679/GW
Issue date: 08-Jun-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	7.650 at 23.0°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	0.27	APHA-2130 B
9.	Total dissolved Solids (TDS) ^	mg/L	< 1000	10	615	APHA-2540 C

Chemical Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
10.	Total Hardness ^	mg/L	<500	0.1	169	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	0.689	APHA-4500-NO_3^--E

info@pakgreen.pk www.pakgreen.pk

Ref #: KPGL/LAB/2026-679/GW
Issue date: 08-Jun-26

Chemical Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
26.	Nitrite^	mg/L	≤ 3	0.001	0.237	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

Pak Green Enviro-Engineering (Pvt) Ltd. Peshawar, Pakistan

TEST REPORT

Ref #: KPGL/LAB/2026-680/WW

Issue date: 08-Jun-26

Name of Client:	NESPAK JV TES
Executing Agency:	C&W Department, Govt. of Khyber Pakhtunkhwa
Project Name:	Phase-IV: 210287-Revamping of Secondary Health Facilities Including Improvement of Accident and Emergency Units In Newly Merged Districts (AIP)

Sample Description:

Nature of sample:	Waste water	
Sampling By:	Pak Green Laboratories	
Sampling Location:	DHQ Hospital Miran Shah, North Waziristan	
Sample source:	Final Drain	
Date of sampling:	24-Apr-26	
Sample Receiving Date:	24-Apr-26	
Testing Facility:	Pak Green Laboratories	
Date of Completion of Analysis:	24-Apr-26 to 01-May-26	
Env. Conditions during Analysis:	Temp=23.0-24.2°C	RH=53.4-59.4%

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 In-Charge
	Muhammad Raza Ullah	Miaji Ikhlaq Ahmad

Pak Green Engineering (Pvt) Ltd. Peshawar Pakistan

Ref #: KPGL/LAB/2026-680/WW

Issue date: 08-Jun-26

Physical Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
1.	Temperature	°C	-	0.1	23.1	APHA-2550 B
2.	pH^	-	6-9	0.001	8.375 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	127	APHA-5220 B
5.	Total Suspended Solids (TSS) ^	mg/L	200	1	75	APHA-2540 D
6.	Total Dissolved Solids (TDS) ^	mg/L	3500	10	964	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	130	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	0.027	APHA 5540 C
12.	Sulphate (SO_4^{2-}) ^	mg/L	600	1	127	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	9.5	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	0.0247	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	0.0862	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	2.3650	APHA-3111 B
27.	Manganese (Mn)^	mg/L	1.5	0.0010	0.0992	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	0.0247	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

Green Enviro-Engineering (Pvt) Ltd. Peshawar, Pakistan

Ref #: KPGG/LAB/2026-680/WW

Issue date: 08-Jun-26

Biological Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
33.	*E. coli*	-	-	Nil	102.7	APHA-9221 F
34.	*Total Coli-form*	-	-	Nil	350.9	APHA-9221 D
35.	*Fecal Coliform*	-	-	Nil	119.2	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.
(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/2026-690/AA

Issue date: 08-Jun-26

Name of Client: NESPAK JV TES
Project Name: Phase-IV: 210287-Revamping Of Secondary Health Facilities Including Improvement Of Accident And Emergency Units In Newly Merged Districts (AIP)
Sampling Location: DHQ Hospital Wana, South Waziristan
Nature of Monitoring: Ambient Air
Monitoring By: Pak Green Laboratories
Monitoring Instrument: AQMS
Monitoring Duration: 24 hours
Monitoring Date: 27-Apr-26 to 28-Apr-26

Results:

Sr. No.	Time	CO	NO	NO_2	SO_2	O_3	PM_{10}	$PM_{2.5}$	SPM	Lead (Pb)
		mg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m3
1.	9:00 AM	1.66	10.56	34.85	34.51					
2.	10:00 AM	1.59	9.77	34.25	45.05					
3.	11:00 AM	1.56	8.97	39.52	41.95					
4.	12:00 PM	1.67	12.14	37.09	39.39					
5.	1:00 PM	1.62	11.09	35.06	41.92					
6.	2:00 PM	1.71	13.46	39.12	46.72					
7.	3:00 PM	1.76	10.56	36.68	38.82					
8.	4:00 PM	1.61	10.82	34.65	39.39					
9.	5:00 PM	1.72	12.54	38.91	40.80					
10.	6:00 PM	1.64	11.61	40.74	38.54					
11.	7:00 PM	1.59	10.43	41.55	38.26					
12.	8:00 PM	1.69	9.24	39.12	37.41					
13.	9:00 PM	1.55	14.39	38.71	39.39	70.3	147.9	46.3*	459.8	0.01
14.	10:00 PM	1.49	15.84	39.32	41.08					
15.	11:00 PM	1.66	16.50	34.65	41.64					
16.	12:00 AM	1.62	14.78	39.12	48.23					
17.	1:00 AM	1.70	13.20	34.45	47.39					
18.	2:00 AM	1.61	16.76	33.84	51.05					
19.	3:00 AM	1.77	10.29	36.68	47.95					
20.	4:00 AM	1.69	11.61	33.84	52.46					
21.	5:00 AM	1.83	9.11	38.31	51.90					
22.	6:00 AM	1.78	10.29	41.15	51.05					
23.	7:00 AM	1.74	9.90	42.16	46.82					
24.	8:00 AM	1.62	9.63	39.12	49.08					
Average (24 Hours)		1.66	11.81	37.62	43.78					
NEQS		5 8hours	40 24hours	80 24hours	120 24hours	130 1 hour	150 24hours	35 24hours	500 24hours	1.5 24 hours

End of Report

Ref. #: KPGL/LAB/2026-690/AA

Issue date: 08-Jun-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

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/2026-691/NL
Issue date: 08-Jun-26

Name of Client: NESPAK JV TES
Project Name: Phase-IV: 210287-Revamping of Secondary Health Facilities Including Improvement of Accident And Emergency Units In Newly Merged Districts (AIP)

Nature of Monitoring: Noise Level (24 Hours)
Sampling Location: DHQ Hospital Wana, South Waziristan
Monitoring By: Pak Green Laboratories
Monitoring Time: Real Time
Monitoring Instrument: Smart Sensor
Monitoring Date: 27-Apr-26 to 28-Apr-26

Results:

Sr. No.	Day Time	Equivalent Noise dB (A)
1.	6:00 – 7:00 AM	56.3
2.	7:00 -8:00 AM	59.5
3.	8:00- 9:00 AM	64.4
4.	9:00- 10:00 AM	67.1
5.	10:00 -11:00 AM	65.0
6.	11:00- 12:00 AM	64.8
7.	12:00 -1:00 PM	65.5
8.	1:00- 2:00 PM	68.4
9.	2:00- 3:00 PM	66.3
10.	3:00 4:00 PM	66.9
11.	4:00 5:00 PM	65.8
12.	5:00 6:00 PM	64.6
13.	6:00 7:00 PM	56.1
14.	7:00 8:00 PM	60.5
15.	8:00 9:00 PM	61.4
16.	9:00 10:00 PM	62.7
	Average	63.3

Sr. No.	Night Time	Equivalent Noise dB (A)
17.	10:00 PM - 11:00 PM	42.2
18.	11:00 -12:00 AM	56.9
19.	12:00 -1:00 AM	51.3
20.	1:00 -2:00 AM	48.6
21.	2:00 -3:00 AM	57.4
22.	3:00 -4:00 AM	58.2
23.	4:00- 5:00 AM	52.7
24.	5:00-6:00 AM	42.2
	Average	52.5

End of Report

Ref. #: KPGL/LAB/2026-691/NL

Issue date: 08-Jun-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

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 In-charge

Pak Green Enviro-Engineering (Pvt) Ltd. House No. 4B, Railway Road, University Town, 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. # 48, Railway Road, University Town, Peshawar - Pakistan. Ph: +92-91-5710744 Cell: 0308-4440895
EPA Certified

Rev #01 | Rev date: 1s-06-26

TEST REPORT

Ref #: KPGL/LAB/2026-692/DW

Issue date: 08-Jun-26

Name of Client:	NESPAK JV TES
Executing Agency:	C&W Department, Govt. of Khyber Pakhtunkhwa
Project Name:	Phase-III: 210121- Strengthening Of 12 -DHQ Hospitals (Building Capacity To Respond Covid 19/Any Future Pandemic) In Khyber Pakhtunkhwa

Sample Description:

Nature of sample:	Drinking water	
Sampling By:	Pak Green Laboratories	
Sampling Location:	DHQ Hospital Wana, South Waziristan	
Sample Source:	Pressure Pump	
Date of sampling:	27-Apr-26	
Sample Receiving Date:	27-Apr-26	
Testing Facility:	Pak Green Laboratories	
Date of Completion of Analysis:	27-Apr-26 to 01-May-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.
Discussion: The Presence of microbes contamination may be due to poor sanitation practices in surrounding areas, cross contamination 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 Wilkhar Ahmed

Pak Green Enviro-Engineering (Pvt.) Ltd. Peshawar, Pakistan

Rev #01 | Rev date: 10-06-25

Ref #: KPGL/LAB/2026-692/DW

Issue date: 08-Jun-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	7.770 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	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	210	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	60	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	0.684	APHA-4500-NO_3^--E

Pak Green Enviro-Engineering (Pvt) Ltd. Peshawar, Pakistan

Ref #: KPGL/LAB/2026-692/DW
Issue date: 08-Jun-26

Chemical Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
26.	Nitrite^	mg/L	≤3	0.001	0.244	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

Green Enviro-Engineering (Pvt) Ltd. Peshawar Pakistan

[illegible]	Rev.#03	Rev date: 16-Oct-25

TEST REPORT

Ref #: KPGL/LAB/2026-693/WW

Issue date: 08-Jun-26

Name of Client:	NESPAK JV TES
Executing Agency:	C&W Department, Govt. of Khyber Pakhtunkhwa
Project Name:	Phase-III: 210121- Strengthening Of 12 -DHQ Hospitals (Building Capacity To Respond Covid 19/ Any Future Pandemic) In Khyber Pakhtunkhwa

Sample Description:

Nature of sample:	Waste water	
Sampling By:	Pak Green Laboratories	
Sampling Location:	DHQ Hospital Wana, South Waziristan	
Sample source:	Final Drain	
Date of sampling:	27-Apr-26	
Sample Receiving Date:	27-Apr-26	
Testing Facility:	Pak Green Laboratories	
Date of Completion of Analysis:	27-Apr-26 to 01-May-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

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 Zulkhar Ahmad

Ref #: KPGL/LAB/2026-693/WW

Issue date: 08-Jun-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	7.438 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	18	APHA-5210 D
4.	Chemical Oxygen Demand (COD) ^	mg/L	150	0.4	28	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	890	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	125	APHA-4500-Cl^- B
10.	Fluoride (F^-)	mg/L	10	0.1	0.9	APHA-4500-F-D
11.	An Ionic detergent as MBAs	mg/L	20	0.001	0.038	APHA 5540 C
12.	Sulphate (SO_4^{2-}) ^	mg/L	600	1	110	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	1.1	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	0.0219	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	0.0855	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	1.6671	APHA-3111 B
27.	Manganese (Mn)^	mg/L	1.5	0.0010	0.0997	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	0.0219	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

Rev #01 | Rev date: 10-06-25

Ref #: KPGG/LAB/2026-693/WW

Issue date: 08-Jun-26

Biological Parameters Analysis Results:

Sr. No.	Parameters	Unit	NEQS	LDL	Results	Method / Technique
33.	*E. coli*	-	-	Nil	103.8	APHA-9221 F
34.	*Total Coli-form*	-	-	Nil	354.2	APHA-9221 D
35.	*Fecal Coliform*	-	-	Nil	113.4	APHA-9221 E

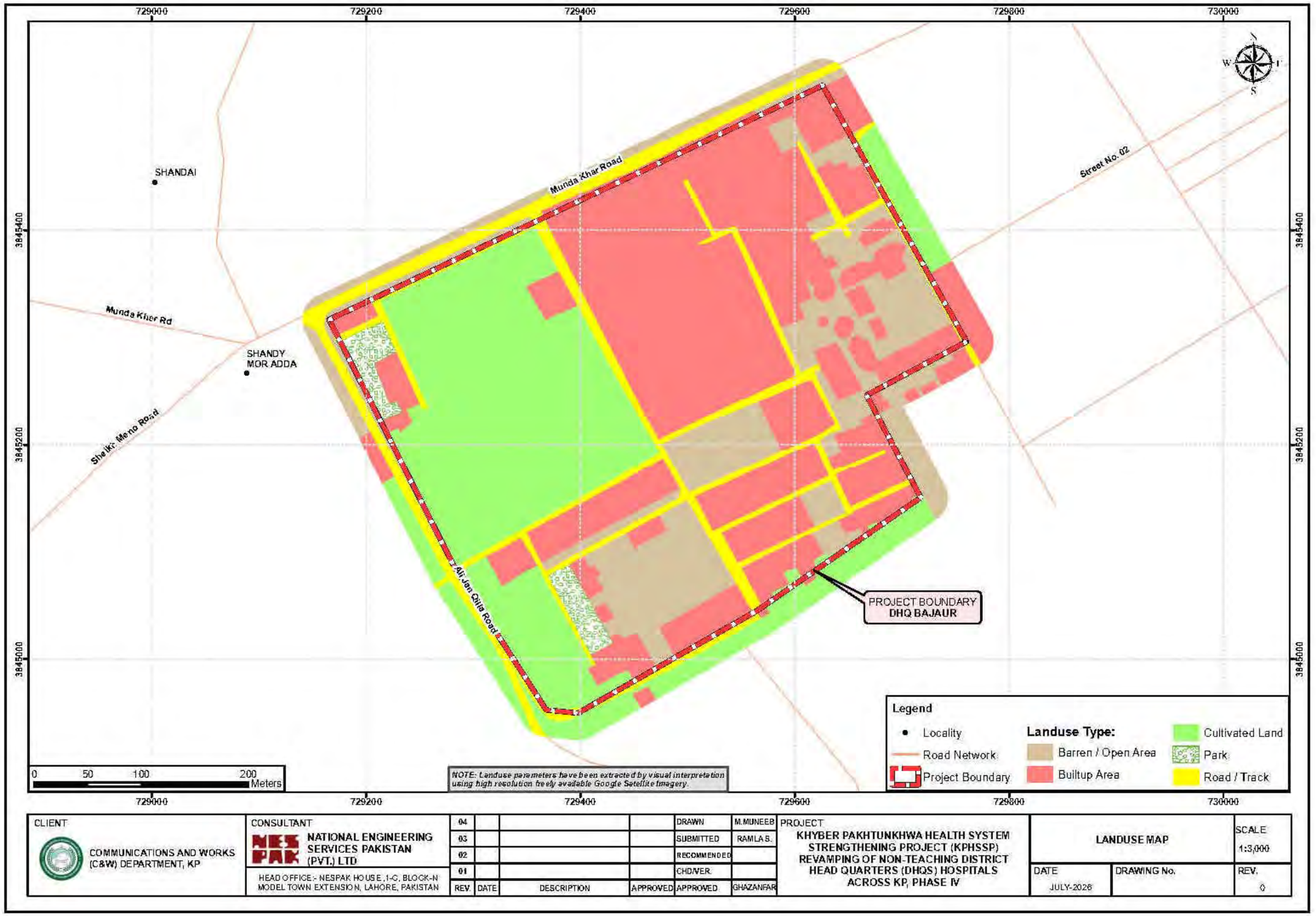
End of Report

NEQS: National Environmental Quality Standard
BDL: Below Detection Limits

With ^PNAC Accredited
LDL: Lowest Detection limit

Green Enviro-Engineering (Pvt) Ltd. Peshawar Pakistan

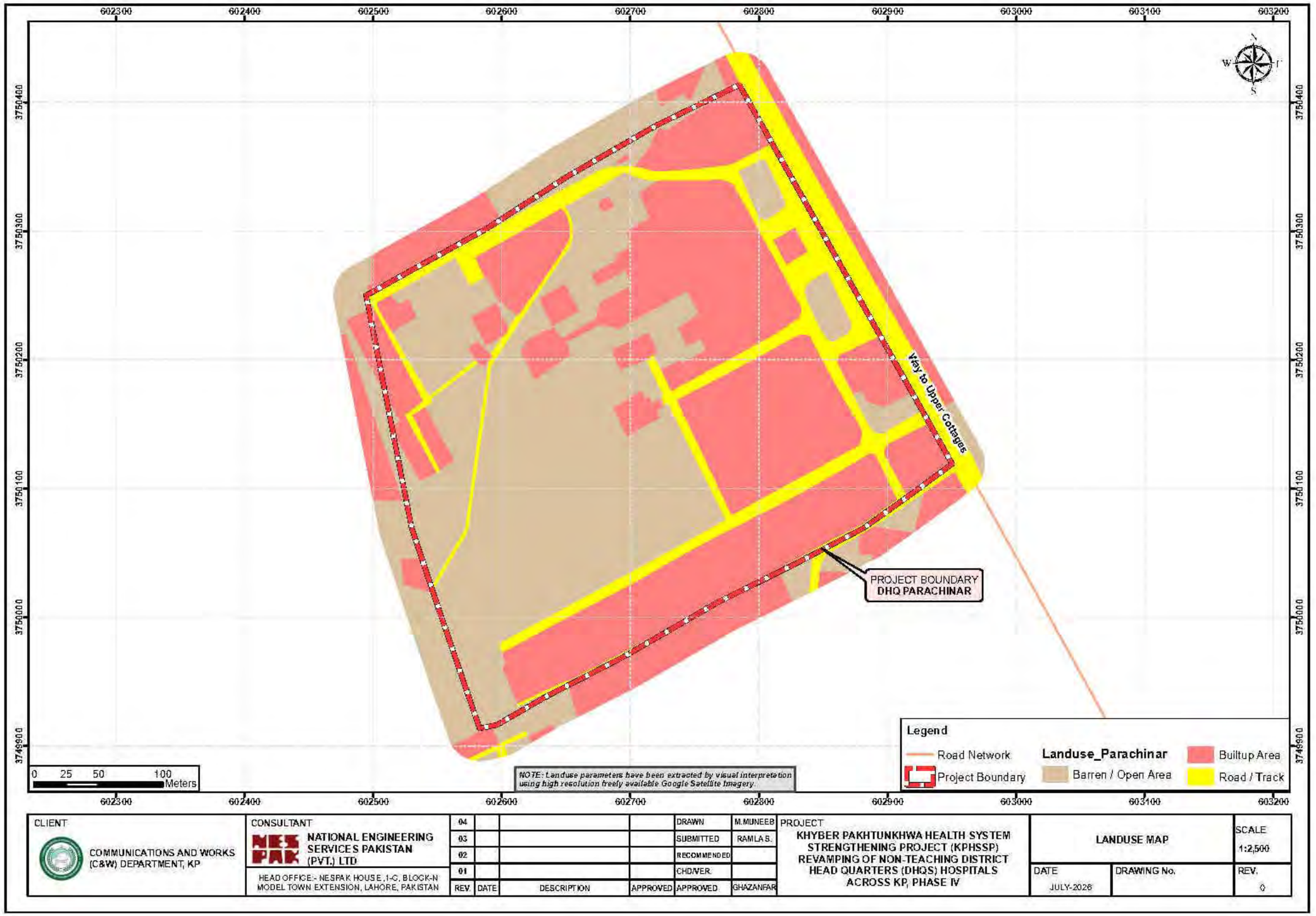
ANNEXURE-IV: LAND USE AND SENSITIVE RECEPTORS



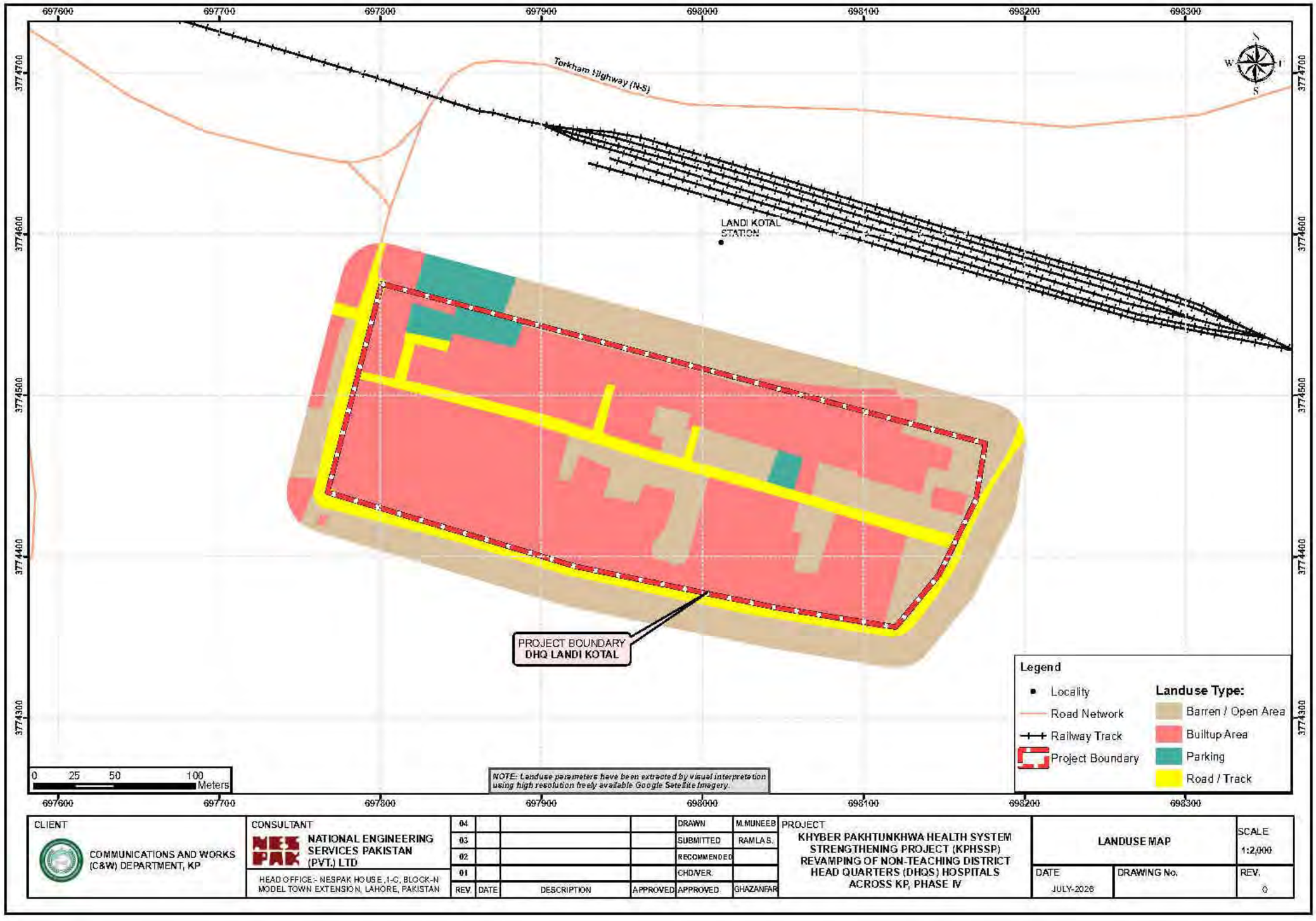
CLIENT: COMMUNICATIONS AND WORKS (C&W) DEPARTMENT, KP	CONSULTANT: NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. HEAD OFFICE:- NESPAK HOUSE,1-C, BLOCK-N MODEL TOWN EXTENSION, LAHORE, PAKISTAN	04			DRAWN	M.MUNEEB
		03			SUBMITTED	RAMLA S.
		02			RECOMMENDED	
		01			CHD/VER.	
		REV.	DATE	DESCRIPTION / APPROVED	APPROVED	GHAZANFAR

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

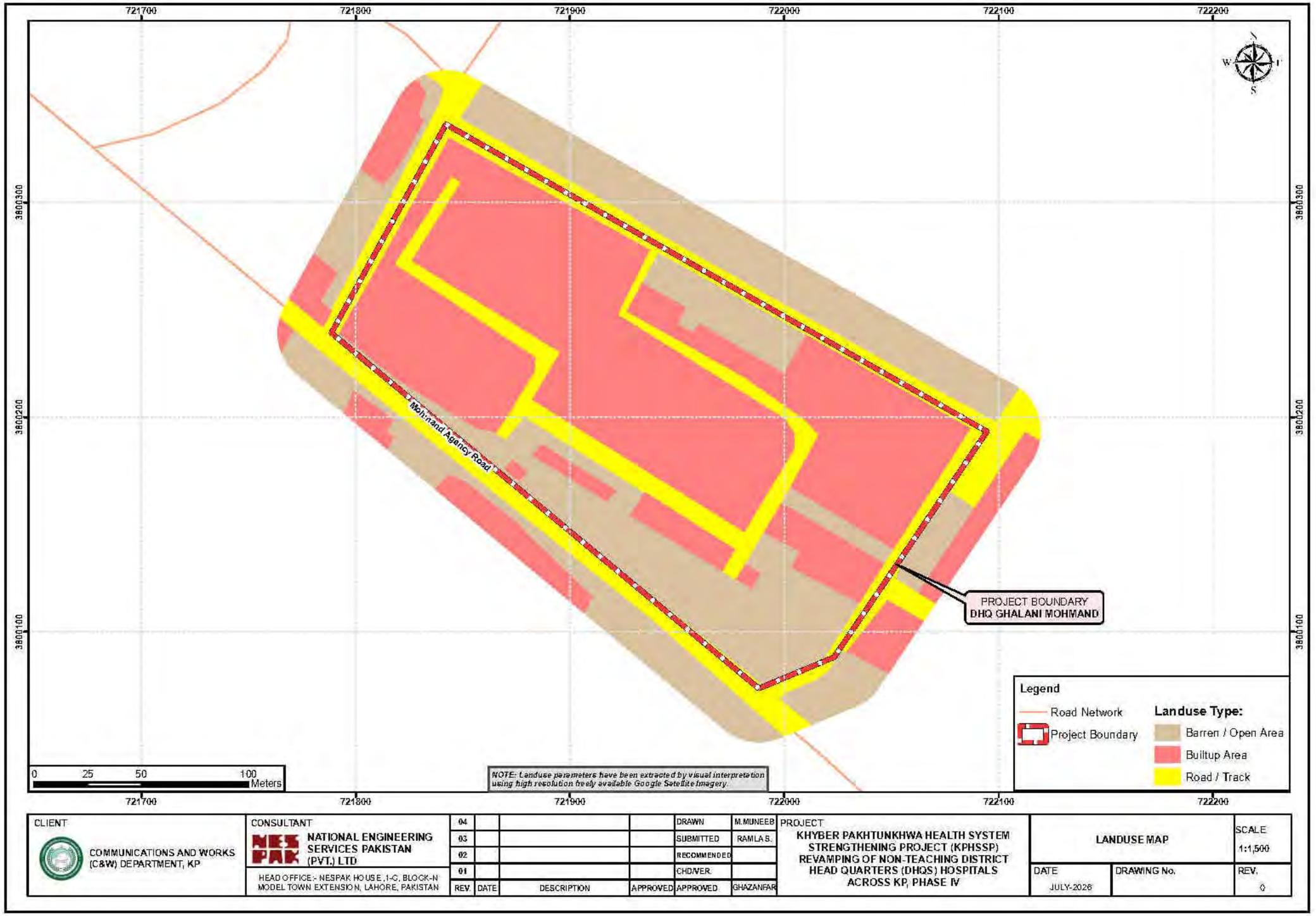
LANDUSE MAP | SCALE 1:3,000 | DATE JULY-2026 | DRAWING No. | REV. 0

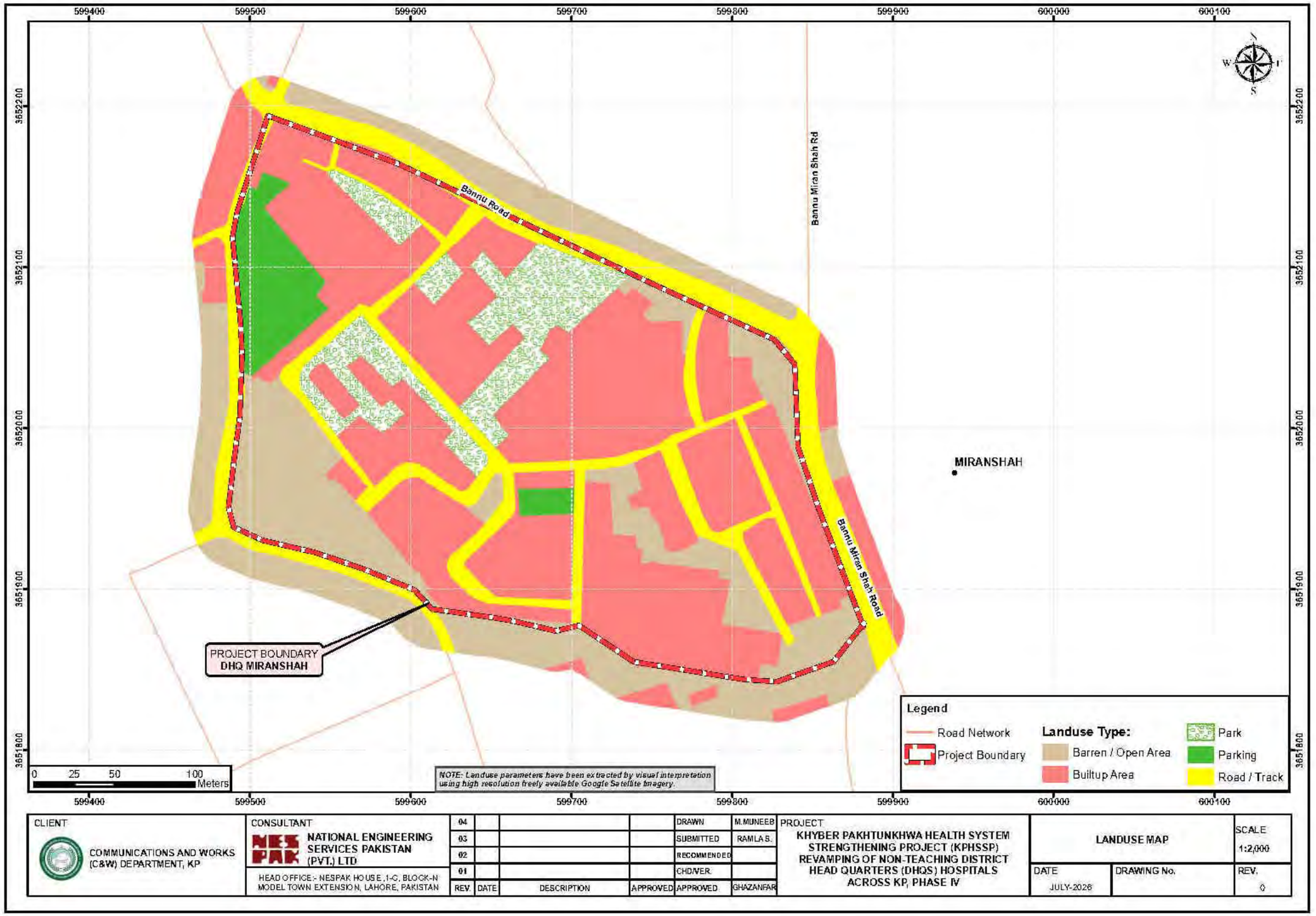


CLIENT: COMMUNICATIONS AND WORKS (C&W) DEPARTMENT, KP	CONSULTANT: NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. HEAD OFFICE:- NESPAK HOUSE ,1-C, BLOCK-N MODEL TOWN EXTENSION, LAHORE, PAKISTAN	04				DRAWN	M.MUNEEB	PROJECT: KHYBER PAKHTUNKHWA HEALTH SYSTEM STRENGTHENING PROJECT (KPHSSP) REVAMPING OF NON-TEACHING DISTRICT HEAD QUARTERS (DHQS) HOSPITALS ACROSS KP, PHASE IV	LANDUSE MAP	SCALE 1:2,500
		03				SUBMITTED	RAMLA S.			
		02				RECOMMENDED				
		01				CHD/VER.			DATE: JULY-2026	DRAWING No.
		REV.	DATE	DESCRIPTION	APPROVED	APPROVED	GHAZANFAR			REV. 0

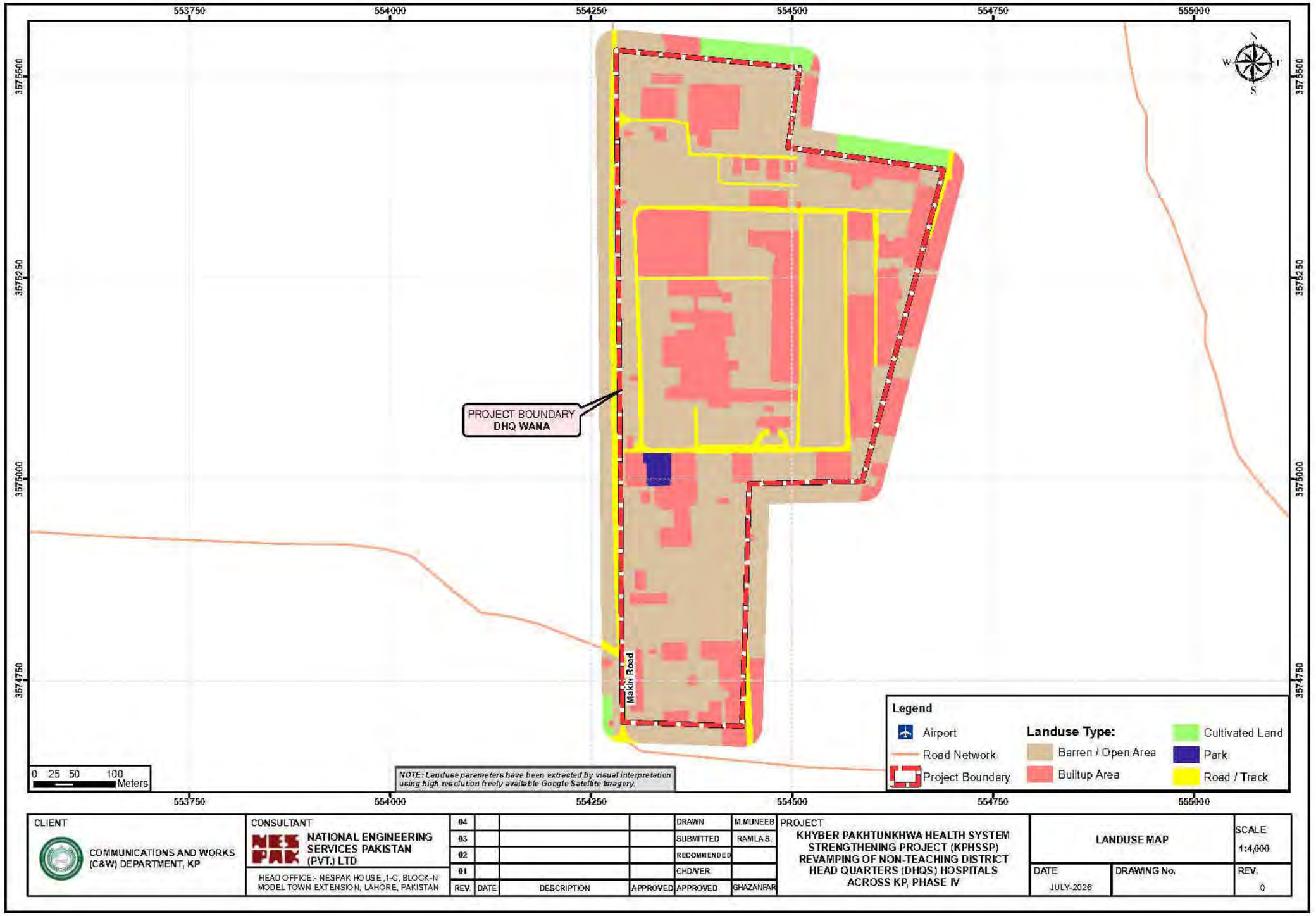


CLIENT: COMMUNICATIONS AND WORKS (C&W) DEPARTMENT, KP	CONSULTANT: NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD HEAD OFFICE:- NESPAK HOUSE,1-C, BLOCK-N MODEL TOWN EXTENSION, LAHORE, PAKISTAN	04				DRAWN	M.MUNEEB	PROJECT: KHYBER PAKHTUNKHWA HEALTH SYSTEM STRENGTHENING PROJECT (KPHSSP) REVAMPING OF NON-TEACHING DISTRICT HEAD QUARTERS (DHQS) HOSPITALS ACROSS KP, PHASE IV	LANDUSE MAP	SCALE 1:2,000
		03				SUBMITTED	RAMLA S.			
		02				RECOMMENDED				
		01				CHD/VER.			DATE: JULY-2026	DRAWING No. / REV. 0
		REV.	DATE	DESCRIPTION	APPROVED	APPROVED	GHAZANFAR			

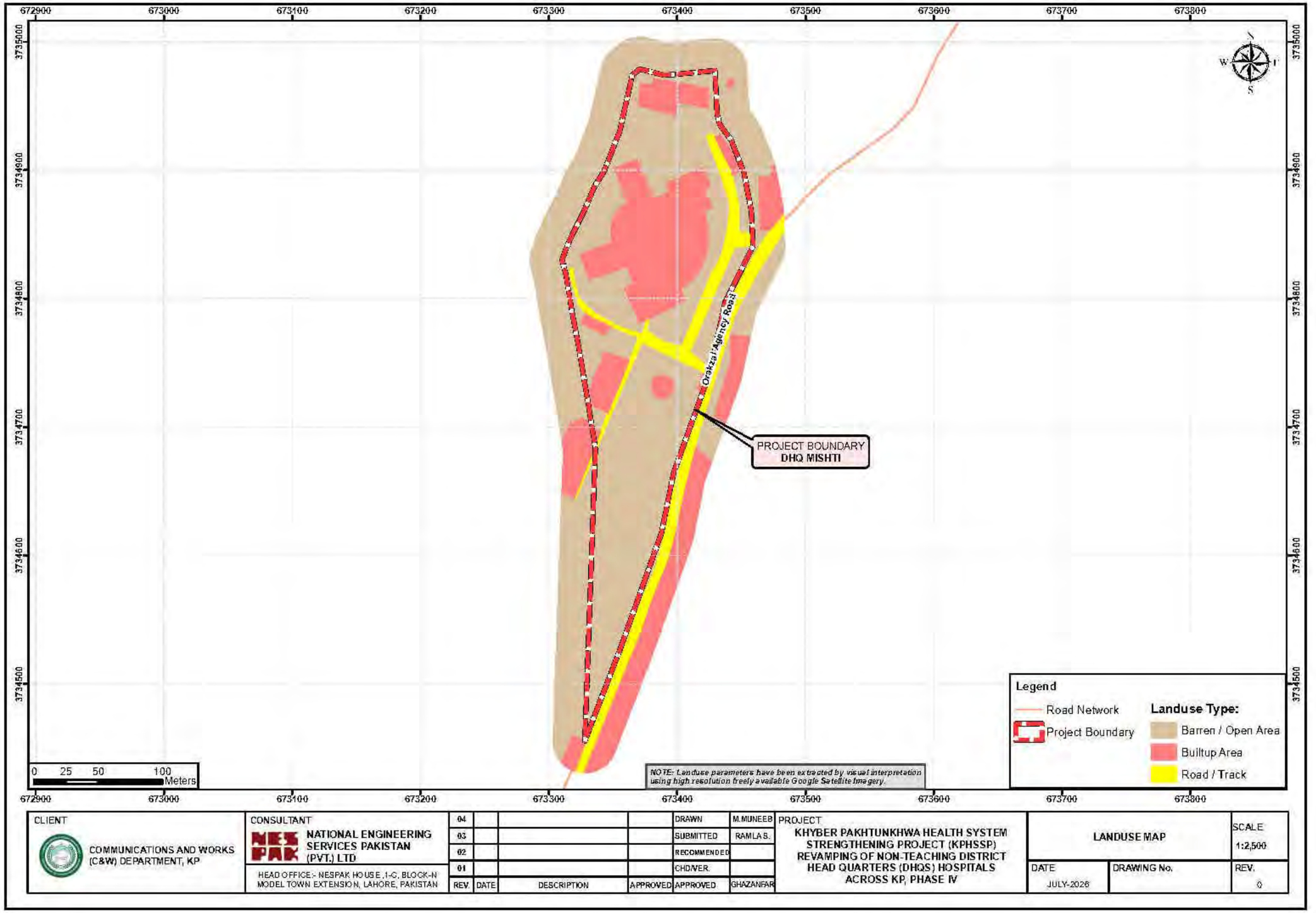

721700
721800
721900
722000
722100
722200
3800300
3800200
3800100
N
W
E
S
Mohmand Agency Road
PROJECT BOUNDARY
DHQ GHALANI MOHMAND
0 25 50 100
Meters
NOTE: Landuse parameters have been extracted by visual interpretation using high resolution freely available Google Satellite Imagery.
Legend
Road Network
Project Boundary
Landuse Type:
Barren / Open Area
Builtup Area
Road / Track
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
03
02
01
REV. DATE DESCRIPTION APPROVED
DRAWN M.MUNEEB
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 IV
LANDUSE MAP
SCALE
1:1,500
DATE
JULY-2026
DRAWING No.
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 IV	LANDUSE MAP	SCALE: 1:2,000
		03				SUBMITTED	RAMLA S.			
		02				RECOMMENDED				
		01				CHD/VER.			DATE: JULY-2026	DRAWING No.
		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 IV	LANDUSE MAP	SCALE: 1:4,000
		03				SUBMITTED	RAMLA S.			
		02				RECOMMENDED				
		01				CHD/VER.			DATE: JULY-2026	DRAWING No. / REV.: 0
		REV.	DATE	DESCRIPTION	APPROVED	APPROVED	GHAZANFAR			



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

LANDUSE MAP		SCALE: 1:2,500
DATE: JULY-2026	DRAWING No.	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 - DHQ KHAR, BAJAUR																	
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	0	4	4	2	2	0	2	0	2	9	0
B. Construction Phase																	
Construction Camps & Workshops	4	4	6	4	6	2	4	2	6	6	4	6	8	6	6	9	2
Demolition Works	4	4	12	4	8	0	0	0	8	6	4	6	8	6	6	9	2
Handling of Asbestos	4	6	2	6	6	0	0	6	6	0	0	0	0	0	0	0	0
Material Transport, Storage and Handling	4	4	9	4	6	2	0	0	6	6	4	6	8	6	6	9	2
Structural & Civil Works	4	4	9	4	8	0	0	0	8	6	4	6	8	6	6	9	3
Drainage & Utilities	4	4	6	4	6	0	0	0	4	6	4	6	8	6	6	9	4
Landscaping	0	0	2	2	4	4	2	0	0	0	0	2	2	2	2	9	3
C. Operational Phase																	
Hospital Operations	0	4	4	4	8	0	0	9	9	2	2	4	6	4	2	9	9
Waste Management (incl. biomedical)	4	4	2	6	0	2	2	2	4	0	0	4	2	4	2	9	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	0	2	0	2	0	6
Building Maintenance	2	4	4	2	4	2	0	0	4	0	0	6	2	4	2	9	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 PARACHINAR, KURRAM																	
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	9	0
B. Construction Phase																	
Construction Camps & Workshops	4	4	6	4	6	2	4	2	6	4	4	6	6	6	6	9	2
Demolition Works	4	4	12	4	8	0	0	0	8	2	4	6	6	6	2	9	2
Handling of Asbestos	4	6	2	6	6	0	0	6	6	0	0	0	0	0	0	0	0
Material Transport, Storage and Handling	4	4	8	4	6	2	0	0	6	2	4	6	6	8	2	9	2
Structural & Civil Works	4	4	9	4	8	0	0	0	8	2	4	6	6	6	2	9	3
Drainage & Utilities	4	4	6	4	6	0	0	0	4	2	4	6	6	6	2	9	4
Landscaping	0	0	2	2	4	4	2	0	0	0	0	2	2	2	2	9	3
C. Operational Phase																	
Hospital Operations	0	4	4	4	8	0	0	9	9	2	2	4	6	4	2	9	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 LANDI, KOTAL																	
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	0	4	4	2	2	0	2	0	2	9	0
B. Construction Phase																	
Construction Camps & Workshops	4	4	6	4	6	2	4	2	6	6	6	6	8	6	6	9	2
Demolition Works	4	4	12	4	8	0	0	0	8	6	6	6	8	6	6	9	2
Handling of Asbestos	4	6	2	6	6	0	0	6	6	0	0	0	0	0	0	0	0
Material Transport, Storage and Handling	4	4	9	4	6	2	0	0	6	6	6	6	8	6	6	9	2
Structural & Civil Works	4	4	9	4	8	0	0	0	8	6	6	6	8	6	6	9	3
Drainage & Utilities	4	4	6	4	6	0	0	0	4	6	6	6	8	6	6	9	4
Landscaping	0	0	2	2	4	4	2	0	0	0	0	2	2	2	2	9	3
C. Operational Phase																	
Hospital Operations	0	4	4	4	8	0	0	9	9	2	2	4	6	4	2	9	9
Waste Management (incl. biomedical)	4	4	2	6	0	2	2	2	4	0	0	4	2	4	2	9	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	0	2	0	2	0	6
Building Maintenance	2	4	4	2	4	2	0	0	4	0	0	6	2	4	2	9	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 GHALLANAI, MUHMAND																	
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	8	0
B. Construction Phase																	
Construction Camps & Workshops	4	4	6	4	6	2	4	2	6	4	8	6	6	6	6	8	2
Demolition Works	4	4	12	4	8	0	0	0	8	4	8	6	6	6	6	8	2
Handling of Asbestos	4	6	2	6	6	0	0	6	6	0	0	0	0	0	0	0	0
Material Transport, Storage and Handling	4	4	8	4	6	2	0	0	6	4	8	6	6	8	6	8	2
Structural & Civil Works	4	4	9	4	8	0	0	0	8	4	8	6	6	6	6	8	3
Drainage & Utilities	4	4	6	4	6	0	0	0	4	4	8	6	6	6	6	8	4
Landscaping	0	0	2	2	4	4	2	0	0	0	0	2	4	2	2	8	3
C. Operational Phase																	
Hospital Operations	0	4	4	4	8	0	0	9	9	2	2	4	4	4	2	8	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 MIRANSHAH, NORTH WAZIRISTAN																	
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	9	0
B. Construction Phase																	
Construction Camps & Workshops	6	6	6	4	6	2	4	2	6	4	6	6	6	8	6	9	2
Demolition Works	6	6	12	4	8	2	0	0	8	4	6	6	6	4	6	9	2
Handling of Asbestos	4	6	2	6	6	0	0	6	6	0	0	0	0	0	0	0	0
Material Transport, Storage and Handling	6	6	8	4	6	2	0	0	6	2	6	4	2	8	6	9	2
Structural & Civil Works	6	6	9	4	8	2	0	0	8	4	6	8	6	8	6	9	3
Drainage & Utilities	6	6	6	4	6	2	0	0	4	2	6	6	2	8	6	9	4
Landscaping	0	0	2	2	4	4	2	0	0	0	0	2	2	2	2	9	3
C. Operational Phase																	
Hospital Operations	0	4	4	4	8	0	0	9	9	2	2	4	6	4	2	9	9
Waste Management (incl. biomedical)	4	4	2	6	0	2	2	2	4	0	0	4	2	4	2	9	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	9	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 WANA, SOUTH WAZIRISTAN																	
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	9	0
B. Construction Phase																	
Construction Camps & Workshops	6	6	6	4	6	2	4	2	6	4	6	6	6	8	6	9	2
Demolition Works	6	6	12	4	8	0	0	0	8	4	6	6	6	4	6	9	2
Handling of Asbestos	4	6	2	6	6	0	0	6	6	0	0	0	0	0	0	0	0
Material Transport, Storage and Handling	6	6	8	4	6	2	0	0	6	2	6	4	2	8	6	9	2
Structural & Civil Works	6	6	9	4	8	0	0	0	8	4	6	8	6	8	6	9	3
Drainage & Utilities	6	6	6	4	6	0	0	0	4	2	6	6	2	8	6	9	4
Landscaping	0	0	2	2	4	4	2	0	0	0	0	2	2	2	2	9	3
C. Operational Phase																	
Hospital Operations	0	4	4	4	8	0	0	9	9	2	2	4	6	4	2	9	9
Waste Management (incl. biomedical)	4	4	2	6	0	2	2	2	4	0	0	4	2	4	2	9	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	9	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 MISHTI MELA, ORAKZAI																	
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	4	0
B. Construction Phase																	
Construction Camps & Workshops	4	4	6	4	6	2	4	2	6	4	6	6	4	6	6	4	2
Demolition Works	4	4	12	4	8	0	0	0	8	2	6	6	4	6	2	4	2
Handling of Asbestos	4	6	2	6	6	0	0	6	6	0	0	0	0	0	0	0	0
Material Transport, Storage and Handling	4	4	8	4	6	2	0	0	6	2	6	4	4	8	2	4	2
Structural & Civil Works	4	4	9	4	8	0	0	0	8	2	6	6	4	6	2	4	3
Drainage & Utilities	4	4	6	4	6	0	0	0	4	2	6	6	4	6	2	4	4
Landscaping	0	0	2	2	4	4	2	0	0	0	0	2	2	2	2	4	3
C. Operational Phase																	
Hospital Operations	0	4	4	4	8	0	0	9	9	2	2	4	6	4	2	4	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 IEE 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 IEE 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;

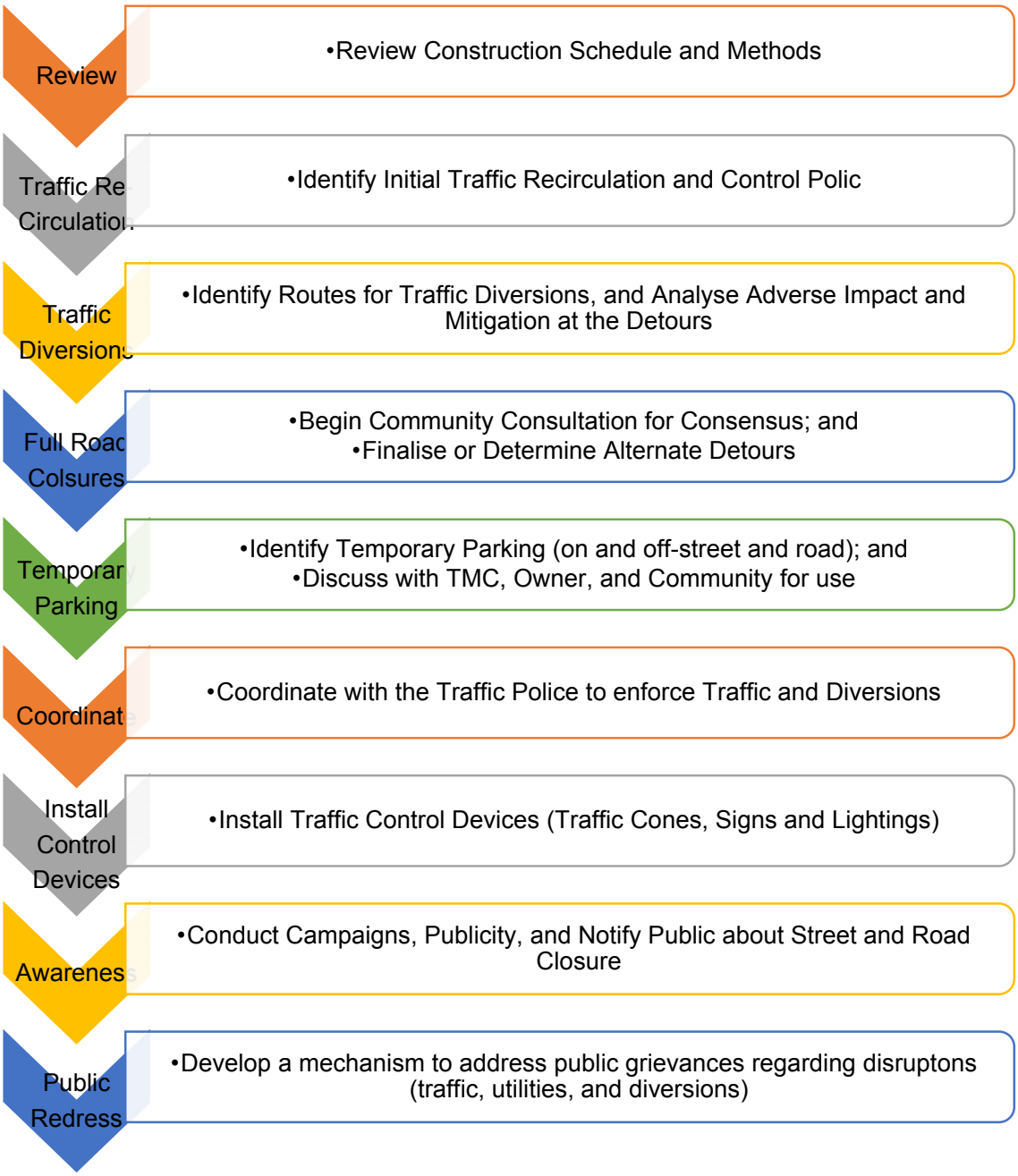


Figure 1: Policy Steps for the TMP

- 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.

ANNEXURE-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 KPHSSP. 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, infection-control 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.

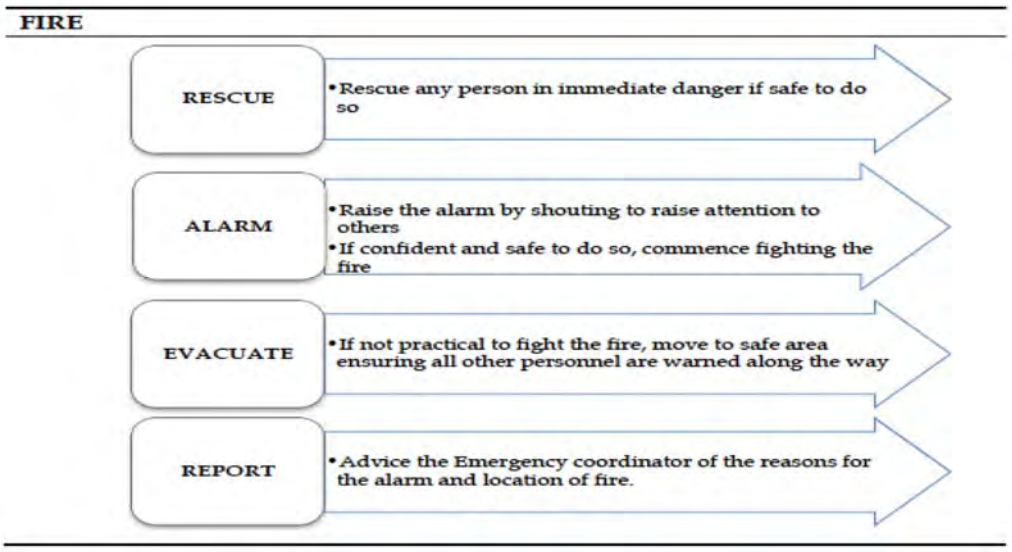


Figure 1: Emergency Procedures for Fire

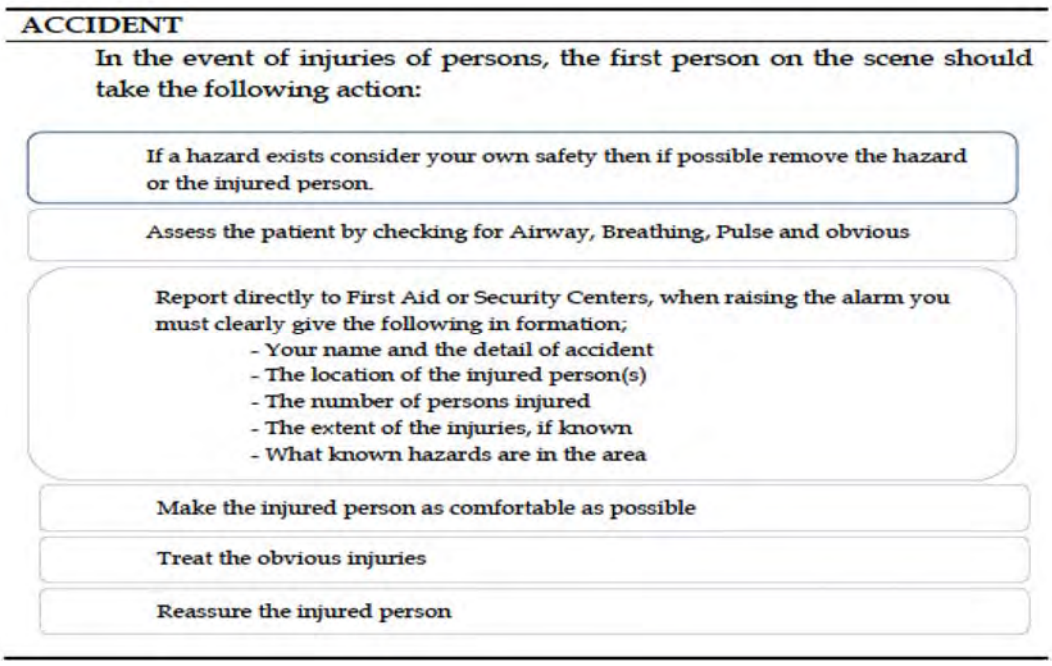


Figure 2: Emergency Procedures for Serious Accident

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**.

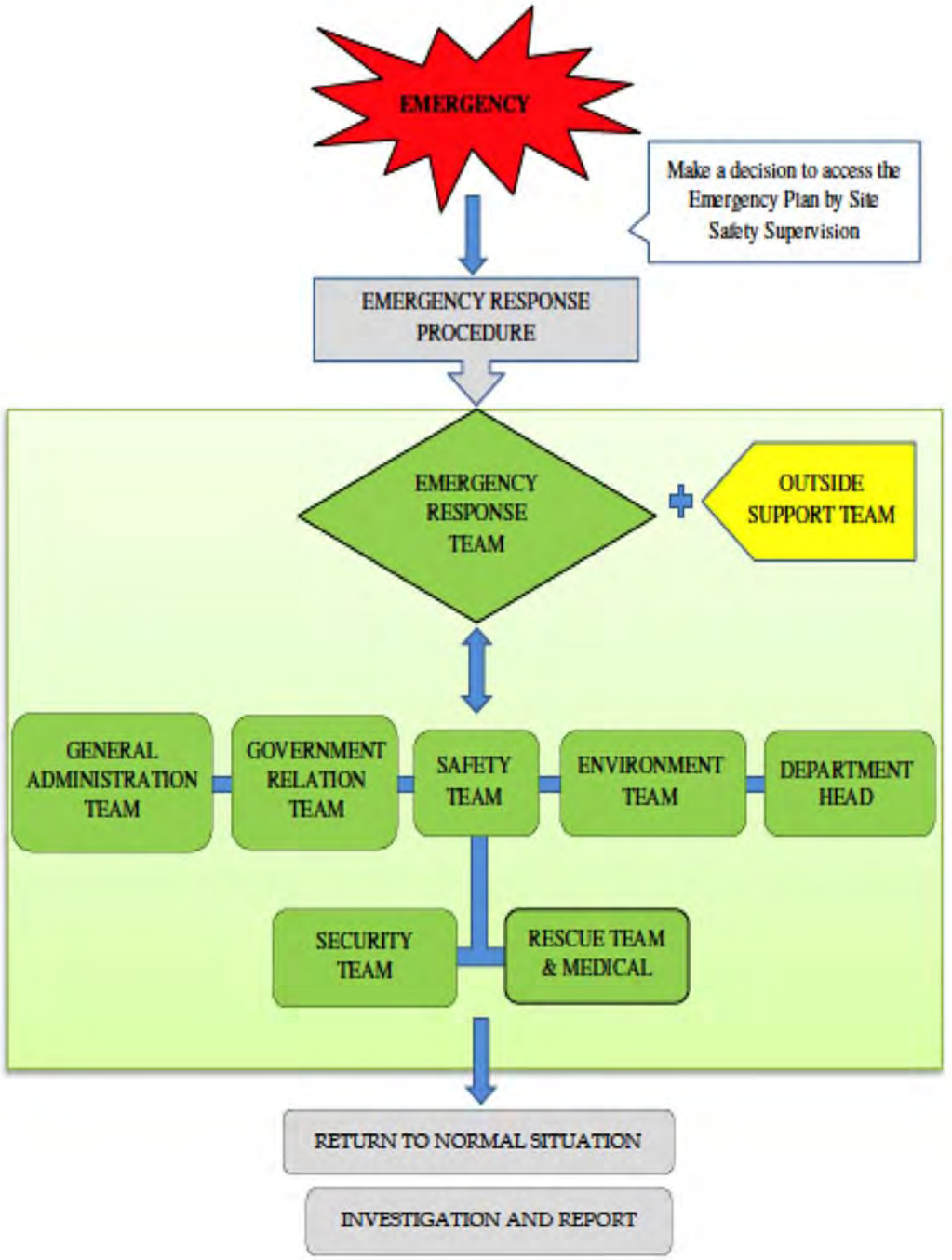


Figure 3: Emergency Response Procedure

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:	Date of Birth: Month	Day	Year	Age:	Regular Job Title:	Experience: In this job title Years	Weeks	In this Project Years	Weeks
	☐ Male ☐ Female									

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:	Date of Birth: Month	Day	Year	Age:	Regular Job Title:	Experience: In this job title Years	Weeks	In this Project Years	Weeks
	☐ Male ☐ Female									

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 small scale 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: LIST OF CONSULTATION PARTICIPANTS

NATIONAL ENGINEERING SERVICES OF PAKISTAN (PVT) LIMITED

Date 28-04-2026 List of Participants DH @ Orakzai

Sr. No.	Name/Father Name	Occupation	Signature/ Thumb
1	Abdul Rehman	Private Job	
2	Hidayat ullah	Private Job	
3	Hazir ullah	Unemployee	
4	Abdul Wahab	Govt Job	
5	Aurangzaib	Private Job	Aurangzeb
6	Muhammad Riaz	//	
7	Muhammad Ayub	//	Ayub

NATIONAL ENGINEERING SERVICES OF PAKISTAN (PVT) LIMITED

Date 29-04-2026 List of Participants DHQ Ghalanai

Sr. No.	Name/Father Name	Occupation	Signature/ Thumb
1	Muhammad Ayaz	Private Job	M. Ayaz
2	Bakhtawar Shah	Govt Job	Bakhtawar
3	Gull Said	Govt Job	
4	Mahammad Akram	Govt Job+Farmer	M Akram
5	Muzafar khan	Govt Job+Farmer	Muzafar
6	Muhammad Kamran	Govt Job + Farmer	
7	Ijaz Khan	Govt Job	Ijaz Khan
8	Sakhawat Khan	Govt Job	Sakhawat
9	Noor Shah	Govt Job	

NATIONAL ENGINEERING SERVICES OF PAKISTAN (PVT) LIMITED

Date 17-04-2026 List of Participants DHQ Landi Kotal

Sr. No.	Name/Father Name	Occupation	Signature/ Thumb
1	Sam-ul-Ah	Govt. Job	
2	Fawad Khan	Govt Job	
3	Ali Shah	Govt Job	
4	Dalya Khan	Private Job	
5	Tariq Khan	Govt Job	
6	Mujeeb-ur-Rehman	Govt Job	
7	Ali Rehman	Private Job	
8	Guldad Khan	Private Job	
9	Masood Khan	Private Job	

NATIONAL ENGINEERING SERVICES OF PAKISTAN (PVT) LIMITED

Date 29-04-2025 List of Participants DHQ Bajaur

Sr. No.	Name/Father Name	Occupation	Signature/ Thumb
1	Tariq Javed	Govt Job	
2	Gul Zaman	Govt Job	
3	Zahir-ul-Haq	Govt Job	
4	Jahanzaib	Businessman	
5	Ibrahim	Govt Job	
6	Noor Badshah	Govt Job	
7	Zafar-Ullah	Govt Job	
8	Shehzad Khan	Govt Job	

ANNEXURE-XV: TREE PLANTATION PLAN

Tree Plantation Plan

Introduction

This is general Tree Planation Plan for Hospitals of the Seven (07) 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-XVI: 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. In addition to the First Aid kits, the following measures will be in place:

- A designated Environment, Health and Safety Specialist 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?